## EuroPREvent 2009 Congress Abstracts

### Abstract Session Category

#### Thursday, 7 May 2009

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<tr>
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Welcome Address

Welcome to EuroPRevent 2009, the European meeting place for science in preventive cardiology. This congress marks the end of a five-year period of political activity at the highest EU level, starting off with the first initiative under the Irish presidency in 2004 and culminating with the presentation of the European Heart Health Charter at the European Parliament in June 2007. Time to meet and evaluate the outcomes!

For three and a half days, EuroPRevent 2009 will provide an innovative meeting format for all partners in prevention: scientists, health workers and others active in the field of preventive cardiology.

On Wednesday, pre-congress sessions will be offered for family doctors, occupational health physicians, school health staff, nurses, physiotherapists, heart foundations and decision makers.

Thursday is the genuine European prevention forum, where all partners will gather around the eight main themes of the Heart Health Charter for broad State of the Art lectures and for update demonstration projects.

Friday and Saturday will be dedicated to in-depth scientific sessions and the presentation of new research. High visibility will be given to the abstract based portion of our scientific programme. The congress includes a Young Investigator Award Session, “Meet the Expert” early morning discussions and Satellite Symposia from our Industry Partners. Among the many novelties, our visitors will find an “ongoing science” session and a Highlight Session at the end of the meeting.

In the Nordic countries visitors appreciate the traditional “Smörgåsbord”, a broad variety of delicious small dishes that fits the taste of many, even the most demanding gourmets. EuroPRevent 2009 will prove to be a true scientific Smörgåsbord with the ‘Venice of the North’ offering her spectacular springtime scenery.

Prof. David Wood
President of the European Association for Cardiovascular Prevention and Rehabilitation (EACPR)

Prof. Joep Perk
Congress Programme Committee Chairperson

Committees

EACPR Board Member
David Wood, EACPR President

Congress Programme Committee
Joep Perk, Chairperson

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Torben Jorgensen, Prevention & Health Policy
Ulf Landmesser, Basic Science
Josef Niebauer, Cardiac Rehabilitation

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Jorma Viikari FI
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Dumitru Zdrenghea RO
Tomasz Zdrojewski PL
Abstract Statistics:

Topic list 2009:

- Behavioural medicine
- Biomarkers
- Cardiovascular epidemiology
- Cardiovascular rehabilitation
- Controlled clinical trials
- CVD surveillance
- Diabetes
- Early detection of asymptomatic disease
- Exercise physiology, testing and training
- Genetic-environmental interactions
- Health economics
- Health services research
- Heart disease
- Hypertension
- Imaging in atherosclerosis
- Lipids and atherosclerosis
- Methodology and statistics
- Nutrition
- Obesity
- Occupational health
- Peripheral vascular disease
- Pharmacoepidemiology
- Physical activity
- Prevention of CVD
- Psychosocial factors and stress
- Public health
- Quality of life
- Quality of care and outcomes research
- Risk factors and risk prediction
- Socio-demographic factors
- Sports cardiology
- Stable angina pectoris
- Stroke
- Sudden Cardiac Death
- Tobacco

Abstract submission:

Global:

EuroPRevent 2009 Stockholm, Sweden: 719 Abstracts Submitted
EuroPRevent 2008 Paris, France: 774 Abstracts Submitted

Top Ten submitted topics:
# Abstracts submitted per topic 2008 - 2009:

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Abstracts submitted per country 2008 - 2009:
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Selected Abstracts:

Abstract acceptance:
452 abstracts were selected for presentation to EuroPRevent 2009

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Abstracts accepted – presentation format:

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K Bennett1, I Perry1, H Hegge2, K Morgan2, E Shelley2, S Jennings3, S Capewell3
1St James Hospital, Dublin, Ireland, 2University College Cork, Cork, Ireland, 3Royal College Surgeons of Ireland, Dublin, Ireland, 0883, Dublin, Ireland, 4University of Liverpool, Liverpool, United Kingdom

Topic: Cardiovascular epidemiology

Objective: to estimate 20-year population-wide trends in systolic blood pressure (SBP), diastolic blood pressure (DBP), total cholesterol and HDL cholesterol in British men, and investigate the contribution of medication use to these changes.

Methods: prospective study of cardiovascular disease in a socially and geographically representative cohort of middle-aged men drawn from 24 General Practices across Britain. SBP, DBP, total cholesterol and HDL cholesterol were measured at baseline (1978-80), when men were aged 40-59 years, and after a 20-year interval (1998-2000, aged 60-79 years). Use of blood pressure lowering drugs or lipid-lowering drugs was determined from questionnaires at five intervals over the 20 years.

Results: of 7735 men originally recruited, 4252 men were followed up at 20 years. Of these, 1573 (37%) reported use of blood pressure lowering drugs and 344 (8.15%) reported use of lipid-lowering drugs at some point over the 20 years. Overall, adjusting for age, mean SBP fell by -7.6mmHg (95% CI -9.7 to -5.4) while mean DBP rose by +3.3mmHg (95% CI -2.2 to +4.5) over the 20 years. Mean total cholesterol fell by -0.1mmol/L (95% CI -0.3 to -0.08) and mean HDL cholesterol rose by +0.06mmol/L (95% CI +0.13 to +0.09). The trends in SBP and DBP varied according to blood pressure lowering drug use: SBP fell significantly by -12.3mmHg (95% CI -14.7 to -9.9) among men on medication, compared with a non-significant fall of -1.6mmHg (95% CI -3.7 to +0.4) in men not on medication (p=0.01 for medication-time interaction). DBP fell non-significantly, by -1.2mmHg (95% CI -2.5 to -0.07), among medication users but increased markedly, by +7.6mmHg (95% CI +6.6 to +8.8) among men not on medication (p=0.001 for interaction). The trend in total cholesterol varied according to lipid-lowering drug use: total cholesterol fell by -1.6mmol/L (95% CI -3.8 to -0.4) among medication users, and fell by +0.06mmol/L (95% CI 0.2 to +0.03) among men not on medication (p=0.01 for interaction). The trend in HDL cholesterol did not vary appreciably according to lipid-lowering drug use (p=0.2 for interaction).

Conclusions: improvements in SBP and total cholesterol were largely confined to medication users, suggesting that the favourable secular changes in these cardiovascular risk factors are primarily attributable to medication use. Conversely, lifestyle changes may be more important for improving HDL cholesterol, which increased regardless of medication use. Greater efforts are needed to reduce blood pressure, in particular DBP, and total cholesterol levels among the general population.

M14 Abdominal obesity and a risk of hypertension in children and adolescents
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Topic: Obesity

Objective: to assess the association between abdominal obesity and hypertension in children and adolescents in Europe.

Methods: we calculated the differences in waist circumference (WC) among age- and gender-stratified children and adolescents from the ECRH (European Community Health Survey) datasets 1999, 2000, and 2002. WC was measured in a standardized way at the level of the iliac crest at the end of expiration. Abdominal obesity was defined as WC >85th percentile for age. Hypertension was defined as systolic blood pressure (SBP) >130mmHg and/or diastolic blood pressure (DBP) >85mmHg.

Results: in boys, WC >85th percentile was associated with significantly higher SBP and DBP compared to those with WC <85th percentile (SBP: increasing WC, adjusted β=0.89 (95% CI 0.87-0.92); DBP: increasing WC, adjusted β=0.76 (95% CI 0.73-0.80)). In girls, WC >85th percentile was associated with significantly higher SBP (SBP: increasing WC, adjusted β=0.74 (95% CI 0.72-0.76)) compared to those with WC <85th percentile. There was a significant gender difference, with SBP and DBP levels in boys with WC >85th percentile being significantly higher compared to girls with WC >85th percentile (SBP: boys: adjusted β=0.89 (95% CI 0.87-0.92); girls: adjusted β=0.74 (95% CI 0.72-0.76)).

Conclusions: abdominal obesity is associated with increased blood pressure in children and adolescents. Early interventions targeting abdominal obesity may have a positive impact on blood pressure levels.
M16  Genetic variants at rs99839 modulate serum lipids levels and the risk of myocardial infarction in the Stockholm Heart Epidemiology Programme
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**Topic:** Lipids and atherosclerosis

Several anonymous genetic loci have been recently found to modulate serum lipids levels, a heritable risk factor for cardiovascular diseases. The aim of the present study was to investigate if one of the recently identified genetic variants, rs99839AG, influences the risk of myocardial infarction (MI) through a regulation of and interaction with serum lipids in the Stockholm Heart Epidemiology Programme (SHERP). Genotype and allele frequencies at rs99839 did not differ among MI cases and controls either in men (n=852/1084) or in women (n=561/597). Serum lipids were stratified according to rs99839 genotype and differences among groups were assessed by Kruskall Wallis test. In male cases, presence of the GG genotype was associated with reduced total cholesterol (mM/0.003), GG: 5.60 (4.86-6.98) vs AA: 6.10 (5.56-9.90), p=0.003. LDL-cholesterol (mM/0.003): GG: 3.64 (3.0-4.91) vs AA: 4.22 (3.67-4.80), p=0.001 and ApoB serum levels (g/1.22±1.71) vs AA: 1.63 (1.38-1.83), p=0.01. We then tested, through a logistic regression analysis, if genetic variants at rs99839 locus modulated the risk of MI through an interaction with total-, LDL-cholesterol and ApoB serum levels. Presence of GG/GA genotype was associated with a significant reduction of MI risk in men exposed to high (>75th percentile) ApoB serum levels (β-coefficient:3.64, SEM:0.34, p=0.002). Our study extends previous knowledge on the relationship between the rs99839 locus and serum lipids levels. It also suggests that the effect exerted by rs99839 on plasma lipids might contribute to a decreased risk of MI in men.

M17  Non-fasting triglycerides are associated with increased risk of cardiovascular deaths in women
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**Topic:** Cardiovascular epidemiology

**Purpose:** The nature of the association between triglycerides and cardiovascular diseases is still not fully elucidated. The objective was to determine the association of non-fasting serum triglycerides and the risk of future cardiovascular deaths.

**Methods:** The Norwegian Counties Study is a prospective cardiovascular study comprising three consecutive cardiovascular screenings performed in 1974-78, 1977-83 and 1985-88 in three Norwegian counties. A total of 2,61 men and women aged 20-80 years initially free for cardiovascular disease were included, and followed until end 2004. The endpoints were total deaths and deaths due to cardiovascular disease (CVD), ischemic heart disease (IHD), or stroke. The Cox proportional hazards model was used to estimate hazard ratios (HR) over quintiles of triglycerides. Adjustments were made for systolic blood pressure, BMI, smoking (yes/no), total cholesterol, physical activity, time since last meal, and menopausal status. All analyses were adjusted for age, smoking, systolic blood pressure, diabetes, total cholesterol and body mass index.

**Results:** During follow-up a total of 796 men and 4,227 women died. Of these, 3,14 men and 1,085 women of CVD; 292 men and 503 women of ischemic heart disease (IHD), 417 men and 292 women of stroke. Increasing levels of non-fasting TG were associated with increasing levels of classical risk factors in both men and women. Significant age-adjusted HRs across triglyceride quintiles for death of both women and men (p<0.001 for trend), and were most pronounced for CVD and IHD deaths. After adjustment for other risk factors, the effect was attenuated for all endpoints in men. For women, however, there were significant increases in HRs across triglyceride quintiles for death of all causes, CVD and IHD (p<0.001 for trend), but not stroke.

**Conclusion:** Non-fasting triglycerides were associated with increased risk for cardiovascular death among women, but not men, in this large prospective cohort study.

M18  Alcohol consumption in relation to vascular and total mortality in patients at high cardiovascular risk: a meta-analysis
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**Topic:** Cardiovascular epidemiology

**Purpose:** Moderate alcohol consumption in healthy people is associated with lower vascular and total mortality. Data on the association of alcohol intake with secondary events in patients at high cardiovascular risk are scarce and controversial. We have performed three meta-analyses to clarify the relationship of alcohol doses with vascular morbidity and mortality, and all-cause mortality in patients at high-risk for cardiovascular events.

**Methods:** Articles were retrieved from those listed until July 2008 by searches within the Medical Subject Heading (MeSH) terms cardiovascular disease, diabetes, hypertension and patients in combination with the MeSH terms or text words alcohol drinking, wine, beer, spirits, mortality, morbidity, survival, and death, supplemented by references of the selected articles. Two independent reviewers selected 24 observational studies including more than 20,000 patients with a history of vascular disease, diabetes or hypertension. Data were pooled with a weighted, least-squares regression analysis of second-order fractional polynomial models. Random model was chosen to describe the pooled effects, while sensitivity analysis were performed by fixed models.

**Results:** A J-shaped pooled curve was consistently observed in all three meta-analyses, and in subgroups according to different types of patients or main characteristics of the studies. Drinking in moderation was associated with an almost 20% lower risk of secondary events, with a maximal effect at a typical intake of 1 to 4 daily servings of alcohol. Special attention was paid in characterising patients with previous coronary or cerebrovascular events. In two meta-analyses on total and vascular mortality, six studies (including more than 12,000 patients) were pooled and moderate alcohol consumption (up to 10 grams/day) appeared to reduce risk (maximal reduction: 22%, 95% CI: 13-30% on cardiovascular mortality and 18%, 95% CI 11-25 on total mortality). The two dose-response curves were similar for both meta-analyses.

**Conclusions:** Low to moderate alcohol consumption is significantly associated with a reduced incidence of secondary fatal (any cause) and non-fatal (vascular) events in patients at high cardiovascular risk. Our findings confirm the hazard of excess drinking.
Circulating adiponectin levels in chronic heart failure patients independently predict hospital admission within 2 years and can be reduced by physical training

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Topic: Biomarkers

Background: adiponectin is an insulin-sensitising, anti-inflammatory and anti-atherogenic adipocytokine. However, recent evidence suggests high adiponectin levels as an independent predictor of mortality in chronic heart failure (CHF) patients (pts). Modification of adiponectin levels in CHF pts has not been studied. We aimed to assess the prognostic value of circulating adiponectin concentrations in CHF pts and evaluated the effects of physical training.

Methods: sixty-one CHF pts and 10 healthy subjects underwent clinical assessment, echocardiography and cardiopulmonary exercise testing. Circulating concentrations of adiponectin, NT-pro-BNP and lipoproteins were measured. The effect of 4 months exercise training on adiponectin levels was studied in a subgroup (n=42). In addition, adiponectin was assessed twice (similar time interval) in an untrained control CHF group (n=19). After 2 years, the hazard ratio (HR) of adiponectin for CHF related hospitalisations, mortality and heart transplantation in the trained CHF pts was estimated using multivariable Cox regression analysis.

Results: adiponectin levels were higher in the CHF vs healthy subjects (11.78 mg/L ±0.85 vs 6.57 mg/L ±1.09, mean ± SEM, P=0.017). Stratification of CHF pts according to tertiles of NT-pro-BNP revealed an increase of adiponectin with disease severity (7.50 mg/L ±1.11 vs 11.08 mg/L ±1.31 before similar time interval, P=0.024 for time x group interaction).

Exercise training reduced circulating adiponectin levels in CHF pts (12.27 mg/L ±1.08 before, 11.08 mg/L ±1.13 after training), whereas no changes were observed in the untrained control CHF group (10.70 mg/L ±1.31 before, 11.94 mg/L ±2.03 after similar time interval, P=0.0001).

Exercise training following similar time interval in a subgroup in an untrained control CHF group (n=42). In addition, adiponectin was assessed twice (similar time interval) in an untrained control CHF group (n=19). After 2 years, the hazard ratio (HR) of adiponectin for CHF related hospitalisations, mortality and heart transplantation in the trained CHF pts was estimated using multivariable Cox regression analysis.

Conclusions: significantly higher circulating adiponectin concentrations were found in CHF pts with more severe CHF. High adiponectin levels predict hospital admission within 2 years in CHF pts independently of well-established and novel prognostic factors. This is the first report showing the beneficial effect of exercise training on adiponectin levels in CHF pts.

Prevalence and significance of silent myocardial ischaemia in patients with type 2 diabetes and dyslipidemia

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Topic: Heart disease

Objectives were to compare the prevalence of silent myocardial ischaemia (SI) in asymptomatic diabetes mellitus (DM) patients with and without dyslipidemia and to investigate the relationships between baseline SI, dyslipidemia and future coronary heart disease events.

Methods: The study was performed on 196 patients with type 2 DM and no history or symptoms for coronary heart disease. All patients were evaluated at baseline and were followed-up prospectively for 3 years for major cardiac events: sudden cardiac death and acute myocardial infarction (AMI). Data recorded: age, sex, duration of DM, smoking status, DM treatment, BMI, blood pressure and blood testing for: HbA1c, lipids (cholesterol total, LDL and HDL, triglycerides). Treadmill exercise ECG and Holter ECG were performed at baseline for SI detection.

Results: SI was present in 42 patients (21.4%) and 17 patients positive treadmill exercise ECG (40.5%), 4 patients had positive Holter ECG (9.5%) and in 21 patients (50%) ischemia was detected with both methods. Dyslipidemia was present in 33 patients with SI (83.3%) and in 127 patients without SI (62,5%). SI occurred in 7 patients without dyslipidemia (16.7%) and 27 patients had no SI and no dyslipidemia (17,5%). Treadmill exercise test was positive in 33 patients with dyslipidemia (20,4%) and in only 5 patients without dyslipidemia (14,7%) and in 13 patients dyslipidemia (25,9%) and in only 2 patients without dyslipidemia (8,5%) [RR=5,4). At follow-up there have been 16 major cardiac events (8,2%): 11 AMI (5,6%) and 5 cardiac deaths (2,6%). Major cardiac events were more frequent in patients with SI 16,7% vs 5,5% [RR=3,04. In patients with SI AMI was more frequent 9,5% vs 4,5% [RR=2,1) and deaths were more frequent 7,1% vs 1,9% [RR=5,4). All patients with SI and major cardiac events had dyslipidemia. Patients with SI and dyslipidemia had the greatest rate of cardiac events, incidence of AMI was 11,4% vs patients with dyslipidemia but no SI, where incidence of AMI was 4,7% [RR=2,4). Deaths occurred in 8,5% patients with SI and dyslipidemia vs 1,6% of patients with dyslipidemia but no SI [RR=5,4). In the group of patients without SI and dyslipidemia only 3 AMI occurred (3,3%) and no deaths.

Conclusions: The presence of dyslipidemia in DM asymptomatic patients is associated with increased risk for the presence of SI. The association of SI and dyslipidemia is significantly related to future coronary events in asymptomatic patients with type 2 DM. This study suggests that SI and dyslipidemia are useful in risk stratification of asymptomatic patients with type 2 DM.
P22
Five-year changes in physical activity level are associated with changes in cardiovascular biomarkers. The Inter99 study
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Purpose: Finland is a bilingual country, where the Swedish-speaking minority has a higher socioeconomic status (SES) and longer life expectancy than the Finnish-speaking majority. We aimed to study the differences in the morbidity and mortality of myocardial infarction (MI) between these language groups in the city of Turku, southwestern Finland, taking into account the socioeconomic differences between the language groups.

Methods: The population-based FINMONICA and FINAMI MI registers recorded 4,845 (4,607 among Finnish-speaking and 238 among Swedish-speaking inhabitants) MI events among people aged 35-99 years in Turku during the eleven-year period 1988-1999. Record linkage of the register data with the files of Statistics Finland provided us with information on these persons’ native language and the indicators of SES. Corresponding information for the back-ground population of the city of Turku was obtained as well. SES was measured by taxable persons’ native language and the indicators of SES. Data were analysed by multiple regression analyses with five-year age of cardiovascular biomarkers as outcome and change in physical activity level as explanatory variable. Sex, age, change in smoking status, diet and alcohol consumption, intake of systolic blood pressure or log-transformed HDL concentration in men only. Women’s use of hormone substitution may be partly responsible for this gender difference.

P23
Myocardial infarction morbidity and mortality among Finnish-speaking majority and Swedish-speaking minority in Turku, Finland
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Results: The attack rate of MI was lower among the 15-64 years old Swedish-speaking men than among Finnish-speaking men of the same age (RR 0.63, 95% CI 0.35-0.91) but the difference did not remain statistically significant after adjustment for the indicators of SES. Similar trends could be seen in the figures on morbidity and mortality of the older age groups (65 years and older). However, these results were not statistically significant.

Conclusions: The Swedish-speaking inhabitants of Turku had lower MI morbidity and mortality than the Finnish-speaking inhabitants. Much of this difference was due to the higher SES of the Swedish-speaking inhabitants. After controlling for SES, some difference remained among men, suggesting that other factors may also play a role.

P24
The significance of angina pectoris symptoms among middle-aged employees: a register-based follow-up study using data on cardiovascular medication and hospitalisation
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Purpose: The main aim was to examine self-reported symptoms of angina pectoris (AP) against register-based information on nitrate prescriptions, special reimbursements for coronary heart disease and related medication, and hospitalisations due to cardiovascular procedures and complications. A second aim was to examine the usefulness of register data in identifying patients with reported symptoms. A third aim was to examine the gender paradox in angina with women reporting more symptoms but men having more clinical coronary outcomes.

Methods: Data were derived from administrative registers linked to questionnaires filled in by 4656 45-year-old employees of the City of Helsinki (n=6606) in 2002. Written consent was asked to conduct these linkages using the unique personal identification numbers. Register data were available for 1999-2006 from the Finnish Social Insurance Institution (special reimburse-ment register data and prescription data) and from the National Development Centre for Welfare and Health (hospital discharge data). AP symptoms were assessed by the Rose Questionnaire.

Results: Six percent of men and four percent of women reported AP symptoms. However, nitrate and other medication, special reimbursements, and hospital care were more prevalent among men than women. Nitrates were more often prescribed to both women and men who reported AP symptoms. Additionally, women and men with AP symptoms were more likely to have had hospital admissions due to ischemic heart disease as compared to their counterparts not reporting symptoms. Special reimbursements for hypertension, hyperlipidaemia, diabetes, and clinically established coronary heart disease were also all more prevalent among those reporting AP symptoms.

Conclusions: Self-reported AP symptoms reflected register-based coronary outcomes in these data. However, gender differences in register-based outcomes were clear. This may indicate either inequality or delay in access to treatment, problems in identification and diagnosis, or a more complex nature of self-reported symptoms among women. Focusing on register-based information only, data on medication and hospitalisation are likely to reflect self-reported symptoms.

P25
The M235T polymorphism in the AGT gene and CHD risk: evidence of a Hardy-Weinberg equilibrium violation and publication bias in an updated meta-analysis and meta-regression
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Purpose: To study relation between the M235T polymorphism in the AGT gene and risk of coronary heart disease (CHD).

Methods: A case-control study was conducted in 1,732 unrelated middle-aged women (210 CHD cases and 1,522 controls) from a prospective cohort of 15,266 initially healthy Dutch women. To evaluate the association, a comprehensive meta-analysis were undertaken of all studies published up to February 2007.

Results: In the case-control study, no increased risk for CHD was found under the additive genetic model (HR=1.20, 95% CI 0.86 to 1.68, P=0.38). This result was not changed by adjustment (HR=1.17, 95% CI 0.83 to 1.64, P=0.38) nor by using dominant, recessive and pairwise genetic models. Analyses for AMI risk under the additive genetic model also did not show any statistically significant association (crude HR=1.49, 95% CI 0.93 to 1.39, P=0.20). The meta-analysis (38 studies with 13284 cases and 18722 controls) showed a per-allele odds ratio (OR) of 1.08 (95% CI 1.01 to 1.16, P=0.02); Hardy-Weinberg equilibrium (HWE) violation and the mean age of cases were statistically significant sources of the observed heterogeneity. In a stratification of non-HWE violation studies, there was no effect. An asymmetric funnel plot, the Egger’s test (P=0.066), and the Begg-Mazumdar test (P=0.074) were all suggestive of the presence of publication bias.

Conclusions: The pooled OR of the present meta-analysis, including our own data, presented evidence that there is an increase in the risk of CHD conferred by the M235T variant of the AGT gene. However, the relevance of this weakly positive overall association remains uncertain because it may be due to various residual biases, including HWE-violation and publication biases.
P26
Endothelial function in a healthy Norwegian population
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Topic: Cardiovascular epidemiology

Purpose: Endothelial dysfunction is a risk factor for atherosclerosis and may be present long before clinical manifestation. Normal values for endothelial function tested as flow-mediated dilation (FMD) have not been established. The aim of our study was to establish normal values for FMD in age and gender groups in a population without clinical established atherosclerosis.

Method: As part of the Nord-Trondelag Health Survey (HUNT) we tested FMD in the left brachial artery in 4379 healthy adults (47% men, 53% women) and 164 teenagers. We measured basal diameter (BD) before arterial occlusion for 5 minutes. Sixty sec after cuff deflation we measured post-diameter (PD). Percent difference between PD and BD gives FMD. Gender differences were analysed by two sample t-test and differences of age groups and genders by two way ANOVA. Analysis was repeated after exclusion of FMD values ≤ 0.

Results: Mean FMD in men over 19 years was 4.3 (SD 3.9) and in women 5.3 (SD 4.3), p<0.001. ANOVA: significant difference (p<0.001), but stronger impact of age group (F=18) than gender (F=6.3). Table presents results for all groups. After exclusion of FMD <0 mean FMD in men over 19 years was 5.4 (SD 3.2) and in women 6.5 (SD 3.8), p<0.001. ANOVA still displayed significant difference (p<0.001) but stronger impact of gender than age group.

Conclusion: Women have higher FMD than men, both with a steady decline with increasing age, genders crossing at age above 60 years. Age over 80 years have higher FMD than age between 50 and 79 years, suggesting survival in favour of preserved FMD and a proportion with subclinical atherosclerosis in the latter. This is in accordance with the mean FMD in this age groups after exclusion of FMD values ≤0 which results in FMD values no lower than 5.1 in men and 5.2 in women (both 70-80 years).

P27
Smokeless tobacco (snus) and risk of heart failure in a community-based sample of elderly men
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Topic: Cardiovascular epidemiology

Objectives: Swedish moist snuff (‘snus’) is marketed as a safer alternative to smoking, and its use increases. Based on its documented effect on blood pressure we hypothesised that snus use increases the risk for heart failure independently of established risk factors, and that the risk elevation is similar to or greater than that associated with smoking.

Methods: A re-investigation at age 70 in a community-based cohort study, information about snus use was collected in 1076 men free from previous heart failure. Risk of a first hospitalisation for heart failure among snus users relative to non-users was investigated using Cox proportional hazards models.

Results: During a median follow-up time of 8.9 years, 95 men were hospitalised for heart failure for the first time. In a model adjusting for baseline smoking dose, pack-years of smoking, systolic blood pressure, antihypertensive drug use, diabetes, body mass index, left ventricular hypertrophy by ECG, occupation, alcohol use and myocardial infarction during follow-up (as a time-dependent covariate), snus use was associated with an increased risk of heart failure (hazard ratio [HR] 2.2, 95% confidence interval [CI] 1.1-4.6). This excess risk was similar to that linked to smoking. A more invasive analysis of ischaemic heart failure as outcome, excluding subjects with a myocardial infarction before baseline and censoring participants at time of a myocardial infarction, snus use was associated with an increased risk (HR 2.6, 95% CI 1.1-6.3).

Conclusion: In this community-based sample of elderly men, snus use was associated with a substantially increased risk of subsequent heart failure.

P28
Australian coronary heart disease mortality trends: the decline is now slowing in young adults
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Topic: Cardiovascular epidemiology

Objectives: coronary heart disease (CHD) mortality rates have been falling for some decades. However, there have been several recent reports of flattening of mortality rates among young adults in the UK and the US. Furthermore, Wilson et al reported a slowing of the rate of decline in Australian CHD mortality rates as early as 1995. To further explore this phenomenon, we have now analysed more recent trends.

Methods: we used mortality data from 1979-2001 (latest available in the WHO mortality database) to calculate overall age-adjusted and age-specific mortality rates for Australia adults aged 35+ years. A ‘joinpoint’ regression was fitted to provide Estimated Annual Percentage Change (EAPC) and to detect points in time where significant changes in the trends occur.

Results: between 1979 & 2001 age-adjusted CHD mortality rates declined by 60% in men (47% in women). A steady decline continued in older groups. Overall, there was an increase in the Estimated Annual Percentage Change (EAPC) of the age adjusted mortality rate for men and women (men, -2.44% 1979 to 1984, -4% 1984 to 1996, women, -0.9% 1979-1985, -2.7% 1985-1994, -4.5% 1994-2001).


In women, a similar pattern occurred, with a significant slowdown starting in 1989 for those aged 35-44 and in 1991 for those aged 45-54 years.

Conclusions: the slowing in CHD mortality rates in men and women, first described in the 1990s has continued AND has also extended to the 44-54 age groups. This may be a cohort effect. Furthermore, similar trends in the UK and the US suggest that this phenomenon is real and widespread. The most probable explanation is recent, adverse trends in major risk factors and that smoking is increasing. Based on its documented effect on blood pressure we hypothesised that snus use increases the risk for heart failure independently of established risk factors, and that the risk elevation is similar to or greater than that associated with smoking.

Methods: A re-investigation at age 70 in a community-based cohort study, information about snus use was collected in 1076 men free from previous heart failure. Risk of a first hospitalisation for heart failure among snus users relative to non-users was investigated using Cox proportional hazards models.

Results: During a median follow-up time of 8.9 years, 95 men were hospitalised for heart failure for the first time. In a model adjusting for baseline smoking dose, pack-years of smoking, systolic blood pressure, antihypertensive drug use, diabetes, body mass index, left ventricular hypertrophy by ECG, occupation, alcohol use and myocardial infarction during follow-up (as a time-dependent covariate), snus use was associated with an increased risk of heart failure (hazard ratio [HR] 2.2, 95% confidence interval [CI] 1.1-4.6). This excess risk was similar to that linked to smoking. A more invasive analysis of ischaemic heart failure as outcome, excluding subjects with a myocardial infarction before baseline and censoring participants at time of a myocardial infarction, snus use was associated with an increased risk (HR 2.6, 95% CI 1.1-6.3).

Conclusion: In this community-based sample of elderly men, snus use was associated with a substantially increased risk of subsequent heart failure.

Abstracts S5

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The Czech Republic, unlike most of the other East European countries, has seen a decrease in total, and cardiovascular (CV) mortality in particular; still CV disease accounts for 45.2% and 55.6% of total mortality in males and females, respectively. The aim of our study was to assess longitudinal trends in major CV risk factors in a representative population sample of the Czech Republic.

Methods: Three cross-sectional surveys of CV risk factors were conducted within the WHO MONICA Project in six Czech districts in 1985 (n = 2570), 1988 (n = 2768), and 1992 (n = 2343). The average daily consumption of wine, beer and spirits was investigated through a standard interview, and smoking habits, systolic blood pressure, total cholesterol, triglycerides, and history of diabetes were also documented. Standardised methods used in the HES-OEC allow trend comparisons between areas at both national and international level. Although these are only preliminary results, OEC trends are similar to those already observed in other countries (e.g. physical inactivity). In combination with other information sources, the OEC may greatly contribute to the evaluation of the efficacy of community actions (smoking ban regulation, introduction of risk assessment in clinical practice and appropriateness of pharmacological treatment).

Parental history of coronary heart disease in a large cohort study from Stockholm

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Karolinska Institute, Stockholm, Sweden

Topic: Cardiovascular epidemiology

Purpose: we investigated the relation between paternal and maternal history of coronary heart disease (CHD), respectively, and risk of CHD in a large population-based cohort of 60-year-old men and women from Stockholm County.

Methods: a cohort of 3740 men and women (participation rate 78%), free from earlier signs and diagnoses of CHD according to questionnaire data, was prospectively followed from baseline 1972-1976, 1972-1980, and 1983-1986.

Results: paternal history of CHD, defined as a CHD diagnosis in the father before the age of 66, was present in 20.6% of HD cases (n=386) and in 11.6% of those without CHD during follow-up (n=3523). The adjusted HR of CHD was 2.21 (95% CI 1.41-3.47) for men reporting paternal history of CHD compared with men with no paternal history. The corresponding HR for women was 1.50 (9.74-3.62). Maternal history of CHD, defined as a CHD diagnosis in the mother in the period before the age of 66, was present in 4.2% of cases and in 6.2% of non-cases, and was associated with an adjusted HR of 0.61 (95% CI 0.20-1.89) in men and a HR of 1.10 (0.39-3.60) in women.

Conclusions: our study shows that the risk of CHD is more clearly influenced by paternal factors than maternal. The reasons behind this are not known, but it could be speculated upon that genetic factors are mediated through these influences.

P31

Parental history of coronary heart disease in a large cohort study from Stockholm

K Leander, M Vikstrom, M Heikkinen, M Nilsson, U Do Fatu

Karolinska Institute, Stockholm, Sweden

Topic: Cardiovascular epidemiology

Purpose: we investigated the relation between paternal and maternal history of coronary heart disease (CHD), respectively, and risk of CHD in a large population-based cohort of 60-year-old men and women from Stockholm County.

Methods: a cohort of 3740 men and women (participation rate 78%), free from earlier signs and diagnoses of CHD according to questionnaire data, was prospectively followed from baseline 1972-1976, 1972-1980, and 1983-1986.

Results: paternal history of CHD, defined as a CHD diagnosis in the father before the age of 66, was present in 20.6% of HD cases (n=386) and in 11.6% of those without CHD during follow-up (n=3523). The adjusted HR of CHD was 2.21 (95% CI 1.41-3.47) for men reporting paternal history of CHD compared with men with no paternal history. The corresponding HR for women was 1.50 (9.74-3.62). Maternal history of CHD, defined as a CHD diagnosis in the mother in the period before the age of 66, was present in 4.2% of cases and in 6.2% of non-cases, and was associated with an adjusted HR of 0.61 (95% CI 0.20-1.89) in men and a HR of 1.10 (0.39-3.60) in women.

Conclusions: our study shows that the risk of CHD is more clearly influenced by paternal factors than maternal. The reasons behind this are not known, but it could be speculated upon that genetic factors are mediated through these influences.

P32

The Italian health examination survey Osservatorio Epidemiologico Cardiovascolare: preliminary results

S Giampaoli, L Lo Noce, D Donfrancesco, P Vancheri, L Iaccovelli, C A Goldoni, D De Sanctis Cialdi, D Vanzetto

Istituto Superiore di Sanita’, Rome, Italy, Az. Ospedaliera S. Ria, Catanzaro, Italy, Universita’ Cattolica, L’Aquila, Italy, Department of Sanita’ Pubblica AUSL, Modena, Italy, Centro per la Prevenzione Cardiovascolare, Udine, Italy

Topic: Cardiovascular epidemiology

Purpose: The Health Examination Survey (HES) – Osservatorio Epidemiologico Cardiovascolare (OEC), one of the research lines within the CUFOR Project, was set up in 1998 with the aim of describing the distribution of cardiovascular risk factors in the Italian adult population. In 2008 a new HES was implemented. The aim of this analysis is to present preliminary results from comparisons between 1998 and 2008 data.

Methods: Randomised population samples were enrolled in 1998 and 2008. Data were collected by trained health professionals and submitted to quality control during field-work. Both in 1998 and 2008, risk factors data were collected using the MONICA Project standardised methodologies and anthropometric values were assessed in the same laboratory. In 1998, about 10’000 men and women aged 35-74 years were enrolled throughout the country (200 persons each 1.5 million of resident population). The new screening is planned to enrol the same sample size with the age range 35-79 years. In this analysis, continuous risk factors means are compared using t-test and chi-square test is used to compare prevalence.

Results: From April to November 2008, four centres, representing two regions in the south and in the north of Italy, were involved in the new screening. At present, data of 206 men and 216 women are available. Data comparison showed a significant decrease for systolic (men: from 141 to 134 mmHg; women: from 131 to 123 mmHg) and diastolic blood pressure mean values (men: from 87 to 84 mmHg; women: from 82 to 79 mmHg) and a significant increase for total-cholesterol values: from 211 to 226 mg/dl; from 203 to 225 mg/dl and HDL-cholesterol mean values (men: from 52 to 55 mg/dl; women: from 60 to 67 mg/dl). Prevalence of physical inactivity at work significantly increased (men: from 35% to 56%; women: from 36% to 39%) and physical inactivity during leisure time decreased in women (from 50% to 38%). Mean values of total cardiovascular risk score obtained using the CUFOR Project risk function increased from 2.2 to 2.5 in men (p=0.003) and from 2.3 to 8.6 in men (p<0.001).

Conclusions: Standardised methods used in the HES-OEC allow trend comparisons between areas at both national and international level. Although these are only preliminary results, OEC trends are similar to those already observed in other countries (e.g. physical inactivity). In combination with other information sources, the OEC may greatly contribute to the evaluation of the efficacy of community actions (smoking ban regulation, introduction of risk assessment in clinical practice and appropriateness of pharmacological treatment).

P33

The association between average alcohol consumption and the incidence of major coronary events

M Ferrari, V Cambioglia, G Veronesi, G Cesana, G Coratzo, C Forazzi, G Manica, R Segi

Universita’ Degli Studi Dell’Insubria, Varese, Italy, Universita’ di Milano - Bicocca, Monza, Italy, Universita’ di Milano - Bicocca, Milan, Italy

Topic: Cardiovascular epidemiology

Purpose: the aim of this study was to assess the relationship between average daily alcohol consumption and major coronary heart disease (CHD) and stroke incidence, in a population-based male sample in northern Italy.

Methods: the study sample is composed by n. 2350 men, enrolled between 1996 and 1994 from the MONICA Brussona population, aged 35-64 and free of CVD at baseline. The average daily consumption of wine, beer and spirits was investigated through a standard interview, and classified as not current drinkers, light (<50g alcohol/day), moderate (50-100 g/day) and heavy (>100 g/day). Almost 95% of the average daily alcohol intake (ADI) was in the form of wine. Smoking habits, systolic blood pressure, total cholesterol, triglycerides, and history of diabetes were investigated according to the WHO MONICA Project protocols. Participants were followed up for incidence of first CHD and stroke events (MONICA validated), until 31/12/2002. Poison regression was used to estimate relative risks (RR) and their 95% confidence intervals according to ADI, with tertileter as the reference group.

Results: in a median 12-years follow-up 160 CHD and 62 strokes events, fatal or non-fatal, were observed, corresponding to an incidence rate of 601 and 225 per 100,000 person-years, respectively. The categories of ADI were positively associated with gamma-glutamyl transpeptidase values (p-value for trend: 0.0001). Strong associations were also found between categories of ADI and investigated CHD risk factors. After adjusting for age and CHD risk factors, a monotonically decreasing trend of CHD incidence rates was found for increasing ADI categories (p=0.0026). Compared to teetotaller, light drinkers do not reveal a lower risk to develop major CHD events (RR=0.76, 95% CI 0.51-1.14), but both moderate drinkers (RR=0.53, 95% CI 0.35-0.79) and heavy drinkers (RR=0.49, 95% CI 0.28-0.86) evidenced lower risks. The association between ADI and stroke incidence was weak and not significant. Results did not change when former drinkers (only 9% in our sample) were dropped-out from non-drinkers in the analysis.

Conclusions: under the assumption that our single baseline alcohol assessment is an adequate measure of long-term alcohol intake, our results are in support of a beneficial association of average daily alcohol consumption, mainly in the form of wine, with respect of CHD incidence.

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increased triglycerides (OR 1.39 and 1.78, p < 0.0001) and for abnormal carbohydrate metabolism. No significant relationship was present for total cholesterol and hypertension - RR = 1.27 and 1.84, p < 0.0001). No significant relationship was present for total cholesterol and hypertension - RR = 1.27, p < 0.0001) and for abnormal carbohydrate metabolism.

Methods: Analysis was based in two databases: in subjects that voluntarily called for screening in the prevention arm of the Polish 400 Cities Programme and in subjects that were invited for CVD screening in “monitoring” arm of the project performed in the representative sample of inhabitants of small towns. The results are shown in the table.

<table>
<thead>
<tr>
<th>Screening</th>
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<tr>
<td>Hypertension</td>
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<td></td>
</tr>
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<td>Normal subjects</td>
<td>RR=1.40/90</td>
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Results: Smoking and obesity are the main participants of the public screening surveys. Subjects are more often overweight and obese. They smoke two times less in comparison with subjects from representative sample. 2. Public screening surveys might not be a sufficient method to identify high CV risk subjects. This method fails especially in the group of middle-aged men with undiagnosed hypercholesterolemia, hypertension, and diabetes.

Conclusions: 1: Women and elderly patients with previously diagnosed hypertension and diabetes were the main participants of the public screenings surveys. These subjects are more often overweight and obese. They smoke two times less in comparison with subjects from representative sample. 2. Public screening surveys might not be a sufficient method to identify high CV risk subjects. This method fails especially in the group of middle-aged men with undiagnosed hypercholesterolemia, hypertension, and diabetes.

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P38
Pulmonary function and cardiovascular risk in an healthy population from the MOLI-SAMI project.

A Arcidi et al,1 D Barbato1, S Costanzo,2 A De Curtis1, HJ Schunemann1, MB Donati1, G De Gattorno1, L Jaccioli1

1Catholic University, Campobasso, Italy, 2Italian National Cancer Institute, Rome, Italy

Topic: Cardiovascular epidemiology

Purpose: to evaluate the association between pulmonary function and cardiovascular risk estimate.

Methods: the Moli-Sami project is an on-going cohort study of subjects aged ≥35 randomly recruited from a Southern Italy general population. 19,916 subjects had been enrolled. We measured Forced Vital Capacity (FVC) and Forced Expiratory Volume in the first second (FEV1) and calculated the Cardiovascular risk calculated with the Cope Project equation, including gender, age, diabetes, hypertension, HDL, cholesterol, smoking habits. Subjects with history of cardiovascular (n=993), pulmonary disease (n=1,593), malignancy (n=647) and with low quality spirometric tests (n=958) were excluded.

Results: finally, 9,612 men and 5,629 women aged 52±10.7 years and 51.9±10.2 years respectively were analysed. COPD risk score was associated with FVC and FEV1 (Table) regardless of age, height, obesity (BMI), social status, physical activity, work exposures and C-Reactive Protein blood levels. Only in men COPD risk score was inversely associated with obstruction index, FEV1/FVC (Table).

Conclusions: among participants in the Moli-Sami study, higher Cardiovascular risk score was associated with lower pulmonary function independently from possible environmental and biological confounding.

Lung values in CUORE risk score groups

| Cuore risk score | MEN | 0 - 4 | 5 - 19 | >20 | p | R2
<table>
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<tr>
<td>(SE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FVC (L)</td>
<td></td>
<td>4.81</td>
<td>4.74</td>
<td>4.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEV1 (L)</td>
<td></td>
<td>3.70</td>
<td>3.58</td>
<td>3.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEV1/FVC</td>
<td></td>
<td>76.7</td>
<td>75.8</td>
<td>74.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WOMEN</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>(SE)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FVC (L)</td>
<td></td>
<td>3.50</td>
<td>3.42</td>
<td>3.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEV1 (L)</td>
<td></td>
<td>2.71</td>
<td>2.69</td>
<td>2.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEV1/FVC</td>
<td></td>
<td>78.0</td>
<td>77.8</td>
<td>77.3</td>
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</tbody>
</table>

Lung measures adjusted means,p and R2 for Multivariate Analyses

P39
Abdominal obesity and associated cardiovascular disease in Poland - Results from the IDEA study (International Day for the Evaluation of Abdominal Obesity)

M Chrostowska1, A Szyndler1, A Rojek1, P Paczwa2, K Narkiewicz1

1Dept. of Hypertension & Diabetology, Gdansk, Poland, 2Sanofi Aventis Poland, Warsaw, Poland

Topic: Cardiovascular epidemiology

Aims: (1) evaluate the prevalence of obesity, AO measured by waist circumference (WC) and associated cardiovascular disease (CVD) in Poland primary care patients; (2) compare the frequencies of obesity and CVD to those observed in North-West Europe (NW Europe).

Materials and methods: The IDEA study was an international cross-sectional study including 168,159 patients in 62 countries. In Poland, 200 randomly selected general practitioners included 2,032 men and 3,347 women. Age, gender, WC, BMI and the presence of known HT, DM and CVD in Polish primary care patients were assessed. The IDEA study was an international cross-sectional study.

Results: The mean age was 51.7 years in general practice and 51.6 years in our study. The prevalence of obesity was higher in Poland than NW Europe 33.5% vs. 23% among men (M) and 33.5% vs. 23% among women (W). AO was recorded in 36.5% M and 54% W according to the NCEP criteria. 65% men and 74% W had AO with the IDF criteria. There was a significant and strong association between AO and WC, BMI and CVD with some differences among genders. Particularly in women, WC was more strongly associated with AO (Table 1).

Conclusions: Obesity in primary care patients is found more frequently in Poland than in NW Europe AO: associated with waist circumference (WC) and associated cardiovascular disease (CVD).

Table 1

<table>
<thead>
<tr>
<th>WC for men</th>
<th>OR [95% CI] for CVD</th>
<th>p</th>
<th>OR [95% CI] for DM</th>
<th>p</th>
<th>OR [95% CI] for hypertension</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;94</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>94 - 102</td>
<td>1.29 [0.96 - 1.73]</td>
<td>0.094</td>
<td>1.76 [1.12 - 2.78]</td>
<td>0.015</td>
<td>1.69 [1.2 - 2.31]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&gt;102</td>
<td>1.88 [1.44 - 2.46]</td>
<td>&lt;0.001</td>
<td>3.62 [2.42 - 5.41]</td>
<td>&lt;0.001</td>
<td>1.39 [2.65 - 4.33]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>WC for women</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&lt;90</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>90 - 98</td>
<td>1.35 [0.97 - 1.87]</td>
<td>0.078</td>
<td>2.54 [1.36 - 4.75]</td>
<td>0.003</td>
<td>1.66 [1.26 - 2.19]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&gt;98</td>
<td>2.12 [1.6 - 2.81]</td>
<td>&lt;0.001</td>
<td>6.21 [5.06 - 9.8]</td>
<td>&lt;0.001</td>
<td>0.56 [2.88 - 4.65]</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Age-adjusted ORs for CVD, DM and HT according to the NCEP/IDF WC categories

P40
Risk of death is high after initial admission for heart failure

J Vaarjas1, JB Reitsma1, A De Bruin1, M Bot1

1University Medical Centre, Utrecht, Netherlands, 2Academic Medical Centre, Amsterdam, Netherlands, 3Statistics Netherlands, The Hague, Netherlands

Topic: Cardiovascular epidemiology

Purpose: With the ageing of the population in developed countries the number of heart failure (HF) patients may be increasing. Age- and gender-specific mortality risk after a first hospital admission with the diagnosis heart failure is important information with regard to the burden of heart failure.

Methods: Patients hospitalised for the first time for heart failure (ICD-9 codes 402, 429) in 1997 or 2000 were identified through linkage of national registers. Follow-up for mortality lasted 5 years.

Results: The HF cohort consisted of 14,529 men (74 ± 11 yr) and 14,524 women (78 ± 11 yr). Mortality risks are presented in table 1. Comparison of age- and gender-specific mortality risks between HF patients, stroke patients and acute myocardial infarction patients showed the highest mortality risks for male HF patients (data not presented in abstract).

Conclusions: Age-specific short- and long-term mortality is high, especially for elderly male patients.
**P42**

Comparative evaluation of multiple Doppler echocardiographic criteria for estimating the risk of clinical deterioration in chronic heart failure II NYHA class patients

R De Vecchis1, C Coppa2, A Giasi3, A Pucciarelli4, S Cantatrione5

1Ryazan Regional Clinical Cardiology Centre, Ryazan, Russian Federation, 2University Hospital, Bratislava, Slovak Republic, 3Institute of Pathological Anatomy, Bratislava, Slovak Republic

**Topic: Cardiovascular epidemiology**

**Background:** The prognosis of pts suffering from mild-to-moderate chronic heart failure (CHF) appears difficult to be stated because it depends on many variables, so as we know only partly the factors able to predict an accelerated progression towards severe cardiac decompensation; moreover, the finding of left ventricular ejection fraction (LVEF) reduced under 0.55 appears rather to predict sudden arrhythmic death than increased risk for cardio-renal syndrome and/or terminal decompensated heart failure (so-called "progressive" CHF).

**Aims:** the goal of our study was to evaluate, in the set of CHF II NYHA class pts, the respective predictive performances of some Doppler echocardiographic criteria with regard to end-point "transition to III NYHA class", we chose as surrogate end-point of death preceded by "progressive" CHF.

**Methods:** a case-control study was carried out, including a number of outpatients, monitored with clinical and Doppler echocardiographic periodical evaluation, which had been exhibiting, during a follow-up (FU) period of 5 years at least, the clinical picture of worsening CHF (i.e. transition from II to III NYHA class). For every case, a suitable number of controls (from 3 to 5) was recruited from the same population employed as source of cases, characterised by homogeneous CHF II NYHA class clinical picture at beginning of FU. The following criteria were evaluated: LVEF, subdivided as follow: a) normal (>50%) LVEF b) subnormal (40-50%) LVEF c) depressed (<40%) LVEF; left ventricular mass index (LVMI)=1.391×57.62 mm2; restrictive left ventricular filling pattern (RFP); antero-posterior left atrial diameter (LADi)<50 mm; left ventricular end systolic volumen(LVESV) >57 ml. For each criterion, the following measures were calculated: sensibility, specificity, positive predictive value, negative predictive value, positive likelihood ratio (LR+), negative likelihood ratio (LR-) diagnostic odds ratio (DOR).

**Results:** we found 15 cases of shift into III NYHA class plus one case of sudden cardiac death. For each case, 3 controls were enrolled, so as to include in analysis a total of 60 pts. Among the assessed criteria: RFP-LiR>2; LADi >57 DOR; LVMI=1.391×57.62 mm2 and increased LADs (LADs=L-R−0.5; DOR; LiL−R=0.5)<11.4995; 0.4328-45.841 only were shown to be provided with reliable value as markers of increased risk for worsening CHF. Among pts with RFP, the 26 cases of adverse outcomes documented the risk of adverse outcome was tripled by combination of RFP with LADs>50 mm.

**Conclusions:** RFP and increased LADs are powerful markers of progressive decline in cardiac mechanical performance, so as to identify CHF pts who merit aggressive treatment or complex therapeutic regimens.

**P43**

Insufficient detectability of acute coronary artery disease as limiting factor for accurate death registration in the Russian Federation

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**Topic: Cardiovascular epidemiology**

**Background:** the risk of clinical deterioration in chronic heart failure II NYHA class patients

**Aims:** the goal of our study was to evaluate, in the set of CHF II NYHA class pts, the respective predictive performances of some Doppler echocardiographic criteria with regard to end-point "transition to III NYHA class", we chose as surrogate end-point of death preceded by "progressive" CHF.

**Methods:** a case-control study was carried out, including a number of outpatients, monitored with clinical and Doppler echocardiographic periodical evaluation, which had been exhibiting, during a follow-up (FU) period of 5 years at least, the clinical picture of worsening CHF (i.e. transition from II to III NYHA class). For every case, a suitable number of controls (from 3 to 5) was recruited from the same population employed as source of cases, characterised by homogeneous CHF II NYHA class clinical picture at beginning of FU. The following criteria were evaluated: LVEF, subdivided as follow: a) normal (>50%) LVEF b) subnormal (40-50%) LVEF c) depressed (<40%) LVEF; left ventricular mass index (LVMI)=1.391×57.62 mm2; restrictive left ventricular filling pattern (RFP); antero-posterior left atrial diameter (LADi)<50 mm; left ventricular end systolic volumen(LVESV) >57 ml. For each criterion, the following measures were calculated: sensibility, specificity, positive predictive value, negative predictive value, positive likelihood ratio (LR+), negative likelihood ratio (LR-) diagnostic odds ratio (DOR).

**Results:** we found 15 cases of shift into III NYHA class plus one case of sudden cardiac death. For each case, 3 controls were enrolled, so as to include in analysis a total of 60 pts. Among the assessed criteria: RFP-LiR>2; LADi >57 DOR; LVMI=1.391×57.62 mm2 and increased LADs (LADs=L-R−0.5; DOR; LiL−R=0.5)<11.4995; 0.4328-45.841 only were shown to be provided with reliable value as markers of increased risk for worsening CHF. Among pts with RFP, the 26 cases of adverse outcomes documented the risk of adverse outcome was tripled by combination of RFP with LADs>50 mm.

**Conclusions:** RFP and increased LADs are powerful markers of progressive decline in cardiac mechanical performance, so as to identify CHF pts who merit aggressive treatment or complex therapeutic regimens.

**P44**

Analysis of acute coronary heart disease mortality in average statistical region of Russian Federation

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**Topic: Cardiovascular epidemiology**

**Purpose:** considering contradictory statistical information about high cardiovascular mortality (CVM) in the presence of low myocardial infarction prevalence in the Russian Federation it is necessary to study the existing situation punctually and comprehensively.

**Methods:** the real acute coronary heart disease (CHD) mortality was specified by profound analysis of all causes of deaths with an accent on out-on-hospital lethal outcomes. The sources of data were the acts of civil status, autopsy reports, hospital medical histories, out-patient medical cards and also information about pre-mortem symptoms from district doctor and patient relatives.

**Results:** the Ryazan region has average demographic and epidemiological characteristics among Russian regions. Region population amounts to 1.21 millions people. 45.7% of total population are males and 83.8% are urban population. According to the acts of civil status official cardiovascular mortality is equal 760.06 per 100 000 population, CHD mortality 298.90 per 100 000 and mortality from acute forms of CHD only 56.12 per 100 000 or 10.79% of all CHD-induced deaths. According to hospital medical histories and out-patient medical cards official prevalence of nonfatal acute CHD amounts to 156.16 per 100 000 population. The results of acute CHD-induced deaths detection demonstrated that true mortality from acute CHD exceeds officially registered level at the least 2.26 times for males (p<0.001) and in 3.13 times for females (p<0.001). The main reasons of mistaken conclusion about the reason of death are insufficient analysis of pre-mortem symptoms, insufficient rate of autopsy and mistaken coding according to International Classification of Diseases. In 83.1% unregistered fatal cases of acute CHD the diagnoses “masks” were any chronic forms of CHD, in 8.1% - cerebrovascular diseases. Of fatal lethality among male patient with acute CHD is 25.2% of all acute CHD cases, specified lethality increases up to 39.6% (p<0.05), among female patients accordingly 25.4 and 44.9% (p<0.01).

**Conclusions:** Detailed analysis of all cases of deaths defined the most real level of acute CHD mortality exceeded officially registered level at the least in 2.62–5.13 times. All unregistered cases of acute CHD were among out-of-hospital deaths. Improvement of quality and opportuneness of acute CHD diagnostics in out-of-hospital patients would allow decrease the weight of unfavorable outcomes and CVM.

**P45**

Venous thromboembolism - Actual clinical problem

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**Topic: Cardiovascular epidemiology**

**Objectives:** Venous thromboembolism (VTE) is a major public-health problem. It belongs to the most frequent non-diagnosed acute diseases in medical practice. Also the prophylaxis is undersublimed. Aim of the presented retrospective study was to compare the results of pulmonary embolism diagnosis with the autopsy findings in a follow-up period of 25 years.

**Methods:** Clinicopathological comparison of VTE diagnosis during 25 years observation on our department with 1375 deaths. Out of them 986 have been autopsied (71 %). Of fatal pulmonary embolisation was diagnosed by autopsy in 118 cases (12 %). Accordance of clinical and anatomopathological diagnosis of VTE was 54 cases. In 64 cases the clinical diagnosis absented. In 109 cases the clinical suspicion was by the autopsy not confirmed. The average age in our group with VTE was 76 years (range 38-96). Immobility, heart failure and pyrctic state were the most frequent dispositional factors. The most frequent autopsy findings of VTE source was the thrombosis of femoral vein in 52 cases (44.1 %). In 40 cases (33.9 %) despite autopsy the source of VTE remained unknown.

**Conclusions:** Data from our clinics-pathological comparative retrospective study suggest that acute complex prevention of VTE must be given permanent attention, especially in patients with risk factors. Out of 1357 deaths 70% were autopsied, with the incidence of fatal VTE of 12 %. VTE is a common disease and major cause of death and therefore we recommend to improve the prophylaxis.
Oslo. cardiovascular disease seems to be higher among Tamils in Sri Lanka than among Tamils in ratio was higher in Sri Lanka and so was the mean blood pressure. All indicators of obesity were Sri Lankan Tamils living in Oslo and Tamils living in Kandy Sri Lanka. Total/HDL cholesterol physically inactive during leisure time both in Oslo and in Sri Lanka. mean systolic and diastolic pressure than in Oslo. A very high proportion of people were among men too was low (19.2% in Oslo, 13.1% in Sri Lanka, P=0.16). Although different among women in Sri Lanka. None of the women from Oslo or Sri Lanka smoked. Smoking both sexes. But an important indicator of central obesity, mean waist to hip ratio, was higher in Oslo versus 6.0 in Sri Lanka, P=0.01). Moreover, we observed an age-dependent increase of systolic blood pressure values above the 50th percentile. Although many epidemiological studies have been performed in adult populations, little is known about the incidence of essential hypertension in teenagers. The aim of the "Close Giованne" (Young Hearts) project is to examine the blood pressure values of a population of 3,000 teenagers. Subjects classified as at high-risk of essential hypertension will be subjected to follow-up. Blood pressure values of high school students in Matera, Italy were obtained in the morning by an ambulatory device. When abnormal blood pressure was detected, measurements were repeated at least twice, and the lowest value was registered. Results: We evaluated 2,851 teenagers (14-19 year old, 1,262 girls and 1,589 boys) in 2007 and 2008. Results were plotted as percentiles of the values and classified diastolic and systolic arterial blood pressure based on 5 age ranges. We observed that the 50th percentile values of systolic and diastolic blood pressure were 120 and 70 mmHg, respectively. Blood pressure values at 90th percentile were 130 and 80 mmHg. 8.5% of the teenagers had a systolic blood pressure above the 90th percentile value, while 6.9% had a diastolic blood pressure above the 90th percentile. Moreover, we observed an age-dependent increase of systolic blood pressure values above the 50th percentile (p<0.001). A small but significant increase of diastolic blood pressure values above the 50th percentile was also observed in older teenagers (p<0.02).

Comparison of cardiovascular disease risk factors between Sri Lankan Tamils in Oslo, Norway and urban Tamils of Kandy, Sri Lanka

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Purpose: The aim of this study was to compare selected cardiovascular risk factors between Sri Lankan Tamils living in Oslo, Norway and Urban Tamils from Kandy, Sri Lanka.

Methods: Data on 1145 Sri Lankan Tamils from the population based, cross-sectional Oslo immuno-epidemiological study conducted in 2003 was compared with data on 233 participants of cross-sectional study on Urban Tamils of Kandy Sri Lanka from 2005. By design the two studies were comparable except in the methods used for measuring blood pressure. Data on socio-demographics and health status was collected. Blood pressure and anthropometrics were measured and a non-fasting blood samples was collected for serum lipid analysis. Lipids analysed in Lab were measured using NCCLS methods at the reference laboratory in Oslo.

Results: In both men and women mean total cholesterol and mean HDL cholesterol was higher in Oslo. Total/HDL cholesterol ratio was higher in Sri Lanka suggesting a higher risk (Men: 5.3 in Oslo versus 6.0 in Sri Lanka, P=0.001 and women: 4.3 in Oslo versus 5.7 in Sri Lanka, P=0.001). Mean waist circumference, hip circumference and body mass index was higher in Oslo in both sexes. But an important indicator of central obesity, mean waist to hip ratio, was higher among women in Sri Lanka. None of the women from Oslo or Sri Lanka smoked. Smoking among men too was low (19.2% in Oslo, 13.1% in Sri Lanka, P=0.16). Although different methods make it difficult to compare blood pressure, subjects in Sri Lanka had much higher mean systolic and diastolic pressure than in Oslo. A very high proportion of people were physically inactive during leisure time both in Oslo and in Sri Lanka.

Conclusions: This comparison shows that there are differences in risk factors between migrant Sri Lankan Tamils living in Oslo and Tamils living in Kandy Sri Lanka. Total/HDL cholesterol ratio was higher in Sri Lanka and so was the mean blood pressure. All indicators of obesity were higher in Oslo except waist to hip ratio among women, which was higher in Sri Lanka. Smoking was low in both groups whereas physical inactivity was high. If any thing, the risk of cardiovascular disease seems to be higher among Tamils in Sri Lanka than among Tamils in Oslo.
Iceland

National Institute of Health, Yerevan, Armenia

indirectly depends on the accessibility and quality of PHC and hospital services.

lethality caused by these diseases happening in the hospital. The high percentage of prevalence,

diseases. The percentage of hospital lethality from myocardial infarction and cerebrovascular

Conclusion:

more (675, 724 accordingly) and from cerebrovascular diseases 1.4 times more (682, 968 accordingly).

P50 Epidemiological study of prevalence, mortality and hospital lethality from myocardial infarction and cerebrovascular diseases among Armenian population

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Topic: Cardiovascular epidemiology

Purpose: To study and analyse of prevalence, mortality and hospital lethality from main diseases of circulatory system (myocardial infarction [MI], cerebrovascular diseases [CD]) among 18 years and above Armenian population.

Methods: The official data of National Information-Analytic Centre and National Statistical Service of Republic of Armenia of 1990-2007 were studied.

Results: In 2007 the prevalence of the circulatory system diseases was 14.5%, the mortality rate was 50.4%. In comparison with 1990 in 2007 the prevalence of myocardial infarction has increased 1.25 times more (1990-710, 2007-845 per 100 000 population), of stroke-1.28 times more (683, 506 accordingly). The rate of mortality from myocardial infarction has increased 1.4 times more (54, 77 accordingly), from cerebrovascular diseases 1.24 times more (84, 104 accordingly).

The rate of hospital lethality from myocardial infarction has increased 1.2 times more (67, 724 accordingly) and from cerebrovascular diseases 1.4 times more (562, 966 accordingly).

Conclusion: The analysed data for 1990-2007 show the trend to rising of main circulatory system diseases. The percentage of hospital lethality from myocardial infarction and cerebrovascular diseases is higher than from other non-communicable diseases, with every fourth case of lethality caused by these diseases happening in the hospital. The high percentage of prevalence, mortality and hospital lethality due to myocardial infarction and cerebrovascular diseases indirectly depends on the accessibility and quality of PHC and hospital services.

PS1 Cardiovascular risk factors in the young. A study of Icelandic college students.

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Topic: Cardiovascular epidemiology

Purpose: In recent years there has been a growing concern about the increase in cardiovascular risk factors such as obesity, hypertension, type 2 diabetes and physical inactivity, amongst adolescents and young adults. The purpose of our study was to investigate the prevalence of cardiovascular risk factors in young people aged 18-22 years, in Iceland.

Methods: Students aged 18-22 years, in two colleges in Akureyri Iceland were invited to participate in the Young Icelanders study. All participants answered questionnaires on smoking, physical activity and family history of cardiovascular disease. On physical examination, blood pressure, weight, height, waist-hip circumference were measured. Total cholesterol, HDL-cholesterol and triglyceride were measured.

Results: 270 students participated in the study, 65% female and 35% male. Mean age was 17.7 years. Body mass index (BMI) is shown in picture 1. Mean waist circumference for men and female was 86.9cm and 82.6cm respectively. Waist circumference was greater than 102 cm in 13.8% of males and greater than 88cm in 25% of females. The mean waist-hip ratio was 0.8 for both males and females. Nystolic blood pressure was higher than 140mmHg in 13% of males and 4% of females. None of the students had diastolic blood pressure greater than 90mmHg. Mean total cholesterol was 4.1mmol/L, mean HDL-cholesterol 1.4mmol/L and mean non-fasting triglycerides was 1.5mmol/L.

Conclusion: Our study shows that a considerable number of college students are overweight (picture 1) and have a waist circumference greater than the recommended cut-off value for detection of increased cardiovascular risk. This might increase the risk of future cardiovascular disease, despite the blood pressure and cholesterol levels being relatively low.

PS2 Gender disparities in reperfusion therapy and in-hospital outcome among middle eastern patients with acute ST elevation myocardial infarction

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Topic: Cardiovascular epidemiology

Objectives and methods: Gender disparities in the treatment of acute ST elevation myocardial infarction (STEMI) have been found in several western studies. It is largely unknown if this also applies to Middle Eastern women, and whether they have worse in-hospital adverse outcome compared to men. We evaluated the clinical profiles and outcomes of 962 patients admitted with STEMI between 11-2004 and 12-2007.

Results: Women (n=147) comprised 15% of the whole group, and men (n=815) comprised 85%. Women were older than men (mean age 62.7±10.2 vs. 53.8±11.4, p<0.001). Most women (74%) were older than 56 years of age while 58% of men were younger than 56 years. The presentation to the ER was <3 hours after onset of chest pain in 75.5% of women and 77.8% in men (p=NS). More women than men had diabetes (39% vs. 32%, p<0.001) and hypertension (51% vs. 23%, p<0.001), but they smoked less (16% vs. 68%, p<0.001). Women and men did not have different incidence of anterior MI vs. non anterior MI (52% vs. 48% in women and men, p=NS).

Reperfusion therapy (thrombolysis [TI] and primary coronary intervention [PCI]) was administered to 36% of women and 75% of men (p<0.01). Less women received TI (27% vs. 38%, p=0.05) or underwent primary PCI than men (29% vs. 36%, p=0.05). Coronary bypass surgery was similar in both genders (11% vs. 9%, p=NS).

In-hospital mortality was significantly higher in women than men (6.8% vs. 2.6%, p<0.001). Heart failure and life-threatening arrhythmias were similar in both genders (18% vs. 15%, p=NS) but women suffered more strokes (2% vs. 0.99%, p<0.01).

Conclusions: Similar to western women, Middle Eastern women with STEMI were older than men and had more comorbid diseases. Women had higher in-hospital mortality and strokes, and were less likely to receive reperfusion therapy and coronary revascularisation procedures than men.

PS3 Screening patients for hypertension with hypertension crisis in emergency department

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Topic: Cardiovascular epidemiology

Background and aims: identification of patients with hypertension crisis (HC) in an emergency room, when organ damage occurs, is a result of severely elevated blood pressure; this is considered a hypertensive emergency. When this occurs, blood pressure must be reduced immediately to prevent organ damage. This is done in an intensive care unit of a hospital.

Material and methods: the analysis was performed in 23803 patients, they visited emergency room ambulance for 1 year (from January until end of December 2006). Around 15946 (67 %) patients (from 23803 patients visited ER) presented with hypertension, but only 1132 (4.76%) cases presented with hypertensive crisis, defined as systolic pressure ≥ 180 mmHg and / or diastolic pressure ≥ 110 mmHg and symptoms of hypertensive emergency.

Results: we identified 1132 patients (4.7 %) with HC, more frequently male, 644 pts (57%) vs. 488 female (43%). In population, age 50-60 years was highest (30.9 %) and we identified 330 patients-191 male and 139 female, the second group were age 61- 70 (19.4 %) and group 41-50 ages- (18.4 %). The big group of ages 21-40 (22.5%). 128 patients (11.5%) were comparing with (acute coronary syndrome, 8 pts with, transient ischemic attacks, -2 pts with, stroke, 19 pts, heart failure, 46 pts, acute renal insufficiency and dissection- 6 pts. There are founded too seasonally variability of HC- more of cases were in winter, spring and autumn seasons.

Conclusions: patients with HC in our series were predominantly male, especially group – age ST 60 years. Malignant hypertension has been reported by others, more frequently in young males. More than 11.3 % of cases were previously diagnosed with abnormalities and needed hospitalisation and 88.7 % of cases received intensive care in emergency room.
S12 EuroPrevent Congress Abstracts May 2009

P54 The registry of acute myocardial infection (STEMI and NON-STEMI) in a sample of Greek population
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Topic: Cardiovascular epidemiology

Aim: to registry AMI (STEMI and NON-STEMI) in the 2nd Department of Cardiology of Aristotel University of Thessaloniki-Hippokration Hospital during 2007.

Methods: 642 patients, 462 males (72.0%), 180 (29.2%) females, median age 67.45±12.9 years were enrolled in the study. Patients were divided into 6 groups depending upon age. Risk factors such as arterial hypertension, diabetes mellitus, dyslipidemia, smoking and family history of CAD were evaluated.

Results: In 321 patients with STEMI, 125 (38.3%) had hypertension, 81 (25.2%) had diabetes mellitus, 126 (39.3%) had dyslipidemia, 120 (37.4%) were smokers, 30 (9.3%) had family history of CAD, 51 (15.3%) had previous history of CAD and 48 (14.5%) had free personal history. Anterior STEMI occurred in 105 patients (32.7%), lateral in 12 (3.7%), anterior in 75 (23.4%) and inferior in 129 (40.2%). Fibrinolytic therapy received 264 patients (82.9%) and the remaining 57 (17.1%) received glycoprotein IIb/IIIa. 36 patients (11.5%) with STEMI died. In 321 patients with NON-STEMI, 186 (55.3%) had hypertension, 126 (38.3%) had diabetes mellitus, 104 (38.5%) had dyslipidemia, 77 (23.8%) were smokers, 30 (9.9%) had family history of CAD, 111 (34.6%) had previous history of CAD and 24 (7.5%) had free personal history. Anterior NON-STEMI occurred in 57 patients (17.8%), lateral in 102 (31.8%), anterior in 75 (23.4%) and inferior in 87 (27.1%). None of the NON-STEMI patients received fibrinolytic therapy, while 120 (37.4%) received glycoprotein IIb/IIIa. 7 patients (6.5%) with NON-STEMI died. According age distribution in STEMI <40 years was 15 patients (4.7%), 41-50 50 (16.2%), 51-60 106 (33.6%), 61-70 60 (93.7%), 71-80 88 (25.2%), >81 51 (15.4%), while in NON-STEMI respectively was 12 (3.7%), 77 (24.7%), 62 (19.4%), 72 (22.1%), 42 (13.1%), 37 (11.3%) patients had none risk factor (R F.), 181 (56.3%) with 1 R F., 234 (64.4%) with 2 R F., 129 (20.1%) with 3 R F. and 21 (3.7%) with 4 R F.

Conclusions: STEMI occurred more frequent in the group aged 61-70 and NON-STEMI in the group aged 51-60. In patients with STEMI the most frequent risk factor was dyslipidemia, while in patients with NON-STEMI was arterial hypertension. Inferior MI occurred more frequent in the group aged 41-50, lateral MI occurred more frequent in the group aged 81+, anterior MI in the group aged 41-60 and anteriorateral in the group aged <40, 51-60 and 71-80. Most of the patients with MI had 2 risk factors.

P55 Psychosocial stress, overweight and smoking are the main promoters of hypertension in a typical mature sample of Romanian population
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Topic: Cardiovascular epidemiology

Introduction: After abrupt increase in 90’s, CVD mortality in Romania stabilised recently to a higher level of 220.6/100,000 for 65% of all deceases vs 37% for RT 15 153% for RT 25. A MI decreasing trend is now compensated by stroke taking-off while hypertension (HT) stays its course (10 % as direct cause of death). We explain HT prevalence based upon CINDI baseline examination in a typical mature sample of Romanian population in a town with a mix urban & rural habitat typical to Romania.

Methods: Psychosocial study used a single morning protocol to collect data on health & life-style in a random sample of 564 subjects (272 Males - M, 292 Females-M) with 43.8±14.6 (SD) years, study conducted in a town with a mix urban & rural habitat typical to Romania.

Results: BMI was 25.8 5.5 kg/m2 (26.4 6.1 in F) with 51.5% >25 in M, 44.9% >25 in F. Systolic blood pressure (SBP) was 127.9 (23.0) mg/dL (37.9 <40 years was 15 patients (4.7%), 41-50 50 (16.2%), 51-60 106 (33.6%), 61-70 60 (93.7%), 71-80 88 (25.2%), >81 51 (15.4%), while in NON-STEMI respectively was 12 (3.7%), 77 (24.7%), 62 (19.4%), 72 (22.1%), 42 (13.1%), 37 (11.3%) patients had none risk factor (R F.), 181 (56.3%) with 1 R F., 234 (64.4%) with 2 R F., 129 (20.1%) with 3 R F. and 21 (3.7%) with 4 R F.

Conclusions: STEMI occurred more frequent in the group aged 61-70 and NON-STEMI in the group aged 51-60. In patients with STEMI the most frequent risk factor was dyslipidemia, while in patients with NON-STEMI was arterial hypertension. Inferior MI occurred more frequent in the group aged 41-50, lateral MI occurred more frequent in the group aged 81+, anterior MI in the group aged 41-60 and anteriorateral in the group aged <40, 51-60 and 71-80. Most of the patients with MI had 2 risk factors.

P56 Night-smoking as a predictor for tobacco dependence and prognostic marker for treatment outcome
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Topic: Tobacco

Aim: smoking at night to smoke is a common behavior among smokers and may be associated with poor treatment outcome at 6 months follow-up. The aim of the study was the identification of factors associated with night-smoking and the assessment with treatment outcome.

Methods: a total of 653 cigarette smokers who sought treatment at our smoking cessation counselling center were studied. Patients’ data (previous clinical history, risk factors and smoking habits) were collected from their medical records. Moreover, a structured questionnaire was used to obtain additional information such as nicotine dependence. All participants were followed up for 6 months after their target quit date. Based on smoking relapse, patients were divided to those who stopped (quitters) and those who continued to smoke (non-quitters).

Results: of the total sample 215 (32.9%) reported smoking abstinence at 6 months follow-up. Night-smokers were identified 325 (49.7%). Night smoking was associated with a number of other patient characteristic, including medical symptoms and situations related with smoking (CAD, COPD, stroke), treated for depression, smoking within 30 minutes of waking in the morning, more than 30 cigarettes per day, higher Fagerstrom score and lower socioculturally status. In multivariate analysis night-smoking remained a significant and independent predictor of smoking at 6 months follow-up. Night smokers also reported a shorter average time to relapse (42.4 vs 63.7 days, p=0.03).

Conclusion: night smoking is a significant indicator of nicotine dependence and a marker of more intensive and sustained treatment for smoking cessation. This behavior, associated with several socioeconomic and tobacco used characteristics, can be assessed by a simple question.

P57 How Quit&Win 2002-2008 cessation campaigns may have contributed to curing of smoking in Romania
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Topic: Tobacco

Background: Quit & Win (QW) - an international contest that challenges smokers to quit during every other month of May to qualify for a big monetary prize drawing - is organised in Romania (QWR) since 2000 by coalitions coordinated by the Institute of Public Health. According to CPSS national studies, prevalence of smoking in Romanians aged 14 to 60 curved first time in last decades from 45.1 to 33.9% (in males) and from 44.7 to 32.2% (in females) between 2003 and 2007, reflecting evolutions from 54.7 to 37.1% in males (M) and from 43.5 to 33.7% in females (F).

Methods: QWR 2002 enrolled 1389 smokers, all of them being addressed by mailed questions with the 2003 follow-up featuring a response rate of 33.5%, while QWR 2006 enrolled 1031 participants with the 2007 follow-up response rate of 21.9%.

Results and discussion: QWR recruitment dynamics shows the "blowing-up then recoil" pattern also seen in other countries. One year follow-ups found 23.5% (26.4 M, 24.4 F) continuous non-smokers and 46.1% (point) non-smokers at the follow-up time as a result of QWR 2002, and 34.9% continuous (36.6 M, 33.7 F) and 50.5% point abstinents after QWR 2006, as compared with continuous level got by QW Germany 2000 of about 30% and point level got by QW Veneto Italy 1998 of 37.5%. QW campaigns appear more effective in males, despite lesser steps to prevent relapse taken by men in both 2002-03 (p=0.05 vs women, Fisher test) and 2006-07 (p=0.03). Among relapse prevention steps, nicotine substitution significantly increased (p<0.001) from 2002 to 2007. Women had more frequently to health professionals to remain smoke-free in 2006-07 vs 2002-03 (p=0.033), while men used more frequently media information than professional advice (p=0.03). As for relapse reasons with previous tries to quit, stress is the most important factor influencing relapse, while other factors are of minor importance.

Conclusion: despite of psycho-social climate rather hostile to life-style improvement, Romanians remain sensitive to positive health campaigning like QW & QW that may have contributed to curing of smoking in 2003-2007.
D Demina et al.  
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Topic: Tobacco  
Smoking is one of the major preventable causes of death in the world. Control of the factor since adolescence may reduce cardiovascular morbidity and mortality in adulthood.  
Objective: To assess the prevalence, trends and gender differences of adolescent smoking in the end of XX century.  
Design and subjects: Smoking was monitored from 1985 to 2003 in urban Siberian adolescent population in four cross-sectional surveys. Total sample was 2569 (boys ‘1214, girls ‘1355), total response: 95%. Subjects were classified as non-smokers, occasional smokers (less 1 cig/week), and regular smokers (1 cig/week and more).  
Results: During the period 1989 to 2003, the prevalence of regular smoking among boys declined from 45% to 27%. In 2003 the regular of regular smokers among boys and girls was similar: 27%. Since 1989 the average age of smoking initiation among regular smokers (1 cig/week and more).  
Conclusions: High prevalence of tobacco use in Russian adolescents, increasing rate of female smoking, rejuvenescence of smoking and negative effect of smoking on antiradical free radical fraction (HDL) emphasise the necessity of complex preventive actions among youth population in Russia.

Exposure to smoking in popular movies and life time smoking experience among 15-20 olds in Norway: a cross-sectional study  
G Schol1  
1Oslo, Norway  
Topic: Tobacco  
Objective: studies of American adolescents have revealed significant effects of exposure to movie smoking on smoking initiation and smoking behavior. German studies have replicated such findings, while a recent British study found no such effects. The present study presents such findings, while a recent British study found no such effects. The present study presents such findings, while a recent British study found no such effects. The present study presents such findings, while a recent British study found no such effects. The present study presents such findings, while a recent British study found no such effects. The present study presents such findings, while a recent British study found no such effects.  
Methods: a cross-sectional study was conducted to analyse the relationship between exposure to smoking in popular movies and life time smoking experience among adolescents in Norway, suggesting similar media effects as those observed among American adolescents.

Income and prevalence of cardiovascular diseases in an ageing population sample in Russia.  
D Malyutina, S Soboleva, M Boba, S K Malyutina, A Pasey, E Veryovkin  
1University College London, London, United Kingdom, 2Institute of Economics, SB RAS, Novosibirsk, Russian Federation, 3Institute of Internal Medicine SB RAMS, Novosibirsk, Russian Federation  
Topic: Socio-demographic factors  
Purpose: To investigate the relationship between individual economic indicators and prevalent cardiovascular diseases (CVD) in an ageing population sample in Russia.  
Methods: In the second wave of the HAPIEE Project, a representative population sample of men and women aged 48-72 was surveyed in 2006-2007 (n=3575) in Novosibirsk (Russia).  
Results: Structured interview was used to estimate economic indicators (economic activity, personal and household income including benefits, informal transfers and non-monetary income in the last 12 months, and indicators of wealth). For the present analysis, we calculated the values of monthly household income and income per family member. The study found significant linear relationships between socio-economic factors, including education, income and smoking rate.  
Conclusions: The prevalence of CVD in the ageing Russian population is inversely related to the measures of household income. The relationship is stronger for stroke than for IHD. This economic gradient has important social and public health implications.

Economic status and disease-specific mortality differences among population survey participants and non-participants  
H Tolonen, T Laatikainen, K Talala, S Heikko, T Martelin, R Prattala  
1National Public Health Institute, Helsinki, Finland  
Topic: Socio-demographic factors  
Background: it has been shown that a socio-economic difference between survey participants and non-participants exists. Many health behaviors are known to have socio-economic differences. We investigated how much of the excess mortality of survey non-participants can be explained by their socio-economic status.  
Methods: adult health behaviors surveys (mailled questionnaire) have been conducted in Finland annually since 1978. A data from 1978-2002 surveys, was linked with mortality data from the Finnish National Cause of Death register and with socio-economic register data (marital status, education and household income) from Statistics Finland. The mortality follow-up lasted up to 2006.  
Results: the total and cause-specific mortality was highest among non-participants than respondents in both men and women (Table 1). When results were adjusted for socio-economic factors (marital status, educational level and household income), the excess mortality of non-respondents decreased in both men and women. The socio-economic factors explained 69% of the decrease in excess total mortality among men and 26% among women.  
Conclusions: a large proportion of the excess mortality among non-respondents is due to the different socio-economic status of the survey respondents and non-respondents. New results also indicate that among non-respondents especially mortality related smoking and alcohol use is more common. Based on these results we could assume that majority of excess mortality among non-respondents is due to different lifestyles prevalent among population with low socio-economic status that are more likely not to attend population surveys.

Table 1.  
<table>
<thead>
<tr>
<th>Model</th>
<th>Cause of death</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR</td>
<td>95% CI</td>
<td>HR</td>
</tr>
<tr>
<td>Unadjusted</td>
<td>Total</td>
<td>1.44</td>
<td>1.37,1.51</td>
</tr>
<tr>
<td>Suicide</td>
<td>2.05</td>
<td>1.66,2.54</td>
<td>1.84</td>
</tr>
<tr>
<td>Smoking</td>
<td>1.34</td>
<td>1.14,1.57</td>
<td>1.67</td>
</tr>
<tr>
<td>Alcohol</td>
<td>1.96</td>
<td>1.66,2.32</td>
<td>2.09</td>
</tr>
<tr>
<td>Adjusted</td>
<td>Total</td>
<td>1.28</td>
<td>1.20,1.33</td>
</tr>
<tr>
<td>Suicide</td>
<td>1.78</td>
<td>1.36,2.12</td>
<td>1.56</td>
</tr>
<tr>
<td>Smoking</td>
<td>1.17</td>
<td>0.99,1.38</td>
<td>1.56</td>
</tr>
<tr>
<td>Alcohol</td>
<td>1.64</td>
<td>1.38,1.96</td>
<td>1.84</td>
</tr>
</tbody>
</table>

Excess mortality of non-respondents in comparison to respondents
Aim: To assess the extent to which classical CVD risk factors and wide range of socioeconomic, medical care and environmental determinants are related to within country differences in CVD mortality.

Methods: The main outcomes were age-standardised CVD mortality rates (ICD-10 codes I00-I99) in each of 16 provinces for men and women ages 20-74. Also for each province 90 indicators, were collected in 9 categories from several sources: prevalence of risk factors, medical care and environmental determinants.

The analysis was based on univariate correlation and discrimination model and multivariate stepwise regression models. Partial and multiple coefficient of determination was calculated with determinants significant in univariate models.

Results: In men about 73% of the within country variance in CVD mortality were significantly explained by the differences between provinces in the level of air pollution, urbanisation, employment rate, monthly income and expenditure on environmental protection. For women: 42% of those differences were explained by differences in expenditure on environmental protection.

Conclusion: Variance in deprivation between LAs shows a higher association with variance in CVD mortality than variance in deprivation within LAs.

P63 Socioeconomic and environmental factors are the main determinants of regional differences in cardiovascular mortality in Poland - ecological analysis

1National Institute of Cardiology, Warsaw, Poland, 2Medical Academy, Gdansk, Poland, 3Jagiellonian University, Krakow, Poland, 4Medical University, Lodzi, Poland

Topic: Socio-demographic factors

Background: Cardiovascular disease (CVD) is the leading cause of death in all 16 administrative provinces in Poland. CVD mortality rates and prevalence of CVD risk factors vary considerably among provinces in Poland. The results promote a deeper understanding and awareness of socioeconomic, medical care and environmental determinants related to within country differences in CVD mortality.

Methods: The main outcomes were age-standardised CVD mortality rates (ICD-10 codes I00-I99) in each of 16 provinces for men and women ages 20-74. Also for each province 90 indicators, were collected in 9 categories from several sources: prevalence of risk factors, medical care, economy, education, welfare state, environmental pollution, demography, living conditions, health status.

The analysis was based on univariate correlation and discrimination model and multivariate stepwise regression models. Partial and multiple coefficient of determination was calculated with determinants significant in univariate models.

Results: In men about 73% of the within country variance in CVD mortality were significantly explained by the differences between provinces in the level of air pollution, urbanisation, employment rate, monthly income and expenditure on environmental protection. For women: 42% of those differences were explained by differences in expenditure on environmental protection.

Conclusion: Variance in deprivation between LAs shows a higher association with variance in CVD mortality than variance in deprivation within LAs.

P64 Socioeconomic status and cardiovascular disease: the Mediterranean case. Results from the Italian Progetto CUORE populations

1University of Oxford, Oxford, United Kingdom, 2University of Ghent, Gent, Belgium, 3Universita' degli Studi Milan-Bicocca, Monza, Italy, 4Universita' degli Studi Federico II, Napoli, Italy, 5Centro per la Prevenzione Cardiovascolare, Udine, Italy

Topic: Socio-demographic factors

Purpose: Social factors (SF) could offer useful information for planning prevention strategy for cardiovascular disease (CVD). This analysis aimed to explore the relationship between some SF and major CVD risk factors and to analyse the role of SF in predicting CVD events and deaths in many cohorts, that may be representative of a Mediterranean country, where the disease incidence is low and the relationship with social factors uncertain.

Methods: Data from the CUORE Project, a prospective population-based Italian study, were used: 7,520 men and 13,127 women aged 35-69 years with validated first cardiovascular events. Educational level was categorised into three groups: high school/college/university/higher, secondary school (middle), and primary school (low). Marital status was grouped into two classes: persons living alone and persons married or in-live-partner. Hazard ratios (HR) for cardiovascular events or case-fatality in SF categories were computed using Cox proportional hazard models adjusted for age, cohort and major cardiovascular risk factors (systolic blood pressure, total cholesterol, HDL-cholesterol, diabetes, smoking habits, anti-hypertensive medication).

Results: more than 80% of the studied population are married or live-in-partner, and about 70% have low or medium level of education. There is a significant inverse relationship between educational level and several major cardiovascular risk factors (blood pressure, BMI, triglycerides, diabetes and anti-hypertensive medication) in both genders; living alone was found moderately protective in women, not so in men. No significant relationship between CVD and stroke events and educational level were observed. Considering marital status, the risk of stroke is significantly higher in women living alone than in those married or live-in-partner (hazard ratio 1.36, 95%CI: 1.10-1.41); no relationship between marital status and coronary events is detected in both genders. Cardiovascular case-fatality is significantly higher in men living alone (1.20, 95%CI: 2.21-6.64). This relationship remains for both stroke and coronary case-fatality considered separately.

Conclusions: High level of education resulted protective for main cardiovascular risk factors in both genders; living alone was found protective in women only. In both genders, no significant differences were found in incidence of CVD events and case-fatality by educational level. The protective effect of Mediterranean diet could hide cardiovascular risk linked to lower educational level in the population.

P65 The EUROASPIRE III survey in general practice. Reported lifestyle habits and lifestyle changes in high-risk patients from 12 European regions.

1Imperial College London, London, United Kingdom, 2University of Ghent, Gent, Belgium, 3Universita' degli Studi Milan-Bicocca, Monza, Italy, 4Universita' Degli Studi Dell'insubria, Varese, Italy

Topic: Prevention of CVD

Purpose: The EUROASPIRE III survey of general practice investigated lifestyle and risk factor management in high-risk patients following treatments to lower BP, lipids and manage diabetes.

Methods: The EUROASPIRE III survey was undertaken in selected geographical areas and general practices. Consecutive patients <80 years of age, without a history of atherosclerotic disease, either started on antiplatelet therapy and/or lipid lowering and/or anti-diabetes treatments, were identified retrospectively. Data collection was based on a review of patients’ medical notes and a prospective interview and examination at least six months after the start of medication.

Results: 4366 (76% of all eligible) patients (mean age 60 years, 56% female) were interviewed. They reported lifestyle habits and changes since treatment was started. Prevalence of smoking at interview was 17% overall. 73% of smokers had been advised to quit, 11% to use NRT. Only 5% accessed a specialist smoking cessation service. Self reported dietary changes are shown in the table. 57% of all patients reported trying to incorporate more everyday physical activity in their lives, and in 11% following specific advice from a professional. 83% of patients were overweight (BMI ≥ 25kg/m2), 44% obese (BMI ≥ 30kg/m2) and 53% centrally obese (waist circumference ≥ 102 cm men, ≥ 89 cm women). Overweight (obese) patients, 69% (83%) had been told they were overweight, 45% (65%) had followed dietary recommendations and 36% (52%) had tried regular physical activity to lose weight.

Conclusions: Only a small proportion of smokers had received professional medical support to stop smoking. Sedentary habits were reported in the majority, although nearly one half reported trying to incorporate more everyday physical activity into their lives. Overweight and obesity are very prevalent in a low risk patient population attempting to lose weight. High-risk patients require professional help to achieve healthy lifestyle changes to reduce their risk of developing CVD.

Table

<table>
<thead>
<tr>
<th>Lifestyle habit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing fat</td>
<td>82</td>
</tr>
<tr>
<td>Changing from saturated to unsaturated fat</td>
<td>76</td>
</tr>
<tr>
<td>Increasing fruit and vegetables</td>
<td>79</td>
</tr>
<tr>
<td>Eating more oily fish</td>
<td>40</td>
</tr>
</tbody>
</table>
Chronic exposure to environmental tobacco smoke seems to confer to the develop-
ment of left ventricular systolic dysfunction in hospitalised patients with acute coronary syndromes

C Chrysohoou1, D B Panagiotakos2, P Aggeopoulos2, C Liontou1, J Skoumas1, G Metallinos1, C Pitsavos1, C Stefanadis1

1Athens, Greece, 2Harokopio University, Athens, Greece

Chronic exposure to environmental tobacco smoke seems to confer to the development of left ventricular systolic dysfunction in hospitalised patients with acute coronary syndromes.

Methods: Several studies have revealed that exposure of non-smokers to environmental tobacco smoke (ETS) is associated with a substantial increase in the risk of coronary heart disease and lung cancer. The purpose of this study was to investigate the association between chronic exposure to ETS and the risk of developing left ventricular systolic dysfunction (LVSD) after an acute coronary syndrome (ACS) event; and to investigate the effect of ETS on cardiovascular risk markers related to cardiovascular disease.

Results: During 2006-2007, 144 male (65.1±14 years) and 50 female (71±12 years) consecutive ACS (myocardial infarction or unstable angina) patients who developed LVSD after the cardiac event and 129 male (64±12 years) and 51 females (62±10 years) consecutive ACS patients who did not develop LVSD after the event, were included in this case-control study. Detailed information regarding their medical records, anthropometric data, physical activity, smoking and other lifestyle habits, were recorded. Exposure to second-hand smoke (>30 minutes per day and <1 day per week) by non-smokers was recorded. Furthermore blood samples were collected during the third day of their hospitalisation. Multiple regression analysis was used to evaluate the effects of exposure to ETS on the occurrence of LVSD and levels of various markers, including N-terminal pro-brain natriuretic peptide (NT-proBNP).

Conclusions: Exposure to ETS was reported by 56% of those who developed LVSD, and 49% of those who did not develop LVSD. Multivariable-adjusted analysis revealed that ACS patients exposed to ETS were 2.5-times more likely to develop LVSD after the cardiac event (OR=2.56; 95% CI 1.35-3.62; p=0.001), controlling for age, gender, diabetes mellitus, hypercholesterolemia, physical activity status, smoking, type of acute coronary syndrome and previous known history of coronary heart disease. Furthermore, among patients with LVSD those exposed to ETS had higher values of NT-proBNP compared to those who were not exposed (1383.6±737.9 vs. 484.9±66.6 pg/ml; p=0.006). The latter association was not evident among non-left ventricular systolic dysfunction patients.

The work supports the hypothesis that exposure to ETS increases the risk of developing LVSD after an ACS. Furthermore, the exposure of ETS seems to increase the level of NT-proBNP among ACS patients who developed LVSD. The latter finding may suggest a possible mechanism, by which ETS virtue its adverse effects on myocardial function, causing a further increase of left ventricular end-diastolic pressure.
P70 Policy and practice of secondary prevention of coronary heart disease in Ireland: a narrative analysis
ME Cupple1, J Wilson1, M Donnelly1, L Prior1, SM Smith2, M Byrne3, M Corrigan1, AW Murphy1
1Queen’s University, Belfast, United Kingdom, 2Trinity College, Dublin, Ireland, 3National University of Ireland, Galway, Ireland

**Topic:** Prevention of CVD

**Objective:** to examine policies for secondary prevention of coronary heart disease (CHD) in two different healthcare systems in Ireland and compare their impact on practice.

**Methods:** Within the evaluation of a randomised controlled trial of an intervention designed to improve the secondary prevention of CHD in general practice in Ireland (the SPHERE Study) we identified recent healthcare policy documents (5) and progress reports (6). We analysed these, using a narrative method, regarding the priority given to secondary prevention, the emphasis on modifying CHD risk factors and the locus of responsibility for health. Semi-structured interviews were conducted with a purposively selected sample of policymakers (28), practice nurses (14), general practitioners (12) and patients (12) to explore their awareness of the contents of policy documents and the extent to which these impacted upon their experience in practice. Interview data were analysed using a thematic framework and compared with the findings of the narrative analysis of the documents.

**Results:** There was consensus between documentary and interview findings that CHD mortality and morbidity need to be tackled by targeting antecedents of the disease. Practitioners reported a lack of awareness of strategic documents. Documents which were linked to contractual arrangements for health service provision did impact on practice. Findings indicated a need for policy documents to make their target audience explicit, contractual arrangements to relate to benefits for patients, patients to be made aware of CHD risks and the role of politics in healthcare policy to be acknowledged.

**Conclusion:** the findings suggest that policies should define proposed actions clearly in the context of practice in order to impact on CHD prevention.

P71 Cardiovascular risk factors and risk awareness among medical professionals
E Maier1, AH Hedman1, KT Traumann1, KT Tutt1, ML Limberg1, SP Prokopovits1, KL Lainessaar1
1East–Tallinn Central Hospital, Tallinn, Estonia

**Topic:** Prevention of CVD

**Purpose:** increasing health awareness of the patients is one of the tasks of medical professionals. The aim was to investigate the occurrence of cardiovascular risk factors and risk awareness among medical professionals.

**Methods:** all employees of a Central Hospital were invited to check their health regarding cardiovascular risk factors. Volunteers completed a questionnaire about their lifestyle and health awareness, followed by an objective cardiovascular check. All subjects with cardiovascular risk factors were included to the programme of active life-style consulting to increase their awareness. The aim was to shift cardiovascular risk factors to a lower class of risk after one year.

**Results:** 159 employees (150 females, mean age 50 years) took the initiative to participate the study. Mean BMI of the subjects was 25.2 kg/m2. Systolic blood pressure was above 130 mmHg in 15% and diastolic blood pressure above 86 mmHg in 47% of the subjects. In 8% of the subjects both systolic and diastolic blood pressure were significantly increased (>155/90 mmHg). In 44% of subjects total cholesterol (TC) was moderately increased (5.6-9 mmol/L) and in 18% of subjects TC was >9 mmol/L and higher. Blood glucose was above normal limit in 7% of subjects. 9% of the subjects had high cardiovascular risk. Only 13% of the subjects were aware of their actual blood pressure and TC values. More than 50% of the subjects were not physically active and 22% were smoking.

The mean results of re-check of 85 subjects (83 females) with cardiovascular risk factors 3 years after the life-style consulting are summarised in the Table.

**The mean results of re-check of 85 subjects**

<table>
<thead>
<tr>
<th>BMI (kg/m²)</th>
<th>Baseline</th>
<th>After 3 years</th>
<th>Mean change</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.2</td>
<td>26.2</td>
<td>27.3</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**Systolic blood pressure (mmHg)**

<table>
<thead>
<tr>
<th>Baseline</th>
<th>After 3 years</th>
<th>Mean change</th>
</tr>
</thead>
<tbody>
<tr>
<td>139.5</td>
<td>159.4</td>
<td>0.3</td>
</tr>
</tbody>
</table>

**Diastolic blood pressure (mmHg)**

<table>
<thead>
<tr>
<th>Baseline</th>
<th>After 3 years</th>
<th>Mean change</th>
</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>86</td>
<td>1.4</td>
</tr>
</tbody>
</table>

**TC (mmol/L)**

<table>
<thead>
<tr>
<th>Baseline</th>
<th>After 3 years</th>
<th>Mean change</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4</td>
<td>6.1</td>
<td>-0.4</td>
</tr>
</tbody>
</table>

**Blood glucose (mmol/L)**

<table>
<thead>
<tr>
<th>Baseline</th>
<th>After 3 years</th>
<th>Mean change</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3</td>
<td>5.8</td>
<td>0.4</td>
</tr>
</tbody>
</table>

P72 The Italian observatory of cardiovascular risk: the CUORE Project experience
L Paraci1, R Reff1, L Demaste2, C Donfrancesco3, P Ciecerelli4, M De Rosa5, A Addisi6, S Giampal1
1Università Superiore di Sanità, Rome, Italy, 2CISECA Concorsi Interuniversitari, Bologna, Italy, 3Agenzia Italiana del Farmaco, Rome, Italy

**Topic:** Prevention of CVD

**Purpose:** The Italian national prevention plan includes cardiovascular risk (CR) assessment of the Italian general population aged 35-69 years using the CUORE Project risk score. A national training programme for general practitioners (GPs) was launched by the Ministry of Health in 2003. GPs were encouraged to collect data on risk factors and risk assessment and to contribute to the CUORE Project risk observatory. The aim of this analysis is to demonstrate the feasibility and effectiveness of risk assessment in primary care.

**Methods:** The computer software, free of charge for GPs and easily downloadable by the CUORE Project web site, is the frame for the GPs data collection. The observatory of cardiovascular disease risk provides a platform to analyse collected data on risk assessment and risk factors, and to compare results at regional and national level in order to support health policy makers in their decision process.

**Results:** Up to now, 2,858 health GPs have downloaded the ‘cuore.exe’ software, 65,324 risk assessment were sent to the observatory based on risk factors profile of 41,264 persons (7,353 persons had more than one risk assessment). Mean level of CR was 3.1% in women and 8.7% in men; 29% of men and 64% of women were at low-risk (CR <5%), 10% of men and 0.4% of women were found at high-risk (CR >20%). Among those with at least two risk assessments, 3% shifted to a lower class of risk after one year. Mean level of systolic and diastolic blood pressure decreased by about 2% in one year; total cholesterol more than 2%, and prevalence of smokers decreased by about 5% in the second risk assessment.

**Conclusions:** These data demonstrate that risk assessment can be included as a first step of prevention in primary care. The CUORE Project risk observatory is expected to become an important tool for GPs to focus on prevention and to encourage them to dedicate time to healthy lifestyle counselling.

P73 European quality indicators for cardiovascular disease and prevention
SM Campbell1, S Ludi1, J Vainiholou1, M Wensing1, D Petek1, E Volbrecht1, R Groff1, M Rolanda
1University of Manchester, Manchester, United Kingdom, 2University of Heidelberg, Heidelberg, Germany, 3Radboud University Nijmegen, Nijmegen, Netherlands, 4University Marburg, Lahnau,//., 5Bertolonea Stiftung, Gutersloh, Germany

**Topic:** Quality of care and outcomes research

**Purpose:** The Italian national prevention plan includes cardiovascular risk (CR) assessment of the Italian general population aged 35-69 years using the CUORE Project risk score. A national training programme for general practitioners (GPs) was launched by the Ministry of Health in 2003. GPs were encouraged to collect data on risk factors and risk assessment and to contribute to the CUORE Project risk observatory. The aim of this analysis is to demonstrate the feasibility and effectiveness of risk assessment in primary care.

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**Conclusions:** These data demonstrate that risk assessment can be included as a first step of prevention in primary care. The CUORE Project risk observatory is expected to become an important tool for GPs to focus on prevention and to encourage them to dedicate time to healthy lifestyle counselling.
P74
Health economic evaluation of lifestyle counselling in primary health care, a preven-
tive cardiology project in South-Eastern Sweden
L Hagberg1, L Hellstrom1, F Feldman1, P Johansson1, G Henriksson1, K-O Engman1
1Oslo County Council, Oslo, Norway; 2County Council of Kalmar, Kalmar, Sweden.

Topic: Health economics

The purpose of this health economic evaluation was to assess the cost-effectiveness of lifestyle
counselling methods employed in primary care in the County Council of Kalmar (the Metabolic
Project).

Methods: the study is a before-after study, where patient data at the start of the study is
compared with data collected at 12 months. The intervention costs seek to include all societal
costs, and are presented both as total costs as averted and as the cost of the project if the cost of the
project had become current practice. Patient data are taken from patient medical records and from a
survey including questions on quality of life in relation to health (SF-36). The study includes
161 patients, of which 142 have complete medical data for the estimates of future illness,
performed by a Markov model. For the simulations, we assumed that patients retain the risk
factor levels recorded at 12 months for another year. During the following two years, the risk
factor levels are changed successively, to arrive at the pre-project levels in year five. The Markov
model estimates the future illness in cardiovascular disease and diabetes, expressed as QALYs
(quality-adjusted life-years), and related societal costs. The analysis also includes the increase in
health-related quality-of-life during the project year.

Results: societal intervention cost amount to EUR 2108 per patient. Average patient quality of
life during the project year increased from 0.53 to 0.62 expressed in QALYs. The preventive
effect is estimated to health increases of 0.1 QALY and societal cost decreases of EUR 1665 per
participant. The sum of treatment and preventive effects on quality of life is 0.27 QALY gained
per participant. From a societal perspective, the cost per QALY is estimated to EUR 1643. If costs and
benefits relevant only to a health care provider are included, the result becomes EUR 2739 per QALY.
Furthermore, if the intervention costs are limited to those of current practice implementation, a
net cost saving for the health care provider of EUR 680 per participant is estimated.

Conclusions: the cost per QALY gained is very low compared to many other health care
interventions. Even if only the treatment effect or the preventive effect is taken into
consideration, or if more pessimistic assumptions about the sustainability of risk factor changes
are made, the project is expected to be cost-effective. The reason is that the intervention is
relatively cheap compared to many other interventions in the health care sector, while major
improvements in quality of life and vital medical factors were achieved.

Prevention-Other

P75
What is the importance of the preoperative electrocardiogram in hypertensive patients
aged over 50 years?
LWF Ramos1, D Leite1, E Elly1, M Calil1, JCS Goes1
1Brazilian Institute for Cancer Control, Sao Paulo, Brazil

Topic: Quality of care and outcomes research

Background: A preoperative ECG is recommended for hypertensive patients by many clinical
guidelines and it is ordered routinely, many times before the medical history is obtained and the
physical examination (PE) is performed. The aim of this study was to determine the role of a PE
on electrocardiographic abnormalities and the importance these abnormalities on outcome.

Methods: Two hundred ninety-six patients (64.7 ± 9.8 years; 89.1% females) with cancer and
hypertension as isolated co-morbidities were evaluated in a prospective study. The patients
were divided into two groups based on the PE findings: normal (I) and abnormal (II). In turn, the
groups were divided into two subgroups (Ia, Ib, IIIa, and IIIb) according to the results of the ECG;
each subgroup was further divided into two other groups according to the in-hospital evolution.
The measure of blood pressure at the time of evaluation was not considered. The potential
contribution of age and previous chemotherapy on PE and ECG results was analysed. The role
of the type of anaesthesia, duration of surgery, risk (ASA), previous chemotherapy, and post-
operative management on outcome was also analysed.

Results: Of the 296 patients, 248 patients (83.8%; CI 79.6 - 88.0) had normal PE (group I) and
49 patients (16.2%; CI 12.0 - 20.4) had abnormal PE (group II). Of the 248 patients in group I, 212 patients (85.5%; CI 81.1 - 89.9) had a normal ECG (subgroup Ia and 36 patients (14.5%; CI
10.1 - 18.9) had an abnormal ECG (subgroup Ib). Of the 49 patients in group II, 22 patients
(45.8%; CI 31.7 - 59.9) had a normal ECG (subgroup IIa) and 26 patients (54.2%; CI 44.1 - 68.3)
had an abnormal ECG (subgroup IIb); p<0.001; OR=3.73; CI 1.91 - 7.28). In relation to outcome, 206 patients (94.9%; CI 96.3 - 99.9) from subgroup Ia, 35 patients (92.2%; CI 91.9 - 100) from
subgroup Ib (p=0.725), 21 patients (95.5%; CI 86.8 - 100) from subgroup IIa, and 25 patients
(96.2%; CI 88.8 - 100) from subgroup IIb did not have any adverse outcomes (p=0.90).

Conclusions: Abnormalities in the physical examination are related to abnormalities on the ECG.
However, these abnormalities did not have any impact on surgical outcome, suggesting that
the physical examination may be a simple method of screening for preoperative ECG in
hypertensive patients.

P76
Cardiac protection by volatile anaesthetics in non-cardiac surgery. A randomised
controlled study.
C Gardini1, G Landoni1, E Bigiani1, M Gonfani2, F Distalo1, A Gori1, T Fusco1, A Zangrillo2
1IRCCS H San Raffaele, Milan, Italy; 2IPCSS H San Raffaele, Milan, Italy

Topic: Controlled clinical trials

Purpose: It is a common belief that the choice of primary anaesthetic agent does not result in
different outcomes after cardiac surgery. However, experimental and clinical evidence has
indicated that volatile anaesthetics reduce myocardial infarction and mortality in patients
undergoing cardiac surgery. Whether these cardioprotective properties also exist in non-
coronary surgery settings is still controversial; this study is to investigate this issue.

Methods: We performed a randomised controlled study including 70 consecutive patients
undergoing vascular or thoracic surgery. The study group (35 patients) received sevoflurane as the
main anaesthetic agent (0.5-2.0 minimum alveolar concentration, MAC) while the control
group (35 patients) received a propofol-based total intravenous anaesthesia. Dosages of serum
troponin I, a marker of myocardial necrosis, were performed before surgery and on post-
operative day 1 and 2. An electrocardiogram was performed the first day after surgery.

Results: Patients with detectable postoperative cardiac troponin I in sevoflurane group (3/35
=8.6%) were significantly (p=0.031) less than those in the propofol group (10/35=28.6%).
Thirty-days mortality in sevoflurane group was 1/35 (2.8%); the patient died of respiratory failure
due to a high-grade lung neoplasia. One patient (propofol group) had pulmonary embolism after
discharge from hospital. Two further patients (sevoflurane group) had intra-operative atrial
fibrillation.

Conclusions: This is the first randomised controlled study to evaluate and document the cardiac
protective properties of volatile agents in non-cardiac surgery and to support recent guidelines
that already suggest use of volatile anaesthetic agents during non-cardiac surgery in patients at
risk for myocardial infarction.

P77
Epidural analgesia reduces the composite end point hospital mortality - myocardial
infarction in patients undergoing cardiac surgery surgery. A meta-analysis of random-
ised matched clinical trials.
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Topic: Quality of care and outcomes research

Purpose: The effects of epidural analgesia in cardiac surgery have been questioned by several
studies with controversial results. We conducted a review of randomised studies to show
whether there are any advantages in using epidural analgesia in patients undergoing cardio-
vascular surgery.

Methods: Medical search engines and conference proceedings were searched (updated June
2007) for randomised trials which compared epidural analgesia to intravenous analgesic therapy
in cardiovascular surgery.

Results: A total of 1998 patients from 29 randomised studies were included in the analysis.
Pooled estimates showed that epidural analgesia evidenced a trend towards a reduction in
postoperative myocardial infarction (OR=0.60 [0.34-1.07], p=0.08) and mortality (OR=0.80
[0.39-1.64], p=0.54). Moreover, the reduction of the combined endpoints myocardial infarction
and mortality was statistically significant (OR=0.58 [0.35-0.97], p=0.04) with epidural analgesia.

Conclusions: This analysis suggests that epidural analgesia reduces hospital mortality and
myocardial infarction in patients undergoing cardiovascular surgery.

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Epidural analgesia in cardiac surgery

Epidural analgesia reduces the composite end point hospital mortality - myocardial infarction in patients undergoing cardiac surgery surgery. A meta-analysis of randomised matched clinical trials.

P77

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Epidural analgesia reduces the composite end point hospital mortality - myocardial infarction in patients undergoing cardiac surgery surgery. A meta-analysis of randomised matched clinical trials.
P78
Aspirin resistance in patients with end-stage kidney disease: Is it an effective therapy?
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Topic: Prevention of CV disease

Objective: This study was designed to determine the profile and prevalence of aspirin resistance in end-stage kidney disease (ESKD).

Background: Coronary heart disease is the most common cause of death in patients with ESKD. Aspirin is useful for primary and secondary atherosclerotic disease, but it has been shown to have variable antplatelet activity in individual patients. Aspirin resistance, defined by platelet function testing and clinical unconventionality to aspirin, has been previously reported. However, no information exists concerning aspirin resistance in patients with ESKD.

Methods: We prospectively enrolled 78 patients with ESKD (28 female, 50.6±12.6 year old) and 79 subjects (29 female, 58±10.6 year old) with normal renal functions (glomerular filtration rate [GFR] >60 ml/min/1.73 m²). All the subjects of the patient and control groups were using aspirin at least for 30 days and were not using other antplatelet agents. Platelet function was assessed using with arachidonic acid-induce aggregometry (APL test). Aspirin resistance was defined as having >300UAI by the multiple electrode aggregometry aggresive rate despite regular aspirin therapy.

Results: Aspirin resistance is more prevalent in patients with ESKD (42.2%) when compared with patients those have normal renal functions (21.5%). The difference was statistically significant (p=0.005). There were no statistically significant differences between ESKD and normal renal function groups by means of sex, age, tobacco use, presence of diabetes mellitus and platelet count.

Conclusions: This study demonstrates the natural history and prevalence of aspirin resistance in patients with ESKD. Frequency of aspirin resistance is higher in patients with ESKD while using aspirin than that in patients with normal renal function. Monitoring of aspirin resistance in patients with ESKD may support the optimization of antplatelet therapy with additional or alternative agents.

P79
Do we really know what makes us prescribe a glycoprotein IIb/IIa inhibitor in acute coronary syndrome patients?
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Topic: Quality of care and outcomes research

Objective: To examine the associations of genetic variation in the IL-1 cluster with IL-1 receptor antagonist (IL-1ra), C-reactive protein (CRP), interleukin 6 (IL-6) and fibrinogen phenotypes.

Methods: In the AIRGENE study, 972 myocardial infarction (MI) survivors were followed up prospectively for 6-8 months with monthly measurements of CRP, IL-6 and fibrinogen (altogether 5794 measurements). IL-1ra was measured in two centres from 392 individuals (2299 measurements). We genotyped common haplotype tagging SNPs (n=15) from the IL1A, IL1B and IL1RN genes and analysed the data using mixed effect models to account for the repeated sampling design. False discovery rate (FDR) was used to control for multiple testing.

Results: Six SNPs in the IL1A and IL1RN genes were associated with the IL-1ra levels in an additive model (Table 1). The coding IL1RN rs315992 explained 8.5-9.5% of the phenotypic variation of IL-1ra. Rs315992 also associated with IL-6 levels in the recessive model (Beta=0.154, p=0.005, FDR=0.10). Furthermore, IL1A rs1005037 associated with fibrinogen levels in the additive model (Beta=0.018, p=0.026, FDR=0.14). IL-1ra levels associated with haplotypic variation of those SNPs shown in Table 1 (p<0.02, FDR<0.03). The IL1RN haplotypes associated with IL-6 levels (p=0.035, FDR=0.18). A rare variant of IL1A/IL1B haplotype associated with CRP levels (p=0.003, FDR=0.091).

Conclusions: Variation in the IL1A and especially in the IL1RN gene is a significant determinant of IL-1ra levels. Associations with CRP, IL-6 and fibrinogen were limited to few variants.

Table1

Genes | SNP | Geneotype | n | Beta | p-value | FDR
--- | --- | --- | --- | --- | --- | ---
IL1 | rs1005037 | AA/AG/GG | (38/77/378) | -0.056 | 0.037 | 0.074
IL1 | rs285636 | TT/TC/CC | (45/43/566) | 0.084 | 0.002 | 0.026
IL1 | rs785488 | GGG/GA/AA | (107/18/30) | -0.109 | 0.019 | 0.060
IL1RN | rs315992 | C/T/C/T | (45/20/11) | 0.112 | 0.0002 | 0.0001
IL1RN | rs452341 | TT/T/G/T | (124/50) | -0.247 | 0.0003 | 0.0009
IL1RN | rs315949 | AA/G/G/G | (42/27/17) | -0.105 | 0.0005 | 0.0005

Associations of IL-1ra with IL1A and IL1RN genotypes in the additive models.

P80
Association of interleukin 1 (IL-1) gene variation with IL1-1 receptor antagonist and inflammation marker phenotypes in myocardial infarction survivors
K Luoto1, M Alaimi1, T Lanki2, B-M Loo3, A Jula4, M Perola1, A Peters5, V Salomaa6
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Topic: Genetic-environmental interactions

Objective: To examine the associations of genetic variation in the IL-1 cluster with IL-1 receptor antagonist (IL-1ra), C-reactive protein (CRP), interleukin 6 (IL-6) and fibrinogen phenotypes.

Methods: In the AIRGENE study, 972 myocardial infarction (MI) survivors were followed up prospectively for 6-8 months with monthly measurements of CRP, IL-6 and fibrinogen (altogether 5794 measurements). IL-1ra was measured in two centres from 392 individuals (2299 measurements). We genotyped common haplotype tagging SNPs (n=15) from the IL1A, IL1B and IL1RN genes and analysed the data using mixed effect models to account for the repeated sampling design. False discovery rate (FDR) was used to control for multiple testing.

Results: Six SNPs in the IL1A and IL1RN genes were associated with the IL-1ra levels in an additive model (Table 1). The coding IL1RN rs315992 explained 8.5-9.5% of the phenotypic variation of IL-1ra. Rs315992 also associated with IL-6 levels in the recessive model (Beta=0.154, p=0.005, FDR=0.10). Furthermore, IL1A rs1005037 associated with fibrinogen levels in the additive model (Beta=0.018, p=0.026, FDR=0.14). IL-1ra levels associated with haplotypic variation of those SNPs shown in Table 1 (p<0.02, FDR<0.03). The IL1RN haplotypes associated with IL-6 levels (p=0.035, FDR=0.18). A rare variant of IL1A/IL1B haplotype associated with CRP levels (p=0.003, FDR=0.091).

Conclusions: Variation in the IL1A and especially in the IL1RN gene is a significant determinant of IL-1ra levels. Associations with CRP, IL-6 and fibrinogen were limited to few variants.

Genetic environmental interaction

P81
High Mobility Group Box 1 protein as early marker of heart failure in patients with acute myocardial infarction
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Topic: Prognostic markers

Purpose: Scientific evidence has accumulated on the predictive role of plasma molecules such as SAA and CRP in the evolution of chronic heart failure (CHF) in patients after acute myocardial infarction (AMI). High Mobility Group Box 1 (HMGB-1) is a nuclear protein involved in the mechanism of DNA stabilisation, normally present in all cells. Cellular death following AMI leads to the release of this protein into the blood stream. It has been recently shown that HMGB-1 plasma levels are significantly increased in patients with acute coronary syndrome. Cardio-pulmonary exercise test (CPT) and echocardiography provide important morphologic and functional information for evaluating a possible evolution toward CHF in patients after AMI. Therefore, aim of our study was to evaluate the correlation between elevated plasma levels of HMGB-1 and the parameters deriving from CPT and echocardiogram in patients after AMI, in order to investigate the potential role of this protein as possible predictor of evolution to CHF.

Methods: Plasma levels of HMGB-1 were measured by the ELISA method in patients in AMI = 54, 1-3 days after admission, all homogeneous for clinical characteristics. In addition, patients underwent echocardiography and, 2 weeks after AMI, CPT.

Results: HMGB-1 levels in AMI patients were significantly higher compared to age- and BMI-matched controls (14.8 ± 6.8 vs 2.3 ± 1.8 mg/ml, respectively, p<0.0001). Elevated plasma concentrations of HMGB-1 were correlated with reductions of left ventricular (LV) ejection fraction and an increase in LV end-diastolic volume (P<0.001). In addition, elevated plasma concentrations of HMGB-1 were correlated with a reduction of VO2peak, and an increase in VE/VO2 slope (p<0.001).

Conclusions: The increased plasma concentration of HMGB-1 in patients with recent AMI is associated with an unfavorable LV remodelling and a worse functional capacity. These results suggest a potential role of HMGB-1 as an early predictor of evolution to CHF in patients with AMI.
P82  Genetic variants associated with Insulin Resistance and Metabolic Syndrome in young Asian Indians with myocardial infarction  

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Topic: Genetic-environmental interactions  

Background: The objective of this study was to assess whether an association exists between the metabolic syndrome and polymorphisms in genes involved in insulin resistance in young Asian Indian patients presenting with acute myocardial infarction (AMI).  

Methods: The study population comprised 467 patients who were 45 years or younger. The National Cholesterol Education Program [NCEP ATP III] and the International Diabetes Federation [IDF] definitions were used to assess the prevalence of the metabolic syndrome. We examined the genotype and allele frequencies of the INS I72T, PPARG-S232A, KCNJ11 E23K, and TNP alpha-308G/A polymorphisms in relation to the metabolic syndrome determined by both definitions.  

Results: The metabolic syndrome as defined by the NCEP ATP III criteria was found in 282 [60.4%] patients, and in 278 [59.5%] patients according to the IDF criteria. This gave only a moderate level of agreement of 79% between the two definitions (Cohen’s kappa = 0.554). No association was found between the INS I72R, PPARG-S232A, and KCNJ11 E23K, or TNP alpha-308G/A polymorphic variants and the metabolic syndrome, or its components, for either definition.  

Conclusion: Although the metabolic syndrome is a common finding in young Asian Indian patients with AMI, there was only a moderate level of agreement between the NCEP ATP III and IDF definitions of the syndrome. Our findings do not support a role for any of the polymorphic variant alleles in the four insulin resistance related genes examined in the etiology of insulin resistance, and reinforces the notion of a multifactorial aetiology for the metabolic syndrome.

P83  Household effect to variance of glucose and lipid phenotypes in the Moli-Family study  

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1Università Cattolica del Sacro Cuore, Casolano, Italy  

Topic: Genetic-environmental interactions  

Lipids are heritable traits strongly associated with cardiovascular risk. Determination of the relative contribution of environmental factors shared by members of a household (household effects-HE) can identify important targets in preventing lipid disorders. However, such data are scant and inconsistent.  

Methods: We estimated heritability of glucose and lipid traits including consideration of HE in extended pedigrees. We recruited 94 families (434 subjects/family, 409 different households) from 29 control families and 25 families identified through a proband with a premature MI. The variance-components approach was used to estimate heritability. Age, sex, age2, age2xsex, therapy and CVD event were considered as covariates in the basic model.  

Results: We observed high prevalence of dyslipidemia (69.3%) and diabetes (6.2%) in the cohort. Heritabilities were highly significant for all the traits, except of glucose where significant at p<0.01(table). HE component was significant for triglycerides (TG) and glucose only and accounted for 10.7% and 15.3% of their residual phenotypic variability. Covariates accounted for 0.075* - 0.281 of variance due to final effects-HE) can identify important targets in preventing lipid disorders. However, such data are scant and inconsistent.  

Conclusion: Heritability Household All covariates  

<table>
<thead>
<tr>
<th>Trait</th>
<th>Heritability</th>
<th>Household</th>
<th>All covariates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chol (mg/dl)</td>
<td>0.42±0.08*</td>
<td>-</td>
<td>0.363</td>
</tr>
<tr>
<td>TG (mg/dl)</td>
<td>0.33±0.075*</td>
<td>0.10±0.052*</td>
<td>0.226</td>
</tr>
<tr>
<td>LDL-C (mg/dl)</td>
<td>0.41±0.075*</td>
<td>-</td>
<td>0.281</td>
</tr>
<tr>
<td>HDL-C (mg/dl)</td>
<td>0.49±0.105*</td>
<td>-</td>
<td>0.110</td>
</tr>
<tr>
<td>AP</td>
<td>0.45±0.075*</td>
<td>-</td>
<td>0.223</td>
</tr>
<tr>
<td>Glucose (mg/dl)</td>
<td>0.39±0.066*</td>
<td>-</td>
<td>0.153±0.056*</td>
</tr>
</tbody>
</table>

Conclusions: Significant HE was identified for heritability of glucose and cholesterol. This highlights importance of family based preventive strategies, probably with focus on shared dietary patterns, in preventing TG and glucose disorders.

P84  Angiogenins converting enzymes (ACE) gene insertion/deletion allele is independently associated with higher troponin I levels in acute coronary syndrome  

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Topic: Genetic-environmental interactions  

Background: The insertion/deletion polymorphism of angiotensin converting enzyme (ACE) genotype has been reported as an independent risk factor for the development of myocardial infarction (MI), even if there are conflicting data showing no relationship between the ACE genotype and coronary artery disease. The troponin I value is now widely used as a marker of risk in ACS, but determinants of its release have not been defined. The present study was performed by comparing the distribution of ACE genotypes in patients with acute MI and to investigate the correlation between ACE genotype polymorphism and Troponin I levels.  

Methods & subjects: We studied 211 caucasian patients, (166 males; mean age 63.2 (SD 12.5) years) admitted to STEMI and alive 30 days after hospitalisation in a coronary care unit. All patients underwent coronary angiography and, if appropriate, primary PCI. Baseline clinical data were recorded; serial blood samples were obtained for troponin-I assay, blood sample for ACE gene polymorphism was stored. ACE DD/D polymorphism was analysed with polymerase chain reaction on DNA from white blood cells.  

Results: The distribution between the genotypes (ID 44.7%, ID 42.4%, II 12.9%) of known risk factors for coronary artery disease (hypertension, total cholesterol, LDL cholesterol, smoking, age) were similar. Significant troponin-I release (>0.1 microg/l) was detected in 970 patients. Logistic regression modelling, performed to test the association of the selected risk factors simultaneously with the genotype profile showed that ACE ID/II combined genotype, was related strongly with troponin I values (median 3.3 vs 15.1 microg/l, p<0.005) in subjects more older (mean age 68.1±11 yrs vs 62.2±12 yrs, p<0.002) an with MBF office lower (84.4±22 mmHg vs 90.1±13.5 mmHg, p<0.02).  

Conclusions: Our data suggest that ACE ID/II combined vs DD genotype in patients with acute coronary syndrome is independent marker of troponin I release. The relationship with higher troponin value suggest a worse prognosis in this patients per se, without correlation with known risk factors.

P85  PON M55L polymorphism associates with higher c reactive protein levels in essential hypertension  

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Topic: Hypertension  

Background: Paroxysmal atrial fibrillation is a high-density lipoprotein associated enzyme, protects lipoproteins from lipid oxidation that, by activating reactive oxygen species generation, may induce systemic inflammation thereby promoting atherosclerotic vascular disease. Previous studies have shown an increased cardiovascular disease risk in subjects carrying the PON M55 allele of the gene coding for paraoxonase (PON) activity possibly because carriers of the M allele have reduced plasma concentration and activities of paraoxonase.  

Methods and definitions: PON M55L genotype, ho-CRP (high sensitivity immunonephelometry), body mass index (BMI), smoking, 24-hour BP, BMI, lipid, post-stimulative (75 grams po, AUCO-120min) plasma glucose and insulinemia were evaluating in 190 never treated, glucose tolerant, non-diabetic essential hypertensive men without overt cardiovascular and renal disease.  

Results: Age (49±9.11 vs 50.8±2.3 yrs), Total Cholesterol (215.3±4.6 vs 213.8±4.2 mg/dl), HDL-C (45.8±1.1 vs 44.3±1.3 mg/dl), BMI (26.7± vs 26.5), plasma glucose (103±± 1.4 vs 102±1.4 mmol/dl), 24h SBP (136.±± vs 131.±± 2 mmHg) did not differ by PON55 (Ll, n=89, vs MM/ML, n=101) ho-CRP (2.8±0.4 vs 4.4±0.4 p<0.01) and InsAUC (7226±361 vs 9712±325, p<0.05) were significantly higher in PON ML/MM than LL subjects but only the former remained significant after accounting for all the above variables (p<0.03).  

Conclusions: In uncomplicated essential hypertensive patients, PON M55L polymorphism associates with ho-CRP levels, a marker of subclinical inflammation and a predictor of clinical events.
Cardiovascular rehabilitation

P86

Long-term results of a 12 weeks comprehensive ambulatory cardiac rehabilitation programme and predictors for success

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Background: Ambulatory cardiac rehabilitation programmes are generally successful short-term. Long-term results and data in regard to predictive factors for success are rare.

Methods: 200 consecutive patients (pts) attending a 12 week comprehensive outpatient cardiac rehabilitation programme were evaluated for cardiovascular risk factors at entry, at the end and 1 year after completion of the programme. The cohort includes 135 pts with acute coronary syndrome or myocardial infarction, 34 pts after heart surgery and 33 pts with heart failure.

Results: c.f. Table 1

Conclusion: A 12 week comprehensive outpatient cardiac rehabilitation programme has good results in regard to risk factor control, medication and psychosocial factors except for BMI and smoking in women. Improvements were maintained over time.

Table 1

<table>
<thead>
<tr>
<th>Risk factors (%)</th>
<th>Programme entry</th>
<th>Programme end</th>
<th>follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>smoking, m</td>
<td>47.2</td>
<td>11.6</td>
<td>16.0</td>
</tr>
<tr>
<td>smoking</td>
<td>33.4</td>
<td>16.0</td>
<td>22.2</td>
</tr>
<tr>
<td>BMI</td>
<td>56.9</td>
<td>24.0</td>
<td>27.8</td>
</tr>
<tr>
<td>total Chol &gt;5.2 mmol/l</td>
<td>15.5</td>
<td>27.7</td>
<td>20.1</td>
</tr>
<tr>
<td>LDL - Chol &gt;3 mmol/l</td>
<td>59.0</td>
<td>27.3</td>
<td>26.3</td>
</tr>
<tr>
<td>HDL - Chol &gt;1.2 mmol/l</td>
<td>61.8</td>
<td>67.2</td>
<td>77.0</td>
</tr>
</tbody>
</table>

Medication (%)

<table>
<thead>
<tr>
<th>ACEI/AT2 antagonists</th>
<th>73.6</th>
<th>75.5</th>
<th>74.9</th>
</tr>
</thead>
</table>

HADS

Living alone and younger age were important predictors for persistent smoking, anxiety for BP > 140 / 90 mmHg, female gender for lipid control and living alone for BMI.

P87

The Italian SurveY on cardiac rehabilitation (ISYDE-2008). Patients characteristics and current provision of cardiac rehabilitation

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Aim: to provide specific information on characteristics of pts admitted to CR, diagnostic procedures, exercise and educational programmes, treatment, and to compare current provision with recommendation of National GL.

Methods: The ISYDE-2008 is a multicentre, longitudinal, prospective national registry, designed with recommendation of National GL.

Background: Ambulatory rehabilitation programmes are generally successful short-term.

Results: of the ISYDE-2008 broad participation offers a detailed snapshot of current CR provision, organisation and activities.

P88

Effect of ambulatory cardiac training on intensity of erectile dysfunction in men with ischemic heart disease

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Topic: Cardiovascular rehabilitation

There is a strong evidence of the interaction between erectile dysfunction (ED) and common risk factors of atherosclerosis. One of the most significant risk factor seems to be a sedentary lifestyle.

Aim: to study the effect of ambulatory cardiac training on clinical presentation of ED.

Material and Method: study population consisted of 98 patients with IHD at the mean age of 62.58 ± 8.88 years, in whom ED was diagnosed with ≥ 21 scores in IIEF-5 questionnaire. According to the IIEF-5 scores, the ED pts were divided to the four severity group, from the severe to the mild form of ED I (0-7 scores), 35 pts; II (8-11 scores), 10 pts, III (12-16 scores), 27 pts, IV (17-22 scores), 26 pts. The IIEF-5 was repeated in all the patients after finishing the cardiac rehabilitation programme. All the pts underwent 6-month cardiac rehabilitation with physical training performed 5 times a week. The training comprised a 45-min cyclogometer training (ERGOLINE system) with the 4-min interval loads (50% of those established during the ECO exercise testing) increasing with time and broken by the 2-min rest with 10 Watt load (3x/week), with generally improving exercises (2x/week).

Results: after the six-month cardiac rehabilitation, in all the IHD men with ED a statistically significant (p = 0.03) improvement in ED intensity, as tested with IIEF-5 questionnaire, was found: 11.86 ± 6.2 (ED-I vs. 13.49 ± 7.07 (ED-II). The strongest improvement was noted in the ED group III: 14.07 ± 1.22 vs. 17.7 ± 1.80.

Conclusion: the long-term ambulatory cardiac rehabilitation programme showed a positive influence on erectile dysfunction intensity in the men with ischemic heart disease.

P89

Improvement of pulmonary parameters in early versus late inclusion in an ambulatory cardiac rehabilitation in CABG patients

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Topic: Cardiovascular rehabilitation

Aim: to show that early ambulatory rehabilitation inclusion after sternotomy gives rise to a faster pulmonary recovery in comparison with late start up.

Methods: 36 patients (26 m, 10 w, 65 y) were included in an outpatient multidiplinary rehab programme for three months on average 14 days post surgery (’early’ group). The ’late’ group (40 subjects 33 m, 7 w, 62 y) started up in a similar programme on average 29 days after sternotomy.

During the training period at regular times all patients underwent 3 bicycle tests during which ventilational and hemodynamic parameters were assessed.

Results: the evolution of the tidal volume (TV) and the maximal lung capacity (VOD) were similar between groups was compared by means of a one-way ANOVA statistical technique. The early group however showed a faster improvement in both parameters.

Conclusion: no significant difference in final evolution between both early and late inclusion was found for TV and VOD. The early group however showed a faster improvement in both parameters.
Comprehensive rehabilitation in uncomplicated acute myocardial infarction after revascularisation
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1Timisoara, Romania
Topic: Cardiovascular rehabilitation

Premise: Successful revascularisation or angioplasty in uncomplicated AMI does not alter CHD progression even with ideal medication.

Objectives: To use medium-term (5 years) results of added sustained exercise training programme in these patients.

Material and Method: We included 103 uncomplicated AMI patients undergoing either thrombolysis (47 patients-group A) or empiric angioplasty (56 patients-group B) until 2003, which performed phase I and II rehabilitation in specialised environment. From these, 52 patients (27 thrombosis, 25 angioplasty) performed phase III rehabilitation for 5 years, the rest forming a control group.

The starting parameters were slightly different with more young men in the exercise group. We followed the CHD course and effort capacity by biannual follow-up, including control coronarography in 43 patients.

Results: In thrombolysed patients we had higher anginal threshold, lower rest HR and fewer hospital admissions in the exercise group (15% vs 26% p=0.02, 62 vs 74 bpm p=0.01, 14% vs 13% p=0.04). There were more diurethiasms (15% vs 11% p=0.04), systolic performance and mortality were not changed, with a negative trend. In the angioplasty group we had less anginal episodes, fewer hospital admissions, lower rest HR and diurethiasms (6.4% vs 12% p=0.03, 64 vs 71 bpm p=0.02, 10 vs 17 days p=0.01, 13% vs 17% p=0.04). Systolic performance and mortality were not influenced with a positive trend.

The effort parameters improved in both exercise groups (VO2 max, exercise time, maximum HR, venous lactate) with no significant difference between the method of revascularisation. In the control coronarography group exercise decreased restenosis in the angioplasty group but not in thrombolysed patients. CHD progression was the same without exercise.

Conclusion: Exercise training improved CHD course, being more effective after angioplasty than thrombolysis in uncomplicated AMI patients at 5 years. Restenosis was not affected after thrombolysis, but deserves more study after stent placing.

The heart rate response to one exercise session guided by the Borg scale in heart failure patients.
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Topic: Cardiovascular rehabilitation

Background: Hydrotherapy is a new method of rehabilitation and an alternative to patients with orthopedic disorders.

Aim: To evaluate the heart rate response to one session of land and water exercise training guided by the Borg scale in heart failure patients.

Methods: Patients performed the cardiopulmonary exercise test to determine the anaerobic and ventilatory threshold. The percentage of the mean heart rate during the exercise session in relation to the anaerobic threshold heart rate (%EHR-VT), in relation to the peak heart rate by the exercise test (%EHR-Peak) and in relation to the maximum predicted heart rate (%EHR-Predicted) were performed. Than, patients were randomised into land and water exercise groups. One blinded investigator instructed the patients to walk between "relatively easy and slightly tiring" (11-13 of the Borg scale). The heart rate mean during the 30 minutes of exercise session was recorded by a monitor.

Results: The %EHR-VT (AT-114±11 to 111±11, p=0.32) and %EHR-Predicted (63±8 to 58±7, p=0.06) were not different between land and water groups, but different in the %EHR-VT (95±7 to 81±7, p=0.001) and in the %EHR-Peak (85±8 to 78±9, p=0.007). The %EHR-VT (n=63, p=0.018) showed an agreement between land and water groups, but %EHR-VT (n=33, p=0.32), %EHR-Peak (n=18, p=0.48) and %EHR-Predicted (n=38, p=0.75) did not.

Conclusion: Exercise training guided by the Borg scale can be a safe method to train heart failure patients.

Heart-rate profile changes during exercise after cardiac rehabilitation are wider in diabetic coronary patients
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1STAR for LIFE, Siracusa, Italy
Topic: Cardiovascular rehabilitation

Purpose: The aim of this study was to assess the changes of the heart rate (HR) at rest, peak of exercise and in the first 3 minutes of recovery from exercise-induced by cardiac rehabilitation (CR) in coronary artery disease (CAD) patients (pts) with and without diabetes mellitus (DM).

Methods: From April 2007 to May 2008, one hundred ten coronary patients (pts), without history of pacemaker implantation or atrial fibrillation, mean age 64.69 +/- 9.73 years, referred to physician-supervised outpatient CR, were consecutively enrolled for this study and subdivided in two groups: 1) 33 pts, with DM (group A), and 2) 77 pts without DM (group B). All pts underwent exercise testing (ET) previous and after the CR. The resting heart rates, the increase in rate from the resting level to the peak exercise level, and the heart rate recovery rate (HRR), resulting from the difference between the heart rate (HR) achieved at the peak of exercise and the HR throughout the first 3 minutes of recovery from exercise were measured during the initial and final ET.

Results: The results expressed as mean values plus/minus SD, SEM and P value, respectively before and after CR, are shown in table 1.

Conclusion: We can conclude that after CR changes in the resting and recovery HR were enough similar in both groups, but the HR increase from the resting level to the peak exercise level was wider in diabetic pts.

<table>
<thead>
<tr>
<th>Group</th>
<th>Measure</th>
<th>Before CR</th>
<th>After CR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>HR rest</td>
<td>74.7±12.57 (SEM: 2.190)</td>
<td>69.58±10.09 (SEM: 1.756)</td>
<td>P = 0.010</td>
</tr>
<tr>
<td>A</td>
<td>HRRpeak-H</td>
<td>56.79±16.31 (SEM: 2.830)</td>
<td>63.5±13.01 (SEM: 2.425)</td>
<td>P = 0.002</td>
</tr>
<tr>
<td>B</td>
<td>HR peak</td>
<td>19.3±10.88 (SEM: 1.905)</td>
<td>24.55±15.33 (SEM: 2.703)</td>
<td>P = 0.064</td>
</tr>
<tr>
<td>B</td>
<td>HRR peak</td>
<td>32.15±12.08 (SEM: 2.103)</td>
<td>40.3±14.56 (SEM: 2.553)</td>
<td>P = 0.000</td>
</tr>
<tr>
<td>B</td>
<td>HRRrest</td>
<td>40.3±13.15 (SEM: 2.404)</td>
<td>48.5±12.17 (SEM: 2.351)</td>
<td>P = 0.000</td>
</tr>
<tr>
<td>B</td>
<td>HRRrest</td>
<td>72.6±11.83 (SEM: 1.348)</td>
<td>68.5±13.14 (SEM: 1.316)</td>
<td>P = 0.010</td>
</tr>
<tr>
<td>B</td>
<td>HRpeak-H</td>
<td>58.45±17.75 (SEM: 2.023)</td>
<td>61.12±17.26 (SEM: 1.967)</td>
<td>P = 0.013</td>
</tr>
<tr>
<td>B</td>
<td>HR peak</td>
<td>20.77±11.21 (SEM: 1.282)</td>
<td>22.96±9.998 (SEM: 1.139)</td>
<td>P = 0.087</td>
</tr>
<tr>
<td>B</td>
<td>HRR peak</td>
<td>33.87±14.74 (SEM: 1.604)</td>
<td>38.21±11.62 (SEM: 1.552)</td>
<td>P = 0.006</td>
</tr>
<tr>
<td>B</td>
<td>HRRrest</td>
<td>39.96±15.15 (SEM: 1.722)</td>
<td>46.09±15.14 (SEM: 1.725)</td>
<td>P = 0.000</td>
</tr>
</tbody>
</table>

HR: Heart Rate, HRRpeak-H: HR increase from resting to the peak exercise level, HRRrest: decrease in rate from the peak exercise level to one (1), rest to two (2), three (3) minutes of recovery from exercise.

Effect of a targeted behaviour change programme in highly educated adults: a randomised controlled trial
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Topic: Behavioural medicine

Objectives: Little is known about the effectiveness and the adequate intervention dose of interventions to change multiple risk behaviours for cardiovascular disease. The aims of our study were to examine the effects and the dose-response effects of a tailored behaviour change programme on behaviour, diet, physical activity and smoking, in a highly educated study sample.

Methods: A general sample of 314 highly educated adults was recruited in Belgium and allocated at random using a 2:3 ratio to an intensive intervention and a standard intervention. The participants that were allocated to the intensive intervention received medical assessments and could choose for behaviour change interventions (access to a tailored website, individual coaching and group sessions). Moreover, each participant in this study group could determine the dose (frequency and duration) and the delivery mode (e-mail, telephone, face-to-face) of his or her individual coaching at baseline. Participants in the standard intervention received medical assessments for data collection. The behavioural outcome measures were assessed with a validated full intake questionnaire, the international physical activity questionnaire (IPAQ) and a national health questionnaire for smoking. Repeated measures analysis of variances were used to examine the differences between the study groups. Linear modelling was used to examine the dose-response effects for diet and physical activity.

Results: Of the participants, 236 completed the questionnaires at baseline and after one year of intervention. Both the intensive intervention and the standard intervention resulted in a lower fat intake (p<0.05) and a higher level of physical activity (p<0.001). In the total sample, 23% of the smokers quitted smoking. No significant differences between the study groups were found for diet, physical activity and smoking. Independent of the motivation for behaviour change at baseline, significant dose-response effects were found for the intensive intervention. For diet, frequent telephone coaching should be combined with frequent face-to-face sessions to reduce the fat intake (p<0.001). Intensive telephone coaching should be supplemented with frequent e-mails to increase physical activity (p<0.05).

Conclusion: No differences were found between the intensive intervention and the standard intervention. However, significant dose-response effects were found for the intensive intervention. The latter finding emphasises the need to determine the adequate intervention dose and delivery mode to change behaviour in cardiovascular prevention programmes.
Individualisation and supervised exercise adds value to cardiac rehabilitation: The effects on mortality and morbidity of an individualised, menu-based cross-sector programme in Scotland

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Objective: The primary objective is to evaluate the efficacy of a motivational support (MS) intervention, delivered within the context of a standard CRP, in increasing adherence to regular exercise among cardiac patients. Secondary objectives include evaluation of psychosocial process variables.

Methods: Cardiac patients (N=60) were recruited from a CRP and randomly assigned to a MS counseling or an attention control (AC) group. The MS group received the standard CRP plus five 20-30-minute counseling sessions delivered by an exercise counselor. 1 face-to-face contact after first CRP class and 4 telephone contacts (2, 4, 8 and 12 weeks later). The MS sessions focus on enhancing autonomous motivation and self-efficacy for exercise, formulating attainable exercise goals and plans, problem solving, and facilitating links to community-based exercise programmes. The AC group receives the standard CRP and 5 non-counseling telephone contacts at times consistent with the MS sessions. The primary outcome of interest is change in reported and measured exercise activity over a 7-day period at 12 and 26 weeks after baseline assessment. Variables of secondary interest include autonomous motivation and self-efficacy.

Results: To date, 23 participants (mean age = 61.3; 18 males) completed the 12-week assessment. The full sample will be recruited by February 2009. 100% and 50% of the 12- and 26-week assessments, respectively, will be completed by May 2009. Analyses of covariance in reported and measured exercise activity over a 7-day period at 12 and 26 weeks after baseline assessment. Variables of secondary interest include autonomous motivation and self-efficacy.

Conclusion: To date, 23 participants (mean age = 61.3; 18 males) completed the 12-week assessment. The full sample will be recruited by February 2009. 100% and 50% of the 12- and 26-week assessments, respectively, will be completed by May 2009. Analyses of covariance in reported and measured exercise activity over a 7-day period at 12 and 26 weeks after baseline assessment. Variables of secondary interest include autonomous motivation and self-efficacy.

Conclusion: Our preliminary results strongly support the efficacy of the MS intervention in increasing exercise levels among cardiac patients. The intervention appeals to patients and CRP staff as it compliments the standard CRP components by helping patients integrate regular exercise into their lives outside of the structured CRP setting.
P98 Quality of life assessment using the short form 36 and Minnesota questionnaires in patients enrolled in the cardiovascular rehabilitation programme after aortic valve replacement
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1Univ. of Medicine and Pharmacy Victor Babes, Timisoara, Romania, 2Univ. of Agric. Sciences and Vet. Medicine, Timisoara, Romania

Topic: Quality of life

Objectives: To assess the improvement of quality of life at the end of phase II of cardiovascular rehabilitation programme in patients after aortic valve replacement with mechanical or biological prosthesis. Quality of life is a reliable parameter to appreciate the efficiency of any applied treatment.

Methods: The Short Form 36 (SF 36, one of the most used questionnaires to assess quality of life in patients after cardiac surgery) and Minnesota Living with Heart Failure Questionnaires were applied at enrollment and after 3 months (at the end of phase II of cardiovascular rehabilitation programme). 67 patients after aortic valve replacement were included. 34 had physical training (group A) and 33 control (group B). Both components of SF 36 (physical PCS-36 and mental MCS-36) were calculated online. An original score ranged between 0-100 (worst and 100-best health-state) was elaborated to quantify scores at SF-36. Minnesota questionaire has 21 items, every item with a scale from 0 to 5, was used to assess quality of life in patients with heart failure.

Results: At enrollment, the PCS-36 component had more reduced values than MCS-36 in both patients groups because of secondary pre- and post-operative lack of physical condition. SF-36 improved significantly in both components in group A after phase II of cardiovascular rehabilitation programme (PCS-36: 31.26±12.2 vs. 56.43±11.6, p<0.01; MCS-36: 44.31±25.5 vs. 58.35±29.4, p<0.01). This improvement was less obvious in group B (PCS-36: 42.45±23.1 vs. 50.01; MCS-36: 42.5±20.41 vs. 51.3±22.4, p<0.05). Minnesota scores improved significantly in group A from 65.12 (highly affected) to 41.14 (medium affected), p<0.01.

Conclusions: One of most important objectives of cardiovascular rehabilitation programmes is to improve patients’ quality of life. All patients modified their lifestyle, but only those with individualised physical training significantly improved their physical, functional and mental state. Also, post-operative cardiac patients enrolled in cardiovascular programmes improved their perception upon their health condition.

P99 Effects of hostility on the risk of arterial hypertension, myocardial infarction, stroke in a sample of males aged 25-64 years (epidemiological trial on the base of WHO Programme MONICA)
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1Cell Laboratory of Epidemiology CHB SB RAMS, Novosibirsk, Russian Federation

Topic: Psychosocial factors and stress

Aims: to study effects of hostility on the risk of arterial hypertension (AH), myocardial infarction (MI) and stroke in males aged 25-64 years.

Materials and methods: a screening study of the population was performed in 1994 according to WHO programme MONICA-psychosocial. The response in a random representative sample of 25-64-year-old males (n = 657) was 82.1%. New cases of MI, AH and stroke were registered in the control periods 1994-2002. Computer programme package SPSS-10 was used for statistical processing. Cox regression model of the relative risk (RR) was employed.

Results: Hostility was rather prevalent among the examinees (76.9%). MI risk for 8 years was 4.65 (95% CI 2.69-8.04) for Type D (n=10) and non-Type D patients (n=25) were comparable with regards to demographics, disease severity and Framingham risk factor score (all p>0.05). Circulating EPC numbers were reduced by 54% in Type D versus non-Type D patients (0.084±0.053 vs. 0.183±0.029, % of lymphocytes, p = 0.006), whereas the observed increase after CPET was significantly larger in Type D patients (105.9±45.2 vs. 22.9±19.2, p = 0.049). An effect size of 0.8 indicates that Type D personality has a large effect on EPC number. In comparison, advanced age (effect size p=0.46) and high Framingham risk factor score (effect size p=0.17) had a small effect. Baseline migratory capacity was related to disease severity but was not different comparing Type D and non-Type D patients. Exercise-induced enhancement of migratory capacity was similar in both groups of patients.

Conclusions: Reduced EPC numbers might explain impaired cardiovascular outcome in Type D patients. The observed larger increase in circulating EPC in these patients suggests that acute exercise elicits a more pronounced stimulus for endothelial repair.

P101 Does presence of depressive symptoms influence the knowledge on prevention methods level? 
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1National Institute of Cardiology, Warsaw, Poland, 2Medical University, Lodz, Poland

Topic: Psychosocial factors and stress

Introduction: insufficient knowledge on CVD risk factors, unawareness of diseases can cause the limitation of CVD prevention effectiveness. Moreover, negative psychosocial risk factors, such as depression, are recognized as CVD risk factors. Depressive symptoms (DS) can cause the disappearance of life and they reflect the person’s behaviour. We evaluated the knowledge concerning CVD prevention methods (PM) in persons with and without depressive symptoms.

Methods: Data came from the Polish representative population sample - 12922 persons (6076 men and 6846 women), aged 20-74, screened in 2003-2005 in the frame of National Multicentre Health Survey (WOBASZ). Studied persons filled-in the psychological questionnaire - Beck Depression Scale. DS were recognised if persons’ score was > 10 criterion scored criteria. PM knowledge was assessed by 21 items, health-related knowledge on PM than men. Very high percentage of men and women, both with DS as well as without DS, knew nothing about PM (with DS - men: 45%; women: 38%; without DS - respectively in men and women: 34% and 26%). Out of PM the most often mentioned, both by men and women, were: higher physical activity, smoking cessation, healthy life style, and reduction of saturated fatty acids in diet. Because persons with DS, both men and women, were significantly older, we adjusted the mean score of PM knowledge for age. The age-adjusted mean score of knowledge was significantly lower in persons with than in those without depressive symptoms. In general, women had greater knowledge than men.

P100 Circulating CD34+KDR+ endothelial progenitor cells are reduced in chronic heart failure patients as a function of Type D personality
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1Edegem, Belgium, 2Tilburg, Netherlands

Topic: Psychosocial factors and stress

Purpose: The aim of this study was to assess whether EPC number/function might be an explanatory factor for the observed relation between Type D personality (a joint tendency toward negative affectivity and social inhibition) and poor cardiovascular prognosis. We also assessed whether the effect of a single exercise bout on EPC number/function is affected by Type D personality.

Methods: Thirty-five sedentary men with chronic heart failure (CHF) (left ventricular ejection fraction ≤ 45%) underwent cardiopulmonary exercise testing (CPET) and personality assessment with the 14-item Type D Scale. CD34+KDR+ cells were quantified by flow cytometry before and immediately after CPET. Migration of early EPC towards vascular endothelial growth factor and stromal cell-derived factor-1α was investigated.

Results: Type D (n = 10) and non-Type D patients (n = 25) were comparable with regards to demographics, disease severity and Framingham risk factor score (all p > 0.05). Circulating EPC numbers were reduced by 54% in Type D versus non-Type D patients (0.084 ± 0.053 vs. 0.183 ± 0.029, % of lymphocytes, p = 0.006), whereas the observed increase after CPET was significantly larger in Type D patients (105.9 ± 45.2 vs. 22.9 ± 19.2, p = 0.049). An effect size of 0.8 indicates that Type D personality has a large effect on EPC number. In comparison, advanced age (effect size p = 0.46) and high Framingham risk factor score (effect size p = 0.17) had a small effect. Baseline migratory capacity was related to disease severity but was not different comparing Type D and non-Type D patients. Exercise-induced enhancement of migratory capacity was similar in both groups of patients.

Conclusions: Reduced EPC numbers might explain impaired cardiovascular outcome in Type D patients. The observed larger increase in circulating EPC in these patients suggests that acute exercise elicits a more pronounced stimulus for endothelial repair.
P102 Physical and psychological gender differences during long-term rehabilitation after first myocardial infarction. Results of a 2-year follow-up study.
U. Huerdt1, G Klein2
1University of Muench, Muench, Germany, 2Klinik Hochstutz, Retruder, Starebriger Str, Germany

**Topic:** Psychosocial factors and stress

**Purpose:** Although there is growing evidence about gender differences in the natural course of coronary heart disease, less is known about the long-term outcomes of cardiac rehabilitation. This study examines changes in physical and psychological risk factors among men and women during the long-term course of rehabilitation after acute myocardial infarction.

**Methods:** Study subjects were 309 men and 204 women, aged 30 to 75, who were admitted to a cardiac rehabilitation clinic in Southern Bavaria about three weeks after first acute myocardial infarction. The response rate was 85% of all patients who fulfilled the inclusion criteria. Subjective and objective health was determined at entry to in-hospital rehabilitation, at discharge (after 3-4 weeks), and after a follow-up period of 18 months and 3 years. Measures included physical examinations, medical records, standardised patient interviews, and self-administered questionnaires (SF12, Hospital Anxiety and Depression Scale, HADS).

**Results:** at entry to cardiac rehabilitation women had (age-adjusted) significantly more comorbid conditions than men. This included the classical risk factors high blood pressure, hypercholesterolemia, the prevalence of overweight and non-cardiovascular chronic conditions. The anxiety- and depression scores were also significantly higher among women, whereas the health-related quality of life (SF12) was worse. After about 4 weeks of in-hospital rehabilitation the risk factor profile improved significantly for men and women, though the sex differences in anxiety remained significant. During the follow-up period of 18 months a steeper increase of anxiety and depression was observed among women than among men and during the three-year follow-up the age-adjusted self-reported physical and psychological health of women continued to be worse. Regarding behavioural risk factors, low physical activity was a major problem among women.

**Conclusion:** the findings of this study indicate that women in the long-term rehabilitation after myocardial infarction have a higher degree of physical and psychological impairment than men and have gender specific needs regarding aspects of the rehabilitation programme.

P103 Social network and the risk of stroke: findings from the Copenhagen Heart Study.
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1Bispebjerg Hospital, Copenhagen, Denmark

**Topic:** Psychosocial factors and stress

**Purpose:** Social isolation has previously been found to predict myocardial infarction and mortality.

The aim of the present study was to describe whether social network prospectively predicts stroke.

**Methods:** The study population consisted of 9542 randomly selected adults without cardiovascular disease. The Social network was measured by questionnaire concerning frequencies of contacts with parents, children, spouse, other family, colleagues, neighbours and friends. Responses were categorized into ‘no contacts’ (no one available, never or rarely) and ‘contacts’ (daily, weekly or monthly). Endpoint was ischemic and non-specific stroke. Hazard ratio (HR) for incidence of stroke was calculated using Cox proportional hazard model.

**Results:** Contact with other family was associated with decreased risk of stroke (HR=0.78; 95%CI 0.62-0.99) whereas there were no associations between contacts with parents, spouse, friends and colleagues. For contact with children an increased risk of stroke in women was shown and was strengthed by adjustment (HR=2.38; 95%CI 1.51-3.73). In men contact with children was associated with decreased risk (HR=0.78; 95%CI 0.62-0.99).

**Conclusions:** Contact with other family in both genders and contact with children in men seems to be protective of stroke. Data suggest that contact with children predicts stroke in women. However, this could be explained by contact as an indicator of disease.

**Social network and the risk of stroke**

| Source | HR (95%CI) | P-value
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents</td>
<td>0.78 (0.69-1.24)</td>
<td>0.99 (0.95-1.60)</td>
</tr>
<tr>
<td>Children</td>
<td>1.18 (0.91-1.52)</td>
<td>1.32 (0.92-1.88)</td>
</tr>
<tr>
<td>Family</td>
<td>0.71 (0.52-0.94)</td>
<td>0.78 (0.62-0.98)</td>
</tr>
<tr>
<td>Colleagues</td>
<td>0.77 (0.54-1.09)</td>
<td>0.77 (0.54-1.11)</td>
</tr>
<tr>
<td>Neighbours</td>
<td>1.03 (0.82-1.28)</td>
<td>1.03 (0.82-1.30)</td>
</tr>
<tr>
<td>Friends</td>
<td>0.99 (0.78-1.25)</td>
<td>1.03 (0.81-1.31)</td>
</tr>
<tr>
<td>Spouse</td>
<td>0.97 (0.77-1.21)</td>
<td>1.00 (0.79-1.28)</td>
</tr>
</tbody>
</table>

*adjusted for age and gender.*

P104 The perception of job stressors is related to measures of heart rate variability
E Clays1, D De Biegu1, V Crasset1, F Knet1, P De Smet1, M Kortu1, G De Backer1
1Catholic University, Gent, Belgium, 2Free University of Brussels, Brussels, Belgium

**Topic:** Psychosocial factors and stress

**Purpose:** There is ample evidence to consider job stress as an independent risk factor of coronary heart disease (CHD). However, our understanding of the physio-pathological pathways of this relation is incomplete. Recently, it was hypothesised that disturbances of the autonomic nervous system with its sympathetic and parasympathetic mechanisms might mediate the stress-CHD relation. The data of the Belgian Physical Fitness Study conducted in the late seventies were re-examined in the light of these new insights. The aim was to study the perception of job stressors in relation to heart rate variability (HRV).

**Methods:** Results are based on observations in a sample of 653 healthy male workers aged 40-55 years from the Physical Fitness Study (1976-1978). Data on HRV were collected by means of 24-hour ambulatory ECG recordings during regular everyday activities. Both time and frequency domain measures of HRV were calculated. The perception of working conditions was assessed with self-administered questionnaires. An index of physical and psychosocial job stressors was constructed based on 5 items dealing with general satisfaction with working conditions, complaints about physical working conditions, responsibility at work, work rhythm and social relations at the workplace. The conventional coronary risk factors were measured using standardised bios-clinical examinations. The association between the perception of job stressors and HRV parameters was assessed by means of Pearson correlation (r) and multiple linear regression analysis.

**Results:** the job-stressor index was negatively and significantly related to PNN50 (percentage of differences between adjacent normal RR intervals > 50 ms) (r -0.09; p < 0.05) and the ratio of low-frequency over high-frequency power (r 0.10; p < 0.05). After adjusting for age, employment status, body mass index, smoking, total cholesterol, systolic blood pressure and leisure time physical activity, the associations remained statistically significant. No significant associations were found with SDNN (standard deviation of all normal RR intervals) and total power.

**Conclusions:** the results suggest that an accumulation of physical and psychosocial job stressors is related to higher heart rate and reduced HRV. These findings support the idea that disturbances of the autonomic nervous system and its parasympathetic component in particular may play a role in the link between work stress and CHD.

P105 Are triggers, circadian rhythm, and time of onset of acute myocardial infarction in the middle east different from that in the west? Myocardial Infarction Triggers and Onset in Jordan (MINTOR) study
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**Topic:** Psychosocial factors and stress

**Objectives and methods:** In the west, about 20-30% of acute ST-elevation myocardial infarction (STEMI) cases are triggered by acute physical or emotional distress. Moreover, early morning hours of the day have the highest incidence of MI, and Monday is the day of the week with the highest incidence. We sought to study these epidemiologic facts in 962 consecutive patients admitted with STEMI between November 2004-December 2007.

**Results:** Mean age of the whole group was 55±11.7 years; 854 were men (85%) and 147 women (15%). Hypertension, diabetes, and smoking were present in 31%, 36%, and 60%; respectively. Triggers were reported by 42.7% of all patients (42.1% in men and 46.3% in women, p=NS). Commonest triggers were: emotional distress (26%), physical exertion (11%), and heavy meal (22%). The prevalence of these triggers in men was similar to that in women. Onset of STEMI during 6 am and 12 mid-day occurred in only 29% of cases and 30% occurred between midnight and 6 am. Only 25% occurred during day. However, 10% of cases occurred in the first 4 hours after waking up, and 45% occurred during the remaining 20 hours of the day. No significant differences were found in incidence on the days of the week (least on Sunday 6.2% vs. highest on Friday 16.9%; p=NS). Despite absence of seasonal variation in summer and winter (31.9% vs. 32.7% respectively; p=NS), January had significantly higher incidence than August (9.9% vs.6%). The prevalence of these triggers in men was similar to that in women.

**Conclusions:** In this largest Middle East study on STEMI, triggers preceded 410 cases, higher than the rate quoted in the west (23/100 cases). The most commonly encountered triggers, emotional (26%) and physical stresses (15%) were also higher than those in the west (7% and 6%, respectively). More than 50% of cases occurred in the first 4 hours after waking up occurred between 4-8 am. STEMI Incidence was not higher during a specific week day or season.
P106
Anxiety and prognosis of patients with ischemic heart disease
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Topic: Psychosocial factors and stress

Purpose: to study prognosis of patients with ischemic heart disease (IHD) and anxiety.

Materials and methods: 183 patients with IHD (140 men and 43 women) from 36 till 67 years (average age 55.2±7.2 years) were examined. All patients had angina pectoris (II – IV functional class). A level of state and trait anxiety was estimated by Spielberger questionnaire for State-Trait Anxiety Inventory (STAI). Patients were observed during 24.7±0.38 months. The follow-up points were taken: myocardial infarction (fatal and nonfatal), events of unstable angina pectoris, surgical methods of myocardial revascularisation (coronary artery bypass surgery and percutaneous transluminal coronary angioplasty). Also two combined points were analysed. The first point included all nonfatal cardiovascular events and the second point - all cardiovascular events (including death from IHD). Kaplan-Meier method was used to study influence of different factors on cardiovascular events. Statistical significant differences were determined by Cox’s F-Test.

Results: The level of state anxiety was 43.4±1.2 score (from 20 till 76 score). The level of trait anxiety was 47.3±0.9 score (from 36 till 67 score). Patients were divided into 2 groups. First group included 112 patients with high level of trait anxiety (score ≥ 46 on STAI), second group - 71 patients with low level of trait anxiety (score < 46 on STAI). The groups did not differ on age, duration IHD, function class of angina pectoris, therapy. During 24.7±0.38 months 59 events were registered: 9 cases of myocardial infarction (4 cases of fatal and 5 cases of nonfatal), 19 events of unstable angina pectoris, 20 cases of surgical myocardial revascularisation, 9 cases of death, connected with cardiovascular pathology, 6 cases of death not connected with cardiovascular pathology, 15 cases of death from all causes (total mortality). There were 44 nonfatal cardiovascular events and 59 cases of all cardiovascular events. Patients with high level of trait anxiety had higher total mortality (p=0.044) in comparison with patients of the second group. Patients with high level of trait anxiety had more myocardial infarctions (p=0.076) and more cases of surgical methods of myocardial revascularisation (p=0.387) versus patients of the second group.

Conclusions: thus, anxiety worsens prognosis of patients with ischemic heart disease.
Metabolic syndrome is a predictor of outcome in patients with familial combined hyperlipidemia. C. Masoura1, M De Lorgeril2, P Sälen3, F Laporter2, A Di Castelnuovo1, V Krozhi1, MB Donati1, L Iacoviello1

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Topic: Lipids and atherosclerosis

Purpose: Familial combined hyperlipidemia (FCH) is a polygenic lipid disorder associated with premature cardiovascular disease. It is unknown whether metabolic syndrome (MetS) modulates cardiovascular risk in FCH patients.

Methods: We studied prospectively 644 FCH patients (421 men) for 9.2 ± 3.6 years. Demographic characteristics and biochemical parameters were evaluated at enrollment, before the initiation of treatment. The diagnosis of MetS was based on the modified ATP III criteria (glucose > 100 mg/dl, Hard cardiovascular end-points, like acute myocardial infarction (AMI) and cardiovascular death, were recorded during the follow-up. Results: The 55% of patients with MetS were older (50.8 ± 10.2 vs. 46.7 ± 11.0 years. The attack rate and had higher triglyceride and glucose levels, but they had lower HDL-C levels compared with patients without MetS (all P < 0.001). There was no difference in total cholesterol. The combined endpoint (AMI/cardiak failure) occurred in 29 patients with MetS and in 9 patients without MetS (9.0% vs. 2.8%, P = 0.001). Kaplan-Meier analysis showed a significant difference in the combined endpoint (AMI/death) occurred in 29 patients with MetS and in 9 patients without MetS (9.0% vs. 2.8%, P = 0.001). Kaplan-Meier analysis showed a significant difference in the event-free survival between the 2 groups (P = 0.003, figure). Multivariate analysis (Cox regression) showed that MetS at enrollment predicts AMI/cardiak failure independent of age, sex or previous cardiovascular disease (adjusted odd’s ratio 2.25, 95% CI 1.06-4.75, P = 0.034).

Conclusions: MetS represents an independent predictor of major cardiovascular events in FCH patients.

M136
Alcohol consumption and omega 3 polyunsaturated fatty acids in healthy men and women from 3 European populations
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Topic: Nutrition

Objective: because high dietary and blood n3 (omega-3) fatty acids (FA) are protective against coronary heart disease and sudden cardiac death, the alcohol-associated increase in blood n3 FAs could be considered an original mechanism of alcohol’s cardioprotective effect.

Methods: in the framework of the IMMIDIET Project (Dietary Habit Profile in European Communities with Different Risk of Myocardial Infarction: the Impact of Migration as a Model of Gene-Environment Interaction), 1604 subjects (802 women-men pairs), aged 20-65 yrs, were enrolled in Italy, Belgium, and England. A 1-y recall food-frequency questionnaire was used to evaluate dietary intake.

Results: in women, in the age and country adjusted model, higher alcohol intake was significantly associated with plasma and red blood cell eicosapentaenoic acid (EPA; P=0.001 for both), docosahexaenoic acid (DHA; P<0.001 and P=0.007), and EPA/DHA concentrations (P=0.001 and P=0.004). In fully adjusted analyses, all associations remained significant in plasma (EPA P=0.001, DHA P=0.006, and EPA/DHA P=0.002), whereas only EPA (P=0.002) and EPA/DHA (P=0.037) were associated with alcohol intake in red blood cells. In men, higher alcohol intake was significantly associated with lower n-6 linoleic acid (ALa) in plasma and red blood cells (P=0.014 and P=0.037, respectively), with higher EPA concentrations in plasma and red blood cells (P<0.001) and with higher EPA/DHA concentrations (P=0.048) in plasma. In fully adjusted analyses, EPA remained significantly associated with alcohol intake in plasma and red blood cells (P=0.003 and P=0.04), and ALa remained significantly associated with alcohol intake (P=0.043) in plasma. Stratified analyses, for type of alcoholic beverage, showed an association between alcohol and both plasma and red cell EPA (P=0.009 and P=0.002, respectively), DHA (P=0.014 and P=0.006, respectively), and the EPA/DHA index (P=0.010 and P=0.006, respectively) in wine drinkers, whereas no association was found in those who drink beer and spirits.

Conclusions: alcohol intake was associated with higher plasma and red blood cell concentrations of marine n3 FAs. Components of wine other than alcohol (polyphenols) might exert these effects. Part of the alcohol-induced cardioprotection may be mediated through increased marine n3 FAs.

M137
Morbidity and mortality among smokers and non-smokers - 30 years follow-up of 54 000 middle-aged Norwegian women and men
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Topic: Tobacco

Smoking is strongly related to morbidity and mortality from various causes. We studied mortality by smoking status and cardiovascular morbidity by smoking status in middle-aged men and women followed for three decades. During 1974-78 all persons aged 45-49 years living in three Norwegian counties were invited to a cardiovascular screening (hereafter called baseline), and so where random samples of younger age groups. Around 91% of the invited attended. In 2006-08 (hereafter called follow-up) a questionnaire was sent to all surviving participants born 1945-47. Deaths were recorded by linkage to the Population registry of Norway. A total of 17% filled in the questionnaire and gave written consent, ranging from 50% in the oldest half to 63% in the youngest half. Based on smoking habits reported at baseline participants were categorized as never smokers, ex-smokers, current cigarette smokers 1-19 cigarettes/day, 10-19 cigarettes/day and ≥ 20 cigarettes/day (the last group hereafter called heavy smokers). Mean age was 40 years at baseline and 72 years (range 60-88) at follow-up. Of the original 54075 participants, 11303 (21.2%) had died at follow-up 30 years later. In men, the proportion that died ranged from 19% in never-smokers to 45% in those reporting heavy smoking at baseline (age-adjusted RR 2.3, 95% CI 2.3-3.5). The corresponding figures in women were 13% in never-smokers and 33% in heavy smokers (age-adjusted RR 2.7, 95% CI 2.4-3.1). In the survivors responding to the questionnaire at follow-up, 1758 men and 608 women stated that they had had a myocardial infarction (MI). The cumulative incidence of MI increased from 10% in never-smoking men to 21% in heavy smoking men and from 4% in never-smoking women to 11% in heavy smoking women. Compared to never-smokers, the RR for MI was thus 1.9 (95% CI 1.6-2.3) in heavy smoking men after adjustment for age, total serum cholesterol, systolic blood pressure, physical activity in leisure time and county of residence. The corresponding figure in women was 3.0 (95% CI 2.0-4.5). At follow-up, 3033 men and 1874 women reported MI, stroke and/or diabetes mellitus. In men, the cumulative incidence increased from 20% in never-smokers to 36% in heavy-smokers (multivariate adjusted RR 1.7 (95% CI 1.5-1.9)), and in women from 14% in never-smokers to 24% in heavy-smokers (multivariate adjusted RR 1.8 (95% CI 1.4-2.4)).

Our data suggest that around 2/3 of the heavy smoking men and 1/2 of the heavy smoking women had died or contracted MI, stroke or diabetes mellitus during three decades of follow-up. In never-smokers, the corresponding figures were 1/3 in men and 1/4 in women.
M139
Dietary intake of marine n-3 polyunsaturated fatty acids and the risk of acute coronary syndrome in healthy men and women.
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**Topic Nutrition**

**Background:** dietary intake of marine n-3 polyunsaturated fatty acids (n-3 PUFA) has been reported to decrease coronary mortality among subjects with known coronary heart disease (CHD), whereas an effect in healthy subjects is less documented.

**Objective:** to assess the hypothesis that consumption of marine n-3 PUFA is negatively associated with the risk of acute coronary syndrome (ACS) in healthy subjects.

**Methods:** in the cohort-study Diet, Cancer and Health 27,178 men and 29,675 women between 50 and 64 years were enrolled. Participants gave information on dietary intake of marine n-3 PUFA in a food frequency questionnaire that was validated against two times seven days of weighed diet records. Furthermore, a specific biomarker study validated the information of intake of fatty acids. During a mean follow-up period of 7.6 years we identified all cases (n=1,150) with an incident ACS-diagnosis in the Danish National Patient Registry. Diagnoses were verified through medical record review. In Cox proportional hazard models we adjusted for several well established risk factors for ACS.

**Results:** in the four highest quintiles of intake of n-3 PUFA (more than 0.59 g n-3 PUFA/day) had a lower incidence of ACS compared to men in the lowest quintile. The hazard ratio was 0.83 (0.67-1.03) when we compared men with the second lowest and lowest quintile of n-3 PUFA intake. Higher intake of n-3 PUFA did not strengthen this association any further. No convincing associations were found among women.

**Conclusion:** we found a trend towards a negative association between the intake of marine n-3 PUFA and ACS among healthy men, but not among healthy women.

M140
Impact of favorable cardiovascular risk profile on total and cardiovascular mortality: results from the CUORE Project
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**Topic: Prevention of CVD**

We aimed to evaluate the association of a favorable cardiovascular risk profile (HRi) on the risk of cardiovascular disease (CVD) mortality in the general population. To assess the hypothesis that consumption of marine n-3 PUFA is negatively associated with the risk of acute coronary syndrome (ACS) in healthy subjects.

**Methods:** in the cohort-study Diet, Cancer and Health 27,178 men and 29,675 women between 50 and 64 years were enrolled. Participants gave information on dietary intake of marine n-3 PUFA in a food frequency questionnaire that was validated against two times seven days of weighed diet records. Furthermore, a specific biomarker study validated the information of intake of fatty acids. During a mean follow-up period of 7.6 years we identified all cases (n=1,150) with an incident ACS-diagnosis in the Danish National Patient Registry. Diagnoses were verified through medical record review. In Cox proportional hazard models we adjusted for several well established risk factors for ACS.

**Results:** in the four highest quintiles of intake of n-3 PUFA (more than 0.59 g n-3 PUFA/day) had a lower incidence of ACS compared to men in the lowest quintile. The hazard ratio was 0.83 (0.67-1.03) when we compared men with the second lowest and lowest quintile of n-3 PUFA intake. Higher intake of n-3 PUFA did not strengthen this association any further. No convincing associations were found among women.

**Conclusion:** we found a trend towards a negative association between the intake of marine n-3 PUFA and ACS among healthy men, but not among healthy women.

M141
The importance of a healthy diet for prevention of cardiovascular disease
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**Topic: Prevention of CVD**

**Purpose:** to quantify the burden of cardiovascular disease that could be prevented by broader adherence to guidelines for a healthy diet.

**Methods:** a computer model capturing the epidemiology of disease and risk factors in the Dutch population was used to simulate the future occurrence of cardiovascular disease (CVD) under different scenarios of dietary intake. Dietary factors studied were saturated and trans fatty acids (sat FA; trans FA), fruit, vegetables and fish. As input to the model, current consumption patterns as estimated from national food surveys were used. For each of these dietary factors, relative risks for cardiovascular disease associated with different rates of intake were derived from the literature. The cumulative incidence of cardiovascular disease over periods of 10 and 20 years into the future were calculated, first assuming that current patterns of intake would continue (the reference), and then for the following scenarios: 1) the whole population adhering to dietary recommendations (optimum scenario); 2) all individuals moderately improving their consumption pattern (moderate improvement). 3) an increase in the intake of fruit that has been achieved in an actual intervention (‘fruit at work’). Comparison of CVD outcomes in each of these scenarios with the reference scenario yielded estimates of the number of CVD cases prevented. Other outcome measures assessed were (differences in) life expectancy and healthy life expectancy for a 40-year-old person.

**Results:** In the optimum scenario the number of incident cases prevented over a period of 20 years were 240,000 for AMI, or 29% of the expected number of cases, 328,000 (16%) for other coronary heart disease, and 215,000 (21%) for stroke. For the moderate improvement scenario the corresponding figures were 119,000 (14%), 163,000 (8%) and 105,000 (10%). The individual contributions of each of the separate dietary factors in the prevention of AMI and other CVD were greatest for fish, followed in decreasing order by fruit, vegetables, sat FA and trans FA. Only fish and fruit contributed to a decrease in stroke. Life expectancy for a 40-year-old increased by 1 year in the optimum scenario and by half a year in the moderate improvement scenario.

**Conclusion:** Broader adherence to recommendations for daily intake of fruit, vegetables, fish, and fatty acid composition may take away as much as 20-30% of the burden of CVD and result in approximately one extra life year for a 40-year-old individual. Promotion of a healthy diet should be given more emphasis in the prevention of cardiovascular disease.
M143  Are healthy teenagers really healthy? Results of the screening project Sopkard 15.  
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Topic: Prevention of CVD  

The purpose of the study: Cardiovascular diseases (CVD) are the leading cause of death all over the world, accounting for more than 23% of annual mortality in adults. It brings up the question when any preventive procedures should be implemented. The aim of the study was to perform a complex assessment of the health in the population of 14-teen year old high school students, especially to screen for risk factors of CVD.

Methods: All second grade students from high schools in Sopot were invited to participate in the screening programme Sopkard 15. The following CVD risk factors were assessed: overweight and obesity (body mass index and content of fat tissue by bioimpedance and ultrasound examination), hypertension (three separate blood pressure measurements), fasting glucose and glucose intolerance, hypercholesterolemia, albuminuria (urine albumin to creatinine ratio), smoking (questionnaire), and symptoms of depression (Beck questionnaire).

Results: During the period of 2006-2007 368 teenagers (186 boys, 182 girls) participated in the study. The response rate was 66%. The following estimates were observed: overweight in 9.4% participants, obesity in 8.9%, hypertension in 10%, pre-hypertension in 7.8%, impaired glucose tolerance in 7.1%, hypercholesterolemia in 8.2%, borderline cholesterol level in 27%, albuminuria in 10%. Eight percent of participants declared permanent smoking and 30% - symptoms of depression. Only one third of the screened population was healthy and free of CVD risk factors.

Conclusions: The prevalence of CVD risk factors is high in teenagers. Effective primary prevention should be introduced early during the life time.

M144  A programme of prevention of cardiovascular disease in the primary school: results of the first 4 years of activity  
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Topic: Prevention of CVD  

Purpose: the prevalence of coronary risk factors (CRF) in the Italian young population (> 14 years) is remarkable: hypercholesterolemia 12.6%, hypertension 16.8%, smoke 29.8%, overweight/obesity 39.5%, inactivity 60.5%.

Cornerstone of CRF prevention is the promotion of a "healthy heart" style of life since the childish age. Moreover, also children can acquire skills and competences for the correct management of the emergency. In this scenario, we developed a project of education to the emergency and to a healthy style of life.

Methods: in the years 2004-2008 1653 students have been involved: 1028 belonged to the class 3 and 4 (8-9 y of age) and 625 to the class 5 (10 y). At every meeting, besides the students, the teachers, two nurses and, when necessary, a physician participated.

Matters of teaching, for the younger children, were: what is 1.1.8. (number of emergency’s calls), as and whether to call it; what to do in front of loss of conscience, traumas, hemorrhages, burns and other small emergencies. Was stressed, above all, the importance of calling the 1.1.8. as first ring of the chain of survival. Didactic tools were: brief power-point presentations, posters, drawings and images; the educational message was strengthened with actions simulated in which the pupils first observe, then describe with their words and, they finally face with corrected behaviours the situation of emergency and the 1.1.8 call.

In older pupils, fundamental notions of cardiovascular anatomy and physiology were taught by the physician; besides, CRF and their prevention, and a "healthy heart" style of life. Specific targets were smoke and obesity. A brochure ("Two questions to the... heart") prepared to the purpose, was left to the students as memory and reinforcement of the educational message.

Results: verification of learning was made through the same questionnaires (one specific on the emergency and the other on the prevention of CRF) filled by pupils before and after each lesson. The analysis of the data documents an increase of the correct answers in the "emergency area" (pre vs. post: 75% vs. 94%, p<0.05) as in the "CRF prevention" (pre vs. post: 37% vs. 74%, p<0.01).

Conclusions: it’s possible to educate to the management of the emergency and to cardiovascular prevention the students, yet in the primary school before the atherosclerosis starts to damage the arteries. This objective is feasible "in and with" the School, at low cost. Because at this age the child still follows adult’s advices, it predictable a positive "domino" effect on the families and a greater resistance for the future, to the smoke and street drugs.
Public health

P145 Engaging hard to reach populations in CHD primary prevention: A qualitative study
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Purpose: the Scottish Government funded 2 coronary heart disease (CHD) primary prevention projects in Scotland’s largest town, Paisley (population 85,000). Phase II of Have a Heart Paisley (HaHP) employed social marketing to offer risk screening to 45'60 year olds. Striking inequalities in uptake of screening according to socioeconomic deprivation (SED) were observed, with individuals living in the most SED areas being under-represented. Based on this experience the Unmet Need Project used a community development approach to engage with individuals living in the areas of greatest SED in Paisley. We explore the views and experiences of individuals participating in the Unmet Need study. We examine the barriers and facilitators to engaging hard to reach populations.

Methods: Two focus groups were carried out with participants (11 in total) from the areas of greatest SED in Paisley. Discussions focused on perceived barriers to participation in CHD primary prevention programmes and the most effective way to engage hard to reach populations. Discussions were audio-recorded, transcribed verbatim and analysed using thematic analysis.

Results: A number of reasons for low uptake of risk screening amongst individuals living in areas of high SED in response to the social marketing campaign were highlighted. These included undelivered invitation letters, distrust of formal organisations, perceived inadequate explanation of what risk screening was or would entail. This social marketing approach was deemed to be impersonal. A belief that risk screening was not ‘relevant’ or not a priority was expressed. It was felt that there was too much on the individual to engage in (telephone and make an appointment) and a need to travel to the screening location deterred individuals from participating. Participants were positive about the processes of engagement in the Unmet Need Project (in-direct interview, door-to-door calling, involvement in local events, peer referral), the spaces of engagement (informal settings, flexible provision of service via drop-in sessions) and the ethos of the intervention. Study staff were described as approachable, empathic, non-judgemental and non-patronising. The information provided was in-depth and unbiased.

Conclusions: Participants living in areas of high SED are difficult to engage in CHD primary prevention programmes. The likelihood of engagement may be increased by using strategies that are tailored to their needs and more acceptable to them.

P146 Chronic stable CHD patients’ beliefs about and attitudes towards secondary prevention
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Topic: Public health

Purpose: lifestyle interventions can reduce risk in patients with coronary heart disease (CHD). However, achieving long-term lifestyle change is challenging. Understanding the experiences and expectations of CHD patients may provide insight into the determinants of health-related behaviours allowing more targeted interventions. We describe chronic stable CHD patients’ beliefs, beliefs about and attitudes toward secondary prevention. Focusing on physical activity, we identify perceived facilitators and barriers to adopting and maintaining a physically active lifestyle.

Methods: Three trained interviewers carried out structured telephone interviews with 104 (60%) chronic stable CHD patients referred from primary care to participate in a Secondary Prevention Intervention that aimed to promote lifestyle change. Interviews were carried out a minimum of 1 year after referral to the intervention. Responses were transcribed verbatim and analysed using thematic analysis.

Results: the median age of patients was 67.9 (IQR 59.5-75.2) years; 48% (49) were male. 70% (71) had a diagnosis of angina, 60% (61) had a previous myocardial infarction. 37% (36) perceived their future cardiac risk to be low, 1 in 6 high. The most cited risk reducers were diet, exercise, medication, smoking cessation and avoiding stress or exertion. Perceived benefits of physical activity included physical and mental well-being, weight loss, physical fitness, maintaining independence and socialising. Perceived drawbacks included exacerbating chronic health conditions, including CHD and sustaining injuries. 36 (35%) patients felt they had a lot of control over PA they are, 23 (22%) some and 35 (34%) very little or none. Barriers to being PA included personal age, physical (chronic and inter-current illness) perceptive (confidential, motivation, knowledge, awareness and experience of CHD), social (time, other priorities), structural (access to facilities, cost, transportation) and environmental factors (weather). Facilitators included perceived (support, self-management), physical (management of chronic and inter-current medical conditions, tailoring activities to capacities) and structural factors (improved access facilities, reduced cost).

Conclusions: many chronic stable CHD patients do not perceive themselves to be at risk of future cardiac events. While physical activity was perceived to be important in reducing future risk, many patients felt they had little or no control over how active they were. Perceptual factors are important barriers and facilitators to effecting and sustaining lifestyle change and should be addressed.

P147 Cardiovascular risk factors associated with oral contraception use
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Topic: Public health

Objective: the relative risk for cardiovascular events in current users of oral contraceptives (OC) is slightly greater than in nonusers. The incidence for cardiovascular events in young women is very low, but the risk increases of OC are used and is elevated in combination with additional risk factors, especially with smoking. In the present study the prevalence of main cardiovascular risk factors in relation to OC use in the sample of young healthy women has been assessed.

Methods: the sample of 2922 women ‘medical faculty students in mean age 24.6±1.3 yrs were examined during 16 yrs (1992-2007). Examination included Standardised questionnaire on personal data, lifestyle-characteristics (including smoking and OC use), and dietary habits. Objective measurements included anthropometrics (weight, height, waist/hip circumference, body fat percentage), blood pressure, and blood lipids ’ total cholesterol (TC), triglycerides (TG), HDL, LDL, BMI, WHR ratio, atherogenic indices (TC/HDL, TG/HDL, log TG/HDL), and total cardiovascular risk using Relative risk SCORE chart for younger people were calculated. Two groups ’ OC users and nonusers were compared.

Results: there were 15.2% of OC users in the whole sample. The number of OC users gradually increased from 0.5% in 1992 to 33.4% in 2007. Among OC nonusers there were 12.8% of smokers but among OC users 21.2%. While smoking during 16 yrs was stagnating (16.7% in 1992, 13.6% in 2007), smoking among OC users progressively increased from zero to 17.4%. The OC users had significantly higher TG (1.01-6.83; p=0.023). LDL: 1.44 (1.01-1.89; p=0.008), TG: 2.99 (2.00-4.46; p=0.000), but also HDL: 0.49 (0.36-0.67; p=0.000). Atherogenic index (TC/HDL) was higher in nonusers (NS), but index log TG/HDL was significantly higher in OC users. IHD influences everyday life significantly, especially in relation to smoking. Among OC users there were nearly twofold smokers in spite of the high high educational level. OC users had higher levels of bloodlipids, BF, and total CV relative risk score. It is necessary to improve the risk perception of OC use in combination with smoking in general population.

P148 Health behaviour and quality of life among chronic heart patients
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Topic: Public health

Background: research on ischemic heart disease (IHD) is mostly based on patient recruited from hospitals, very little is known about living with chronic IHD. This paper examines health behaviour, risk factors, health-related quality of life (HRQoL) and use of healthcare services among people living in society with chronic IHD, other kinds of chronic illness and living without chronic illness.

Method and material: data from a representative national health interview survey from 2005 including 10.963 persons aged 35+ years. Data were collected at personal interviews (response rate, 66.7%). IHD is defined as self-reported chronic illness classified as ICD-10 I20-I25 or reports of having or having had a heart attack or angina pectoris. IHD influences everyday life significantly, especially in relation to smoking. Furthermore, people living with chronic IHD fail to change lifestyle, and put major strain on the healthcare system. From a public health perspective evidence supports that targeted chronic disease management with focus on self-management and rehabilitation could improve everyday life of people with IHD and reduce health care costs.

Results: among OC users there were nearly twofold smokers in spite of the high high educational level. OC users had higher levels of bloodlipids, BF, and total CV relative risk score. It is necessary to improve the risk perception of OC use in combination with smoking in general population.
Conclusions: provides a detailed and update snapshot of current CR provision, organisation and activities.

23.7% of CR. Mean length of stay for inpatient was 18.5 days (range 1-140, mode 10), ambulatory 87.7 days (average 14.5 accesses). 10.2 days (range 1-133, mode 15), day-hospital 2.7 dedicated physicians (range 1-16, mode 2), 10.1 dedicated nurses, 3.3±2.5 physiotherapists (range 0-20; in 10% there isn't any). 1.5±0.8 psychologists, a diettian is present in 62%. Phase II CR programmes are available in 64.4%; outpatient care is provided on day-hospital basis in 10.9% and on ambulatory in 20%. CR units are lead in 86% of cases by a cardiologist, in 14% by specialists in internal medicine, 2% of internal medicine, 19% of cardiac surgery and other divisions. Phase II CR programmes are offered in 67.9% of cases in residential (inpatient) and in 62%. Phase I CR programmes are offered in 60.6% in outpatient (day-hospital and ambulatory) settings. Phase III programmes are offered in 42.4% of CR. Mean length of stay for inpatient was 18.5±10.2 days (range 1-133, mode 15), day-hospital 25.7±15.3 days (range 1-140, mode 10), ambulatory 87.7±15.3 days (average 145 accesses).

Conclusions: surveys and registries are effective means of assessing the implementation of guidelines. The ISYDE-2008 is a pragmatic survey, with broad participation throughout Italy. It provides a detailed and update snapshot of current CR provision, organisation, and activities.

Aim: The main aim of current study was to assess the knowledge, attitudes and practices related to healthy lifestyle among 6-18 years old children living in the small towns and the biggest cities in Poland.

Methods: The current study is a part of the nationwide cardiovascular prevention project - Polish 400 Cities Project 2003-2006 (P400CP). To the unsurveyed sub-group has been selected representative sample of children and youth population from 419 small towns (population <8000) and 8 biggest cities (population> 40000) in Poland. The number of involved children from small towns was 1458 girls and 1474 boys, from big cities 272 and 296 respectively, age range 6-18. Questionnaire, anthropometrical measurements and triple measurements of blood pressure during one visit were performed in three age groups: I 6-9, II 10-13, III 14-18 years.

Results: Among the most frequent answers on question ‘What is the most harmful thing for human health?’ we found: tobacco smoking (in the age groups respectively (I - 75%, II - 88%, III - 76%), alcohol drinking (I - 49%, II - 66%, III - 64%), taking drugs (I - 23%, II - 50%, III - 54%), stress (I - 15%, II - 10%, III - 42%), excessive carbohydrates/sweets intake (I - 32%, II - 21%, III - 12,5%). Most rarely causes of health aggrevation were: obesity (I - 16%, II - 12%, III - 23%), lack of physical activity (I - 14%, II - 15%, III - 9%), high blood pressure (I - 4%, II - 4%, III - 6%). In the same time, although tobacco-smoking was indicated as one of the most harmful thing for health, boys of children owned up for the fact of ever smoking (girls: I - 2.5%, II - 9%, III - 41%; boys: I - 8.3%, II - 10.2%, III - 60.6%) 1 boys from small towns - 7%, I from cities - 3.5%, II - 14%, III - 53%). Regularly smoke every fifth girl and every third boy, among them everyday smoking owned up 41% of girls and 45% of boys. The importance of physical activity as a method of prevention is underestimated by children, this fact is connected with the habits of TV watching (even 6% girls and 10% of boys in the older age group > 10 daily) or sitting in front of computer’s monitor, particularly youth from big cities (18% of girls, 29% of boys > 4 daily).

Conclusions: Knowledge about healthy lifestyle among Polish children and youth is still insufficient. It indicates the urgent need of implementation of education and preventive activities already in the early school stage. Differences in knowledge related to the place of living were not found.

Aim: To take a detailed snapshot in terms of number, distribution, facilities, staffing levels, organisation, and setting of CR programmes in Italy

Methods: The ISYDE-2008 is a multicentre, longitudinal, prospective web-based national registry, designed by the Italian Association for Cardiovascular Rehabilitation and Epidemiology to collect data on institutional organisation and core components of CR in Italy. Out of 196 CR centres, 165 (85%) joined the study; 2281 consecutive pts were enrolled from Jan 28th to Feb 10th 2008.

Results: on a national basis, there is a CR unit every 299,972 inhabitants in northern regions 1 unit every 263,578, in centre every 384,034, in southern every 434,170. 59% CR units are located in public hospitals, 41% in private owned health care organisations, all operating according to regional public health accreditation and funding systems. 74% CR units are referred to cardiology divisions, 5% are located in the framework of physical medicine and rehabilitation, 2% of internal medicine, 19% of cardiac surgery and other divisions. Phase II CR programmes are available in 64.4%; outpatient care is provided on day-hospital basis in 10.9% and on ambulatory in 20%. CR units are lead in 86% of cases by a cardiologist, in 14% by specialists in internal medicine, geriatrics, physical medicine and rehabilitation, pneumology or other. Every CR unit has 4.0±2.7 dedicated physicians (range 1-16, mode 2), 10.1±8.0 nurses, 3.3±2.5 physiotherapists (range 0-20; in 10% there isn’t any). 1.5±0.8 psychologists, a diettian is present in 62%. Phase II CR programmes are provided on 67.9% of cases in residential (inpatient) and in 60.6% in outpatient (day-hospital and ambulator) settings. Phase III programmes are offeed in 44.4% of centres with centre basis with telecare in 4.8% and without in 3%. Long-term secondary prevention follow-up programmes are provided by 42.4% of CR. Mean length of stay for inpatient was 18.5±10.2 days (range 1-133, mode 15), day-hospital 25.7±15.3 days (range 1-140, mode 10), ambulatory 87.7±15.3 days (average 145 accesses).

Conclusions: surveys and registries are effective means of assessing the implementation of guidelines. The ISYDE-2008 is a pragmatic survey, with broad participation throughout Italy. It provides a detailed and update snapshot of current CR provision, organisation, and activities.

PI51 Improving children’s lifestyle: the cool school project

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Topic: Public health

Aim: In puberty and early adulthood the main base for a person’s future lifestyle is laid. Yet, teachers lack practical methods for assessing the components of lifestyle: health knowledge and behaviour. The aim of the “cool-school” project was to create a computer-based lifestyle assessment tool with prompt feedback to the individual pupil, the teacher and to the school leadership.

Method: The model includes questions on knowledge and habits in the three main domains of lifestyle: physical activity, nutrition, mental health and risk behaviour (smoking, alcohol, drugs). By correlating the outcome of knowledge to the reported behaviour a combined overall assessment can be made in each of the three domains and a total lifestyle profile can be obtained. As the model is computer-based immediate feedback and advice may be given.

Results: the outcome of the first application of the model in a non-selected population of 396 pupils (age 12-16 yrs) showed that a majority had sufficient knowledge on physical activity and they were regularly active. In contrast, knowledge on nutrition was not matched by eating habits: less than half consumed fruit and vegetables daily, whereas more than half eat sweets and snacks regularly. In the age group 15-16 yrs tobacco and alcohol was used by each 4th-6th pupil. We expect that this behaviour will increase the risk for cardiovascular disease in later life.

Conclusion: using the PC-based “cool-school” model a discrepancy between health knowledge and lifestyle behaviour, especially in the field of nutrition, was observed. It may be expected that both direct feedback and structural changes in the method of teaching lifestyle topics may counteract this finding and thus contribute to a better start in life and a lower cardiovascular risk.

PI52 Managing bias in CVD risk prediction, through the evaluation of dietary habits: an application to the score project.

D B Panagiotakos1, C Chrysohoou2, C Pitsavos2, C Stefanadis2

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Topic: Risk factors and risk prediction

Background: In past years the prediction of CVD risk has received special attention, in US as well as in European countries. However, some investigations still state that risk models have so far not been very successful. In this work, we examine whether inclusion of dietary evaluation in a risk prediction model, the SCORE, influences the accuracy and reduces the bias in estimating future CVD events.

Methods: The database of the ATTRA study (that included information from 1514 men and 1528 women) was used. At baseline, the HellenicSCORE values (based on age, gender, smoking, systolic blood pressure and total cholesterol) were calculated while overall assessment of dietary habits was based on the Mediterranean Diet Score (MDS) that evaluates adherence to this traditional diet. In 2006, the 5-year follow-up was performed in 2101 participants and development of CVD (coronary heart disease, acute coronary syndromes, stroke, or other CVD) was defined according to WHO-ICD-10 criteria.

Results: The MDS and the HellenicSCORE were significant predictors of CVD events, even after adjusting for various potential confounders (p<0.05). However, estimating bias (i.e., misclassification of cases) of the model that included HellenicSCORE and other potential confounders was 8.7%. The MDS was associated with the estimating bias of the outcome (p<0.001), and explained 5.5% of this bias. Other baseline factors associated with bias were increased body mass index, low education status and increased energy intake/BMR ratio.

Conclusion: The inclusion of dietary evaluation, as well as other lifestyle characteristics increases the accuracy and reduces estimating bias of CVD risk prediction models.
Impact of type 2 diabetes and coronary heart disease on cardiovascular events in high-risk hypertensive patients: a subanalysis of CASE-J trial

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1Kyoto University Graduate School of Medicine, Kyoto, Japan, 2Osaka Medical Center, Osaka, Japan, 3Kohn University School of Medicine, Tokyo, Japan

Topic: Risk factors and risk prediction

Objective: previous studies have demonstrated that type 2 diabetes has the same impact on the risk of cardiovascular (CV) events as a history of CV disease or myocardial infarction. However, there is little evidence regarding this issue in high-risk hypertensive patients. Thus, we examined the impact of type 2 diabetes and a history of coronary heart disease (CHD) on the incidence of CV events in high-risk Japanese hypertensive patients, as a subanalysis of CASE-J trial.

Methods: the CASE-J trial compared the effects of the angiotensin II receptor blocker candesartan and the calcium channel blocker amlodipine on the incidence of CV events in high-risk Japanese hypertensive patients. There were 4,703 high-risk hypertensive patients (mean age: 63.8 years) to be analysed in the trial. We divided them to four groups based on baseline characteristics (non-diabetics without a history of CHD, n=2292; non-diabetics with a history of CHD, n=393; diabetics without a history of CHD; n=1815; diabetics with a history of CHD, n=203). We used the multivariate Cox regression analysis to estimate the hazard ratio (HR) of CV events adjusted for baseline characteristics as standard covariates and subsequent systolic and diastolic blood pressure (BP) during the trial as time-varying covariates. HR of group A for CV events was set to a reference value of 1.0.

Results: the exceptional HR control (less than 140/80 mmHg) was achieved among four groups. A total of 268 (5.7%) patients experienced CV events for a rate of 17.7 per 1000 person-years during 3.2 ± 0.9 years of follow-up. Crude CV events rates (per 1000 person-years) were 10.1 in non-diabetics without a history of CHD, 22.1 in non-diabetics with a history of CHD, 22.2 in diabetics without a history of CHD, and 55.8 in diabetics with a history of CHD. Diabetes with a history of CHD most frequently experienced CV events among four groups (adjusted HR: 5.25; 95% CI: 3.0; 9.1; P<0.001). Both non-diabetics with a history of CHD and diabetics without a history of CHD had more frequently experienced CV events compared to non-diabetics without a history of CHD (adjusted HR: 2.66; P<0.001, adjusted HR: 2.40; P<0.001, respectively). However, there was no significant difference in the risk of CV events between non-diabetics with a history of CHD and diabetics without a history of CHD (P=0.648).

Conclusion: our data disclosed that type 2 diabetes has the same impact on the risk of CV events and CV risk factors as CHD in high-risk Japanese hypertensive patients. The present study extended the necessity of aggressive management of CV risk factors in high-risk hypertensive patients with type 2 diabetes.

Risk factors and risk prediction

Purpose: coronary artery disease (CAD) and ischemic stroke (IS) share several risk factors (RF) and the prevalence of asymptomatic CAD in patients with IS sequela is presumably high. In some types of IS, that association maybe more important. Our aims were to determine the prevalence of traditional CAD risk factors among a selected IS population, and to verify its impact in IS subtypes.

Methods: IS patients admitted within 18 months in 4 rehabilitation hospitals were retrospectively analysed. Systemic Hypertension (HYP), diabetes (DM), obesity (OB), dyslipidemia (DLP), and smoking (SMK) were considered as RF. Previously diagnosed CAD was excluded. Classification of IS followed TOAST criteria, as atherosclerotic (AT), lacunar (LC), undetermined aetiology (UN) and cardiogenic (CE). Patients awaiting orthopaedic surgery without CAD or IS composed the control group (CG).

Results: IS group (1116 patients, 51% female, mean 64±14 years) and CG (357 individuals, 60% female, mean 61±13 years) were statistically similar for sex and age. RF frequencies are reported in the table. Higher prevalence of all RF in IS (P<0.001) was observed, except for OB, higher in CG. Logistic regression analysis of IS subtypes showed (reported as: OR, 95%CI): AT association with HYP (2.1, 1.5-3.2), HLP (1.4, 1.1-1.9) and DM (1.7, 1.1-2.2). GC with HYP (3.0, 1.7-5.2) and OB (1.6, 1.1-2.4), no significant association of RF with others IS subtypes.

Conclusions: AT patients are more exposed to CAD RF (HYP, DLP, DM), followed by GC (HYP, OB), than others IS subtypes. We reassured the high prevalence of traditional atherosclerotic RF among IS patients in a Brazilian population, in whom investigation for CAD should be considered, especially regarding the rehabilitation process.

P154

The ageing process of the heart: association between degenerative aortic valve disease and long-term exposure to cardiovascular risk factors - The MONICA/KORA-study

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Topic: Risk factors and risk prediction

Result: degenerative aortic valve disease (DAVD), a common finding in the elderly, is associated with an increased risk of death due to cardiovascular causes. Taking advantage of its longitudinal design this study evaluates the prevalence of degenerative aortic valve disease and its temporal associations with long-term exposure to cardiovascular risk factors in the general population.

Methods: we studied 953 subjects (aged 25 to 74 years) from a gender and age stratified random sample of German residents of the Augsburg area. Risk factors had been determined at a baseline investigation in 1994/95. At a follow-up investigation, 10 years later, standardised echocardiography determined aortic valve morphology and aortic valve area as well as left ventricular geometry and function.

Results: at the follow-up study the overall prevalence of DAVD was 20%. In logistic regression models adjusting for traditional cardiovascular risk factors at baseline age (OR 0.8 [1.7-2.3]) and smoking (OR 0.8 [1.7-2.3]) had a significant impact on the incidence of DAVD at follow-up. Furthermore, age as well as baseline status of smoking, and total cholesterol level were significant predictors of a smaller aortic valve area at follow-up study. By contrast, hypertension and obesity had no detectable relationship with long-term changes of aortic valve structure.

Conclusions: the overall population we observed a high prevalence of DAVD that is associated with long-term exposure to elevated cholesterol levels and active smoking. These findings strengthen the notion that smoking cessation and cholesterol lowering are promising treatment targets for prevention of DAVD.

P155

Prevalence of coronary artery disease risk factors in patients with ischemic stroke

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1Sarah Network of Rehabilitation Hospitals, Brazilia, Brazil, 2Sarah Network of Rehabilitation Hospitals, Salvador, Brazil

Topic: Risk factors and risk prediction

Purpose: coronary artery disease (CAD) and ischemic stroke (IS) share several risk factors (RF) and the prevalence of asymptomatic CAD in patients with IS sequela is presumably high. In some types of IS, that association may be more important. Our aims were to determine the prevalence of traditional CAD risk factors among a selected IS population, and to verify its impact in IS subtypes.

Methods: IS patients admitted within 18 months in 4 rehabilitation hospitals were retrospectively analysed. Systemic Hypertension (HYP), diabetes (DM), obesity (OB), dyslipidemia (DLP), and smoking (SMK) were considered as RF. Previously diagnosed CAD was excluded. Classification of IS followed TOAST criteria, as atherosclerotic (AT), lacunar (LC), undetermined aetiology (UN) and cardiogenic (CE). Patients awaiting orthopaedic surgery without CAD or IS composed the control group (CG).

Results: IS group (1116 patients, 51% female, mean 64±14 years) and CG (357 individuals, 60% female, mean 61±13 years) were statistically similar for sex and age. RF frequencies are reported in the table. Higher prevalence of all RF in IS (P<0.001) was observed, except for OB, higher in CG. Logistic regression analysis of IS subtypes showed (reported as: OR, 95%CI): AT association with HYP (2.1, 1.5-3.2), HLP (1.4, 1.1-1.9) and DM (1.7, 1.1-2.2), GC with HYP (3.0, 1.7-5.2) and OB (1.6, 1.1-2.4), no significant association of RF with others IS subtypes.

Conclusions: AT patients are more exposed to CAD RF (HYP, DLP, DM), followed by GC (HYP, OB), than others IS subtypes. We reassured the high prevalence of traditional atherosclerotic RF among IS patients in a Brazilian population, in whom investigation for CAD should be considered, especially regarding the rehabilitation process.

Risk Factor Frequencies - % (absolute)

<table>
<thead>
<tr>
<th>RF</th>
<th>TOAST</th>
<th>IB*</th>
<th>CE</th>
<th>UN</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>33 (371)</td>
<td>17 (186)</td>
<td>12 (130)</td>
<td>16 (178)</td>
<td>22 (251)</td>
</tr>
<tr>
<td>LC</td>
<td>86.6</td>
<td>91.9</td>
<td>58.5</td>
<td>69.7</td>
<td>78.9</td>
</tr>
<tr>
<td>CE</td>
<td>32.3</td>
<td>30.1</td>
<td>7.7</td>
<td>15.7</td>
<td>26.3</td>
</tr>
<tr>
<td>UN</td>
<td>74.9</td>
<td>65.6</td>
<td>42.3</td>
<td>55.6</td>
<td>71.3</td>
</tr>
<tr>
<td>SMK</td>
<td>24</td>
<td>20.4</td>
<td>25.1</td>
<td>28.1</td>
<td>37.8</td>
</tr>
<tr>
<td>OB</td>
<td>14</td>
<td>24.0</td>
<td>6.3</td>
<td>16.3</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Abbreviations in text: *P<0.01; **P<0.001.
P157
Cardiovascular risk management in postmenopausal women: the MENOCARD study
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2Creative Institute of Health Care, Moscow, Russian Federation
3Saint Margit Hospital, Budapest, Hungary
4National Medical Centre, Budapest, Hungary
5Bajcsy-Zsilinszky Hospital, Budapest, Hungary
6University of Science, Szeged, Hungary

Purpose: Cardiovascular risk management in postmenopausal women is a current healthcare issue. The aim of the study was to assess metabolic syndrome (MS) prevalence and to check the impact of applying professional guidelines for primary prevention.

Methods: We examined the metabolic profiles of 2789 postmenopausal women aged 55 years and their own and parental characteristics and MS risk factors. MS was defined according to IDF criteria.

Results: The mean age of the patients was 56.7 ± 4.9 years and BMI was 27.6 ± 5.2 kg/m². The prevalence of MS was 3.9 ± 1.2%. Cardiovascular risk was assessed by the SCORE algorithm.

Conclusion: The prevalence of MS in postmenopausal women aged 55 years is low and risk factors are mainly related to lifestyle factors.

P158
Metabolic syndrome in grown-up children of patients with premature coronary heart disease. Relation to own and parental characteristics.
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2Creative Institute of Health Care, Moscow, Russian Federation

Topic: Risk factors and risk prediction

Purpose: To elucidate associations between metabolic syndrome (MS) in grown-up children of patients with premature coronary heart disease (CHD) and their own and parental characteristics.

Methods: We examined members of 166 families. There were 143 parent-probands with premature CHD and 23 healthy parents. Metabolic risk factors in the children were assessed at ages 13-36 years.

Results: Predictors of MS in children were sexual dimorphism and parental metabolic syndrome.

Conclusion: Our study showed that MS in grown-up children of patients with premature CHD is related to their own and parental metabolic syndrome.

P159
Carotid plaque and intima media thickening (IMT) in the population based REFINEd Reykjavik study in context with the screening for heart attack prevention and education (SHAPE) guidelines
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Topic: Risk factors and risk prediction

Purpose: The goal of the study was to compare the performance of the REFINEd Reykjavik study in context with the screening for heart attack prevention and education (SHAPE) guidelines.

Methods: The REFINEd Reykjavik study is an ongoing population based study of men and women aged between 35 and 70 who are examined in detail for conventional CHD risk factors in addition to a bilateral US examination of the carotids. The study enrolled individuals aged 45-70 years from 2004 to 2007.

Results: The Table shows that 47% of men fulfilled the SHAPE criteria of IMT above 50th percentile and/or plaque, but 12% have plaque only.

Conclusion: If SHAPE criteria for US of the carotids are applied on a population level more than 5 times the number of individuals who will suffer CE during the next 10 years will be eligible for LDL cholesterol lowering treatment to an optimal target. This number is reduced to similar numbers as CE if the criteria of the presence of a plaque is used.

Projected number of 45 to 70 years old apparently healthy men per 100,000

<table>
<thead>
<tr>
<th>Calculated 10 year CHD risk (SCORE)</th>
<th>0-3</th>
<th>3-6</th>
<th>6-10</th>
<th>10-15</th>
<th>15+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>11075</td>
<td>40283</td>
<td>30341</td>
<td>13964</td>
<td>4337</td>
<td>10000</td>
<td></td>
</tr>
<tr>
<td>N eligible for screening (SHAPE)</td>
<td>2018</td>
<td>13586</td>
<td>17824</td>
<td>9976</td>
<td>3655</td>
<td>47059</td>
</tr>
<tr>
<td>N with plaque/IMT&gt;50th centile</td>
<td>212</td>
<td>2198</td>
<td>4295</td>
<td>3257</td>
<td>11976</td>
<td></td>
</tr>
<tr>
<td>N with plaque (REFINE)</td>
<td>288</td>
<td>1894</td>
<td>3023</td>
<td>2570</td>
<td>1309</td>
<td>9085</td>
</tr>
</tbody>
</table>

Note: The project is currently under review for publication.
P161
Disatisfaction with married life is related dose-response to increased CHD and stroke mortality and reduced of survival past age 80 years.
G K Rao1, R Antony1, P Raju1, S Chuah1
1University Hospital Aintree, Liverpool, United Kingdom
Topic: Risk factors and risk prediction

Results: 10 patients in group 1 and 24 patients in group 2 had aortic stenosis (p=0.01). 3 patients in group 1 and 11 patients in group 2 had at least moderate AS (mean gradient C6/C6 9.3mmHg, compared to 25.96/C6/C6 20mmHg) in group 2.

Conclusions: Use of bisphosphonate is associated with lower incidence and severity of aortic stenosis. This effect could be related to indirect effect of preventing bone matrix calcium mobilisation and also direct effect on the aortic valve tissue.

P163
Predictors of pre-hospital delay in ST-elevation acute myocardial infarction
D B Panagiotakos1, C Chrysohoou2, C Pitsavos2, C Stefanadis2
1Harvard University, Athens, Greece, 2Athenos, Athens
Topic: Risk factors and risk prediction

Methods: From May 2001 to December 2002, 3042 men and women (>18 y) without any clinical evidence of CVD, were enrolled in the ATTICA study. In 2006, the 5-year follow-up was performed (941 of the 3042 (31%) participants were lost to follow-up). Development of CVD (coronary heart disease, acute coronary syndromes, stroke, or other CVD) during the follow-up period was defined according to WHO-ICT-10 criteria. An a-priori statistical method, principal components analysis, was applied to extract dietary patterns from various foods or food groups. Moreover, a special diet score that incorporates inherent characteristics of the Mediterranean diet (MedDietScore) was also used to assess the level of adherence to this a-priori defined healthy diet.

Results: Using PCA 10 components (with eigenvalues>1) were extracted that explained the 75% of the total variance in intake. The model that also included various potential confounders together with the extracted components showed adequate goodness-of-fit and very good discriminating ability (C-statistic=0.85). The other model that included the same potential confounders together with the MedDietScore showed also adequate goodness-of-fit and very good discriminating ability, too (C-statistic=0.83).

Conclusions: Both a-priori and a-posterior dietary assessment showed similar estimating and discriminating ability in predicting CVD, in our sample.

P164
A-priori versus a-posterior dietary pattern analysis in predicting 5-year incidence of cardiovascular disease.
D B Panagiotakos1, C Chrysohoou2, C Pitsavos2, C Stefanadis2
1Harvard University, Athens, Greece, 2Athenos, Athens
Topic: Risk factors and risk prediction

Background: Dietary pattern analysis has received much attention the past years. The 5-year incidence of cardiovascular disease (CVD) in relation to dietary habits was evaluated, using two methodological approaches, an a-priori and an a-posterior diet pattern analysis. Aim of this work was to compare these methods in predicting CVD events, since this has never been tested before.

Methods: From May 2001 to December 2002, 3042 men and women (>18 y) without any clinical evidence of CVD, were enrolled in the ATTICA study. In 2006, the 5-year follow-up was performed (941 of the 3042 (31%) participants were lost to follow-up). Development of CVD (coronary heart disease, acute coronary syndromes, stroke, or other CVD) during the follow-up period was defined according to WHO-ICT-10 criteria. An a-priori statistical method, principal components analysis, was applied to extract dietary patterns from various foods or food groups. Moreover, a special diet score that incorporates inherent characteristics of the Mediterranean diet (MedDietScore) was also used to assess the level of adherence to this a-priori defined healthy diet.

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Conclusions: Both an a-priori and a-posterior dietary assessment showed similar estimating and discriminating ability in predicting CVD, in our sample.

P162
Bisphosphonate use is associated with decrease in the incidence and severity of aortic stenosis
G K Rao1, R Antony1, P Raju1, S Chuah1
1University Hospital Aintree, Liverpool, United Kingdom
Topic: Risk factors and risk prediction

Results: Among 797 patients, 77% were men, the mean age was 62/2±0.3 years, 79% had body mass index >25kg/m2, 21% diabetes mellitus (DM), 32% hypertension, 4½ dyslipidemia, 32% were smokers, 1½ ex-smokers, 9% had previous myocardial infarction and 6½ peripheral artery disease (PAD) or previous acute stroke. Pre-hospital delay was ≥3h in 39½ of patients.

Independent predictors of pre-hospital delay ≥3h included female gender (odds ratio [OR] 1.59, 95½ confidence interval [CI] 1.03-2.47, p=0.03), DM (OR 1.89, CI 1.27-2.82, p=0.002), Hypertension (OR 1.62, CI 1.14-2.31, p=0.007), and symptoms initiation between 30 p.m. and 8 a.m. (OR 1.58, CI 1.15-2.19, p=0.005). Independent predictors of pre-hospital delay less than 3h included masculine gender (OR 0.63, CI 0.47-0.97, p=0.03), PAD/previous acute stroke (OR 3.6, CI 1.37-7.07, p=0.007) and previous myocardial infarction (OR 4.3, CI 2.2-8.5, p=0.015). Reperfusion therapy was given to 72%, 52% and 1½ of patients with pre-hospital delay respectively; <3h, ≥3h and ≥12h and >12h (p for trend=0.001).

Patients with longer delay had more severe depression of LV/EF (LV/EF<50%) (p<0.001). It was observed a non-significant trend towards increased inhospital mortality with longer delay (<3h 6.5½%, 3-12h 8.0½% and >12h 9.2½%, p for trend=0.59).

Conclusions: Independent predictors of pre-hospital delay ≥3h were female gender, DM, Hypertension and symptoms initiation between 10 p.m. and 8 a.m. Pre-hospital delay is associated with a non-significant increment in inhospital mortality and with a worse LV/EF.

Rates are per 10,000 person-years

All-cause Mortality
Stroke Mortality
CHD mortality
Marriage successful
144 17.5 51.9 Very successful
156 15.1 52.2 Quite successful
164 17.5 51.9 Very successful
217 36.1 59.0 Not so successful
Topic: Risk factors and risk prediction

Purpose: to describe the role of risk factors in an actual Italian cohort of young adults in predicting long-term major adverse cardiac events (MACCE) following acute myocardial infarction (AMI). Few data are available on prognosis of AMI at young age nevertheless it represents a major health burden.

Methods: 112 consecutive admitted at the coronary care unit (ICU) between March 1995 and January 2007 for AMI below 45 years of age were included and followed for at least 3,5 years follow-up. Conventional cardiovascular risk factors and lifestyle-related risk factors as diet, physical activity, alcohol and coffee daily consumption were assessed at admission and follow-up.

Results: complete follow-up data was available in 104 (94%) patients. Out of these 24 (25%) presented a new cardiovascular event: 16 (15%) angina pectoris, 6 (6%) re-AMI, 1 heart failure and 1 cardiac death. At a multivariate analysis (cox proportional regression model) none of the conventional and lifestyle-related risk factors assessed at admission were independently related to the onset of a new cardiovascular event (p=0.641). Based on conventional and lifestyle-related risk factors assessed at follow-up, instead, physical activity proved as an independent predictor of long-term MACCE (p=0.014). Patients who practiced physical activity more than two hours a week after the AMI had a significantly higher event-free survival compared to inactive controls (log-rank test, p=0.029).

Conclusion: following juvenile AMI physical activity has a relevant prognostic role. To advise and encourage physical exercise deserves maximum attention by the physicians in charge of these patients.

Waist circumference, as a single measurement, is a powerful predictor for risk of type 2 diabetes and cardiovascular disease in middle-aged men

Methods: in the year 2001 all men 40, 45, 50 or 55 years of age in the North-East district of Helsinki, Finland, were invited to participate in a risk factor assessment visit at their local Health Centers. During the appointment with trained nurses the participants filled a type 2 diabetes and cardiovascular disease questionnaires and were interviewed about their lifestyle. Blood pressure was measured in a sitting position, height and weight without shoes on, weight with light indoor clothing on. The waist circumference was measured in a horizontal position, midway between the lowest rib and the iliac crest. All measurements were made by the nurses according to the standard technique. Blood samples were drawn by a trained technician and analysed in a local laboratory for fasting lipids and sugars.

For the present study we selected the age group of 40 years, consisting of 230 men. We determined by cross tabulation how well the "action level" 94 cm for waist circumference was a reliable test in assessing the risk of type 2 diabetes and cardiovascular disease.

Results: 27 (11.7%) of the cases and 14% of the controls (p<0.001) were overweight (BMI > 25). According to established criteria in high-risk persons the risk index is 4,5 or more. A person with a risk score of 7 or a cardiovascular disease mortality is 4,5 or both.

Type 2 Diabetes Risk Score (FINDRISC) takes into account: age, BMI, WC, exercise activity, eating habits for vegetables, fruits and berries, medication for hypertension (HTN) and diabetes (DM), family history, dietetic habits, physical activity, etc. Measurements of weight, height, waist, WBC and hip (HC) circumference, blood pressure (BP) and heart rate were done on each participant and body-mass index (BMI) and waist-to-hip ratio were calculated. Blood tests of cholesterol, HDL, LDL, blood glucose (BG), and triglycerides (TG) were taken at age overnight fasting. MS was defined according to the modified ATP III (AHA) and IDF criteria.

Conclusions: waist circumference was a reliable test in assessing the risk of type 2 diabetes and cardiovascular disease.

The metabolic syndrome (MS) has been shown to increase the risk for coronary artery disease in various populations. Nevertheless the present diversity in definitions of the MS is believed to be a strong predictor of cardiovascular risk.

Aim: to study the presence of the MS and its components in Bulgarian women and its predictive power as a factor for developing acute coronary syndrome (ACS).

Material and methods: Overall, 119 women with ACS (71 % with myocardial infarction) and 238 age-matched female controls participated in a case/control study. All filled in questionnaire about major risk factor, such as smoking, history of hypertension (HTN) and diabetes (DM), family history, dietary habits, physical activity, etc. Measurements of weight, height, waist, WBC and hip (HC) circumference, blood pressure (BP) and heart rate were done on each participant and body-mass index (BMI) and waist-to-hip ratio were calculated. Blood tests of cholesterol, HDL, LDL, blood glucose (BG), and triglycerides (TG) were taken at age overnight fasting. MS was defined according to the modified ATP III (AHA) and IDF criteria.

Results: The WC was higher in the ACS group than in controls - 92,2±13,6 cm (62,1±37 cm) vs. 88,8±14,0 cm (64,9±14 cm), p<0.001, as well as the waist-to-hip ratio ratio: 0.84±0.03 vs. 0.82±0.06, p<0.01. The BMI was also significantly higher in the case group: 30,05±8,86 vs. 28,04±5,25, p<0.002. HTN at the moment was present in 85 (71%) of the patients and 111 (75%) of the healthy females, p<0.001. The mean BG was 7,3±2.8 mmol/l in the group with ACS and 5,8±1.6 mmol/l in the reference group (p<0.001), diabetes mellitus was present in 45% of the cases and 14% of the controls (p<0.001). MS was found in 92 (46%) of the women with ASC and in only 27 (17%) of the reference group according to the ATP III/AHA criteria (p<0.001) and in 89 (42%) and 30 (20%) according the IDF rules (p<0.001). The predictive power of MS for ACS was 3,96 in univariate logistic regression analysis and was reduced to 2,37 after adjusting for other major risk factors in the multivariable analysis (p=0.049).

Conclusions: The frequency of all constituting parts of the MS was higher in female patients with ACS. The MS was strong predictor of developing CHD in women and remained significant after correction for other major risk factors of CVD.
P169  Searching for the best outcome predictor post myocardial infarction: kidney function or blood glucose? 
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Topic: Risk factors and risk prediction
Introduction: Traumatic dysfunction in acute myocardial infarction (AMI) is a predictor of morbidity and mortality. Recently, hyperglycemia during hospitalisation has also been considered an important marker of poor prognosis in this population. Aim: To compare the predictive value of creatinine clearance (CrCl) with metabolic markers on AMI patients’ prognosis and to identify independent predictors of in-hospital and 1-year major acute cardiac events (MACE) and mortality. Population and methods: 764 consecutive AMI patients. Glycaemia (GLY) variation was defined as the difference between admission and lowest GLY and GLY normalisation as the difference between admission and first fasting GLY. Patients were followed for 1 year. Results: After multivariate analysis, age, necrosis markers, haemoglobin, admission and variation GLY were independent predictors of in-hospital mortality, while age, previous diabetes, necrosis markers and ejection fraction (EF) were predictors of 1-year mortality. In-hospital MACE were predicted by EF, angioplasty (PCI) and admission, variation and normalisation GLY; age; previous diabetes, EF, PCI, admission and variation GLY predicted 1-year MACE. We then computed the predictive value of each metabolic marker and CrCl in this population. The receiver-operator curves showed that all parameters were equally predictive of both short and long-term MACE and mortality. Conclusion: In this population, metabolic markers were as predictive of outcome as CrCl, a well recognised and strong prognostic determinant post-AMI. This fact, never before described, underlines the importance of metabolic abnormalities and its control in these patients outcome.

P170  The relationship between alcohol intake and cardiovascular deaths according to different designs
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Topic: Risk factors and risk prediction
Introduction: The relationship between alcohol intake and cardiovascular deaths according to different designs
P171  Prediction of cardiac events of patients with suspected coronary artery disease evaluated by double product at the end point of exercise testing combined with myocardial perfusion SPECT images.
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Topic: Risk factors and risk prediction
Purpose: We assessed whether the double product (DP) at the end point of exercise testing combined with exercise myocardial perfusion SPECT images accurately predicts cardiac events as a sub-analysis of J-AACCESS (Japanese-Assessment of Cardiac Event and Survival Study by Quantitative Gated SPECT) trial.
Methods: In J-AACCESS, 1,474 patients with suspected coronary artery disease without treatment by beta-blockers underwent Ex SPECT. Patients were categorised as Group A (Summed Stress Score (SSS) ≤ 4, DP ≤ 25,000, 738 patients), Group B (SSS > 4, DP ≤ 25,000, 483 patients), Group C (SSS > 4, DP > 25,000, 623 patients). Moreover, each group was classified into two groups whose patients with or without diabetes mellitus. We evaluated major cardiac events including cardiac death, nonfatal myocardial infarction, and severe heart failure requiring hospitalisation for 3 years.
Results: The major cardiac event rates were higher in Group D (7.03%) than in other groups (Group A 1.63%, Group B 2.48%, Group C 2.89%, p < 0.001). Furthermore, Kaplan-Meier analysis also revealed that Group D had poor prognosis (p < 0.0001). In group D, major cardiac event rates in diabetic patients were increased more than a two times compared with that in non-diabetic patients (10.9% vs. 3.02%, p < 0.001).
Conclusion: DP combined with Ex SPECT is a useful predictor for cardiac events in patients with suspected coronary artery disease. Moreover, this tendency is more remarkable in diabetic patients.

P172  The impact of smoking behavior on erectile function in patients with coronary artery disease
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Topic: Risk factors and risk prediction
Introduction: Smoking is a major public health problem worldwide. Studies have shown that smokers are 1.5 times likely to suffer erectile dysfunction than non-smoker, even smoking may amplify the effect of other diseases such as coronary artery disease. Aim: The purpose of this study was to assess the effect of smoking behavior on erectile function in patients with angiographically documented coronary artery disease. (CAD) Method: A group of patients with angiographically documented coronary artery disease (CAD), age ranging from 35-70 years were interviewed. Erectile dysfunction (ED) was investigated by the International Index of Erectile Function. Smoking habits (duration, frequency and the timing of smoking cessation, and the presence of cardiovascular major risk factors: hypertension, diabetes mellitus, hyperlipidemia) were also assessed.
Results: Of the 221 patients were studied, with a regular sexual partner, the majority 148 (66.9%) smoked at some time, and 73 (33,1%) never smoked. The average age was 54.8 years. ED was found among the 88 (72.8 %) current - and ex-smokers and in the 33 (27.2 %) never-smoker patients. Compared with patients who ever smoked, never smokers had higher level of other major cardiovascular risk factors. Conclusion: We found a strong association between ED and smoking habits in patients with CAD. Our study suggest two bi-directional relations between ED and smoking. Smoking may cause ED though atherosclerosis, and ED may cause smoking in patients with CAD.
P173 Intima-media thickness is associated with 10-year framingham risk score in an unselcted general population - cross-sectional baseline data of the Heinz Nixdorf Recall Study.

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Topic: Risk factors and risk prediction

Background: The Heinz Nixdorf Recall Study (HRS) is a prospective population-based cohort study, which recruited unselcted participants in the German Ruhr area in order to evaluate the value of IMT-measurement for extended risk stratification. Population-based data about the association between intima-media thickness (IMT) and the 10-year Framingham risk score (FRS), which is used for traditional risk stratification, are rare.

Methods: IMT, measured by B-Mode sonography, and 10-year-FRS from the baseline examination were calculated for 1681 male and 1750 female participants, aged 45-75 years, without coronary heart disease and/or stroke. Results of IMT were categorised in quartiles, the 10-year FRS was divided in three categories: <10%, 10-20% and >20%.

Results: Male means AF was significantly higher than female IMT (0.69±0.14mm vs. 0.64±0.11mm; p<0.0001). 10-year-FRS increased with an increased IMT ( Cochran-Mantel-Haenszel Test p<0.001 for both, men and women). Utilisation of IMT-measurement could reclassify 22.0% of men vs. 18.4% of women in the lower and 24.2% of men vs. 35.0% of women in the highest IMT-quartile for both sexes in the intermediate risk category according to the FRS. Haenszel Test p<0.0001.

Conclusions: Quanification of carotid atherosclerotic burden via IMT measurement is associated with 10-year FRS. Approximately 30% of both gender of the intermediate risk category according to the FRS were reclassified. Thus, IMT supports traditional cardiovascular risk stratification and additionally offers a remarkable potential for reclassification for risk.

P174 Clustering of metabolic factors and the risk of coronary heart disease: a prospective cohort study in the Netherlands

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Topic: Risk factors and risk prediction

Purpose: prevalences of metabolic factors (MFs) that are associated with an increased risk of coronary heart disease (CHD) are increasing worldwide. However, less is known about clusters of MFs that are associated with the highest CHD risk. Therefore, we investigated the association between individual as well as clusters of MFs and the risk of CHD using the Cardiovascular Registry Maastricht (CAREMA) cohort study.

Methods: The CAREMA cohort consists of 21,148 participants, born in 1927-1977 and randomly sampled from Maastricht and surrounding communities in 1987-1997. At baseline, all participants completed a self-administered questionnaire on life style factors and other risk factors for CHD. Furthermore, height, weight, blood pressure, and plasma cholesterol levels were measured during a physical examination. After follow-up of maximally 16.9 years, 790 incident CHD cases were used in the analyses. Incidence rate ratios (RRs) and 95% confidence intervals (CIs) were estimated using Cox proportional hazards models adjusted for age, sex, baseline study, smoking status, and alcohol consumption.

Results: RRs (95% CI) of CHD were 2.8 (1.9-4.4) for diabetes, 1.8 (1.5-2.2) for hyperlipidemia, 1.8 (1.6-2.1) for low HDL cholesterol, 2.5 (2.2-2.9) for high total cholesterol, and 1.3 (1.1-1.6) for obesity, compared with subjects without the specific MF. Furthermore, we found a clear dose-response trend between an increasing number of MFs and the CHD risk (figure 1). Especially clusters that included diabetes or both a low HDL (<<0.9 mmol/L in men, <1.0 mmol/L in women) and a high total cholesterol level (>6.41 mmol/L) were associated with elevated risks of CHD.

Conclusions: these results show a positive association between individual as well as clusters of MFs and the risk of CHD.

Figure 1 Clustering of MFs and CHD risk

P175 The relation between metabolic syndrome, education and CVD risk in adult population of Jelcz-Laskowice commune in Poland

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Topic: Risk factors and risk prediction

Purpose: The clustering of several cardiovascular disease (CVD) risk factors such as abdominal obesity, hypertension, dyslipidaemia and disturbances in glucose metabolism has been termed as Metabolic Syndrome (MS). Epidemiological studies showed that MS may increase risk of CVD mortality. Patients with low socio-economic status such as low education have an increased all-cause as well as CVD mortality risk, which is only in part mediated by traditional risk factors. The aim of the study was to assess the relation between prevalence of MS, educational status and CVD risk in adult population of commune Jelcz-Laskowice in Lower Silesia in Poland.

Methods: Data collection included medical history, lifestyle variables, clinical parameters (SBP, DBP, height, weight, BMI, waist circumference), parameters of fasting blood sample (glucose, lipids), place of residence and education. A representative sample of 1512 adults (924 women and 588 men, mean age 55.2±10.77 yrs.) of approximately 10 000 citizens of commune Jelcz-Laskowice in age above 35 was examined. CVD risk was estimated using the SCORE system and diagnosis of MS based on IDF and NCEP-R criteria calculated for each subject. Three-way analysis of variance ANOVA was used.

Results: Prevalence of MS (IDF) increased significantly with lowering of educational status for women (OR=1.17; p=0.03), but not for men (OR=1.07; NS) and for MS based on NCEP-R (OR=1.29, p=0.011 for women and OR=1.09, NS for men).

CVD risk in men and women with MS (IDF) was significantly higher as compared to individuals without MS (p=0.91, p=0.0001 both sexes, CVD risk increased with lowering of the educational status (P=0.86, pMS based on IDF and NCEP-R criteria appeared among 60.6 and 52.1% % of men and 67.0% and 60.9% of women and the CVD risk higher than 5% measured by SCORE system. Among examined individuals 38.5% and 27.1% of men and 38.3% and 33.1% of women with MS based on IDF and NCEP-R criteria had not diagnosed higher risk of CVD.

Conclusion: Inverse relation between educational status and MS in women, but not in men was assessed. Metabolic syndrome and low education level significantly elevate the CVD risk of both men and women. Relatively high number of subjects have MS with low CVD risk.

P176 Brief depression screening with a 2-item scale predicts poor prognosis following percutaneous coronary intervention

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Topic: Risk factors and risk prediction

Purpose: Depressive symptoms are associated with worse clinical events in cardiac patients, warranting the availability of brief and valid instruments to identify depressed patients in clinical practice.

We examined the prognostic value of the 2-item Patient Health Questionnaire (PHQ-2) in patients treated with percutaneous coronary intervention (PCI) with drug-eluting stenting. Consecutive PCI patients (N=796; 72% men; mean age = 62.5±11.51) completed the PHQ-2 at baseline and were followed up for 1-year mortality and non-fatal myocardial infarction (MI). At follow-up, 47 patients had experienced an event. In unadjusted analysis, depressive symptoms, using the continuous score of the PHQ-2 and the recommended cut-off ≥2, were not associated with death/MI (p>0.05). However, the incidence of events was significantly higher in depressed patients using a cut-off ≥2 (OR: 8.95; 95% CI: 1.06-50.5, p = 0.034), than in non-depressed patients (OR: 0.87; 95% CI: 0.60-1.24, p = 0.388). In secondary analysis, entering the main effects for depressive symptoms (cut-off ≥2) and gender, and depressive symptoms by gender, the interaction effect was near significant (OR: 3.77; 95% CI: 0.04-45.15, p = 0.06). Performing separate analyses in male and female patients, the incidence of death/MI was higher in depressed versus non-depressed patients (10.4% versus 3.9%, p=0.04) and the associated risk being almost 3-fold (OR: 2.85; 95% CI: 1.40-5.87, p = 0.004). No such relationship was found in female depressed versus non-depressed patients (3.9% versus 6.8; 0.67; 95% CI: 0.23-2.49, p = 0.65) in unvariable analysis. These results remained in adjusted analysis. Depression screening with a 2-item scale independently predicted 1-year clinical events. The PHQ-2 is a brief and valid measure that can easily be used post-PCI to identify patients at risk for adverse health outcomes.
P177
Severe short-term depressive symptoms lead to augmentation of subclinical inflammation in patients with acute coronary syndromes, implicating adverse 30-day prognosis.
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Topic: Risk factors and risk prediction
Aims: We evaluated whether short-term depressive symptoms are associated with more pronounced subclinical inflammation in patients presented with acute coronary syndromes (ACS).
Methods: We evaluated the non-fatal admissions of ACS in our institution during the first semester of 2007. Assessment of depressive symptoms, during past month, was based on the CES-D scale (Radloff S, 1977).
Results: 191 patients met inclusion criteria of the study. (mean age 65±11 years old, 76% were males). The mean CES-D score was 19±12. We divided the patients according the CES-D scale in tertiles (<11, 11–21, >21) and we found that those patients in the upper tertile of CES-D score had higher levels of CRP (96.6±24.7 vs. 48.8±15 mg/dl, p=0.017) and IL-6 (4.7±4.2 vs. 17.6±5.5 pg/ml, p=0.017) compared to the patients at the lower tertile, after controlling for several confounders, like sex, age, ejection fraction of the left ventricle, body mass index, smoking, hypertension, diabetes mellitus, hypercholesterolemia, number of vessel disease. The number of events during the first 30-day following discharge was 9.2% in males and 9.7% in females. Multivariable logistic regression analysis revealed that 1-unit increase in CES-D was associated with 10% higher odds (95% CI 1.09-1.12) of re-current events (death or re-hospitalisation), after adjusting for various socio-demographic, lifestyle and clinical factors.
Conclusion: We revealed that severe short-term depressive symptoms are related to more pronounced subclinical inflammation and a worsen 30-day prognosis of patients hospitalised for ACS.

P178
Calcification of the thoracic aorta as detected by spiral C.T. among stable angina pectoris patients: association with cardiovascular events and death
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Topic: Risk factors and risk prediction
Aims: Calculation of the thoracic aorta is associated with atherosclerotic risk factors, yet its clinical implications are not yet elucidated.
Methods and Results: A prospective cohort of 364 stable angina pectoris patients (307 men and 157 women aged 57-85 years) underwent chest C.T. and were evaluated for aortic calcification. We recorded the incidence of cardiovascular events and death during a 4.5-6 year follow-up. Aortic calcification was documented in 253 patients. Significant correlation was found between patients with aortic calcification to those without for the presence of aortic valve calcification (28% vs. 11%, p<0.001), mitral annulus calcification (29% vs. 4%, p<0.001) and coronary calcification (p=0.001). In multivariable analysis, HR for total events and cardiovascular events were 2.79 (95% CI 1.46-5.20, p=0.002) and 4.65 (95% CI 1.19-18.26, p=0.028) respectively.
Conclusions: Thoracic aortic calcification is associated with an increased risk of death and cardiovascular disease. (Circulation 2008;118[13]:1328-34)

Incidence of events in study patients

<table>
<thead>
<tr>
<th>Aortic</th>
<th>Aortic</th>
<th>P</th>
<th>Age adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcification</td>
<td>Calcification</td>
<td>(n=108)</td>
<td>(n=108)</td>
</tr>
<tr>
<td>Total events</td>
<td>75 (78%)</td>
<td>14 (13%)</td>
<td>0.001</td>
</tr>
<tr>
<td>All cardiovascular events</td>
<td>48 (48.9%)</td>
<td>12 (11.1%)</td>
<td>0.006</td>
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</tbody>
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* Total events included: cardiovascular events, non cardiac cause of death, heart failure and peripheral revascularisation. ** All cardiovascular events included cardiac cause of death, acute MI, refractory angina and stroke.

P179
What is the better risk stratification score for elderly atrial fibrillation patients?
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Topic: Risk factors and risk prediction
Background: atrial fibrillation (AF) is a common medical problem that increases in prevalence as patients age. The use of risk stratification scores can help guide the decision to use anticoagulation in AF patients, but their accuracy in elderly patients has not been well studied.
Objectives: to compare, in a group of elderly AF patients, the two most studied thromboembolic risk stratification scores (CHADS2 and ESC guidelines score) and determine their sensitivity and specificity.
Methods: a total of 161 consecutive elderly patients with AF admitted in a single internal medicine ward were evaluated. CHADS2 and ESC scores were calculated for each patient and sensitivity, specificity and concordance between the scores analyzed. We considered 1 or 2 points as small thromboembolic risk in both scores, 3 and ≥3 points as high-risk in CHADS2 and ESC guidelines scores, respectively. Clinical follow-up was available for 86.4% of patients, with a mean duration of 9 months.
Results: the mean age was 80.9 ± 6.6 years and 97.6% of the patients had permanent AF, with controlled ventricular rate in 56.4%. Previous stroke was verified in 30.4%. Global mortality rate in follow-up was 48.4% and the thromboembolism rate was 14.9%. The sensitivity and specificity of CHADS2 score was 73.7% and 37.9%, respectively, whereas in the ESC guidelines score we verified a higher sensitivity (84.2%) but lower specificity 49.95%. Among the two risk stratification scores, we demonstrated a moderate concordance (116/161 patients, 72%), with a kappa coefficient of 0.317.
Conclusion: the use of risk stratification scores can help guide the decision to use anticoagulation in older patients with atrial fibrillation, with good sensitivity but poor specificity in this elderly population.

P180
Gender related influence of cardiovascular risk factors on renal function.
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Topic: Risk factors and risk prediction
Objectives: to assess the influence of the some cardiovascular risk factors on renal function in patients with no renal disease.
Methods: evaluation of medical records of 977 consecutive patients, 534 women (54,6%, mean age 47,52 years - group A) and 429 men (45,4%, mean age 48,72 years - group B) monitored in a general practitioner cabinet. Patients with history and/or evidence of renal disease were excluded. We have correlated the age, the blood pressure values, the components of lipid profile and blood glucose with creatinine clearance level as a marker for renal function status. Impaired renal function was considered when creatinine clearance was lower than 90 ml/min.
Results: there was no difference between the two groups regarding the demographic factors and cardiovascular risk factors. Impairment of renal function was considered when creatinine clearance was lower than 90 ml/min. Patients with no renal disease.
Conclusion: gender related influence of cardiovascular risk factors on renal function in patients with no renal disease.
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P181 Risk factors management in patients after percutaneous coronary interventions in Serbia - single centre experience
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Topic: Risk factors and risk prediction
Introduction: Patients with known cardiovascular disease (CVD) and previous percutaneous coronary intervention (PCI) are considered as high-risk patients who require optimal risk factor management.

Aim: The aim of the study was to determine the regulation of all CVD risk factors and drug therapy in the group of high-risk patients with prior percutaneous coronary intervention (PCI) as well as to assess a patient’s opinion on risk factor regulation.

Methods: We prospectively studied 437 consecutive high-risk patients (mean age 57±9 years, 74% males, 36% female) scheduled for exercise stress test after PCI. In all patients we have evaluated blood pressure level, lipid status (total, LDL, HDL-cholesterol, triglyceride level), fasting blood glucose, waist circumference, body mass index and smoking status. Blood pressure under 130/80 mmHg, total cholesterol ≤ 4.5 mmol/L, LDL cholesterol ≤ 2.5 mmol/L, no smoking, fasting blood glucose ≤ 6.1 mmol/L, BMI ≤ 25 kg/m2 and avoidance of central obesity (waist circumference < 90 cm for women and < 94 cm for men) were considered as optimally regulated according to ESC guidelines.

Results: A mean systolic BP was 137±14 mmHg and diastolic blood pressure was 86±14 mmHg. Slightly increased values of total and LDL cholesterol were observed (5.0±1.2 mmol/L and 2.8±1.1 mmol/L, respectively). Mean value of HDL was 1.2±0.4 mmol/L, whereas mean value of TG was 1.9±1.4 mmol/L. There was high prevalence of obesity in our group of patients with mean BMI of 27.3±1.3 kg/m2 and waist circumference of 101±10 cm in male and 91±13 cm in female. DM type II was present in 15%.

There was only 43% of patients with three well-regulated risk factors (blood pressure and cholesterol) and 37% of patients with three well-regulated risk factors (blood pressure, cholesterol and avoidance of smoking). Out of 437 patients 37% considered themselves to have well-regulated risk factors but there was only 13% of population with actually well-regulated factors.

Conclusions: In this group of high-risk patients with previous PCI, there are not only the evidence that risk factors are not well regulated but also that the patients are not aware of optimal risk factors management.

P182 Is leucocytosis an adverse risk factor for in-hospital and late events in patients with acute myocardial infarction?
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Topic: Risk factors and risk prediction
Purpose: The aim of this study was to investigate the potential correlation between leucocytosis and in-hospital and late events in patients with acute myocardial infarction (AMI).

Methods: We studied 199 patients (139 men and 60 women), middle age 64±12.5 years old with AMI (135STEMI/64NSTEMI). We assessed their demographic data, their risk factors and treatment, while various blood samples were collected for determination of biochemical profile and white blood cells (WBCs) count. The patients were divided into three groups according to WBC count: group A with WBCs <10,000, group B with WBCs 10,000-14,000 and group C with WBCs >14,000.

In-hospital events (angina, re-infarction, arrhythmias, heart failure) and mortality rate were estimated. Furthermore, the patients were followed for 6 months monitoring the hospital re-admissions and overall mortality.

Results: In-hospital events were observed in 56/99 (23.2%) patients of group A, 20/85 (23.5%) patients of group B and 10/69 (14.0%) patients of group C. In-hospital events (angina, re-infarction, arrhythmias, heart failure) and mortality rate were estimated. Furthermore, the patients were followed for 6 months monitoring the hospital re-admissions and overall mortality.

Results: In-hospital events were observed in 56/99 (23.2%) patients of group A, 20/85 (23.5%) patients of group B and 10/69 (14.0%) patients of group C. In-hospital events (angina, re-infarction, arrhythmias, heart failure) and mortality rate were estimated. Furthermore, the patients were followed for 6 months monitoring the hospital re-admissions and overall mortality.

Conclusions: In patients hospitalised for AMI, leucocytosis represents an important risk factor for in-hospital events, although it does not affect readmissions and early and late mortality.

P183 The role of hypomagnesaemia in detection both atherosclerosis risk factors accumulation and no-specific inflammation syndrome in cardio-cerebrovascular disease in patients from Romania.
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Topic: Risk factors and risk prediction
Purpose: Some works imply magnesium deficiency (MgD) in promoting of inflammatory mechanisms from atherosclerosis by activation of leukocytes, macrophages, freeing of cytokines and increased oxidation of LDL. We proposed to study the possible relationships between MgD and atherosclerosis consequences met in clinical activity, such as cardio-cerebrovascular disease (CCVD). We analysed the links between MgD and both traditional atherosclerosis risk factors (TRF) such as dyslipidaemia, smoking, overweight, arterial hypertension and no specific inflammation syndrome investigated by serum CRP level (4), CRP, leucocytes level and missing mim (MT) number (main consequence of chronic, persistent gumm inflammation: parodontitis, parodontosis).

Methods: In a cross-sectional study we analysed 293 patients with CCVD: old myocardial infarction 76 (26%), angina pectoart 147 (50%), stroke 49 (17%), ischemic cardiomyopathy 21 (7%). Mean age was 59±12 years, 108 (54%) were women. Mean serum Mg level was 2,13±0.45 mg/L (low level first tertile <.1.8 mg/L).

Results: testing all of TRF between the levels of first and last tertile of serum Mg, we found some significance difference for: sex (18.4% women vs 11.9% index, P<0.011), age (63.8±12.5 vs 57.2± years, P<0.006), serum cholesterol (201.5±54.6 vs 227.1±52.2 mg/dl, P<0.003), triglycerides (137.2±88.5 vs 190.5±62.9 mg/dl, P<0.044), serum glucose (125.1±
45.4 vs 103.5±33.2, P<0.014), smoking index (9.96±2.6 vs 7.7±1.6, P<0.003), body mass index (26.4±4.4 vs 29.1±5.7, P<0.015), HDL-cholesterol (41.8±21.0 vs 52.1±11.2, P<0.031). Other TRF do not differ in relation with Mg level. Concerning no specific inflammation we found significant differences for: CRP (43.3±125.2 vs 357.4±98.9 mg/l, P<0.01) and MT (18.1±11.1 vs 13.9±8.9, P<0.02). Leucocytes level and CRP do not differ between the first and third tertiles of magnesium.

Conclusions: these data show that MgD is present in patients with some specific features: women more aged, with reduced body mass index, with dyslipidaemia (specially low HDL-C level) and smokers. These patients have a higher serum level of CRP and more MT indicating an persistent inflammation syndrome. Thus, MgD may be a sign of atherosclerosis manifestations severe, indicating an atherosclerosis risk factors accumulation and presence of no specific inflammatory syndrome in CCVD. We sustain that testing of serum Mg is important for physician orientation in atherogenesis mechanisms knowledge with therapeutical consequences (for example, Mg supplementation in diet).

P184 Restrictive left ventricular filling pattern plus increase in antero-posterior left atrial diameter: a powerful predictor of clinical deterioration in chronic heart failure II NYHA class patients.
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Topic: Risk factors and risk prediction
Background: When a perspective study concerning chronic heart failure (CHF) II NYHA-class pts doesn’t be planned in order to cover a long enough period of follow-up (FU), the mortality cannot be employed as end point, due to low predictable number of events; instead, in this case, it’s interesting for researchers to use the surrogate end point represented by transition to III NYHA class.
Aims: To identify the Doppler echocardiographic criteria able to predict clinical deterioration of mild-to-moderate CHF as well as whenever possible, to evaluate the features of chronological relation of caviatty remodeling in left chambers during FU.

Methods: A case control study, including a number of CHF II NYHA-class pts, was carried out, aimed to evaluate the role as predictor of CHF worsening of some Doppler echographic parameters, listed as follows:left ventricular mass index, analysed as continuous or dichotomous (>310 gm2/m2); left ventricular ejection fraction (LVEF);divided into 2 classes: eLVEF<45%, i.e.normal or mildly impaired LVEF, and 2) reduced (45%-30%) LVEF; restrictive left ventricular filling pattern(RPF), antero-posterior left atrial diameter (apLAD)>30 mm;ratioventricularatrialexternalatriovascularcardiacity—>8. For every case of death or transition to III NYHA class found during a 5 years FU, it was agreed that suitable number (from 3) to controls, matched for sex, age, smoking and FU, duration, had to be recruited from the same cohort employed as source of cases.

Results: 173 pts were enrolled, whose 60 (35 cases of transition to III NYHA class and 45 controls) were included in retrospective analysis. At univariate analysis, RPF (OR:19.5 95%IC: 4.4-86.6) and apLAD>30 mm (OR:11.9 95%IC:2.8-45.8) were shown to be associated with worsening CHF. At multivariate analysis, the role of prognostic indicator of poor outcome was maintained by RPF (OR:17 95%IC:2.2-116.0) as well as by apLAD>30 mm (OR:7.9 95%IC:1.7-41.6). By using the 2d contingency table, RPF was found to be strongly associated with clinical worsening (OR:36), and combined finding of RPF and apLAD>30 mm was proven to multiply by 3 the strength of association, thereby supporting the protective confounding exercised by left atrial dilatation.

Conclusions: In mild-to-moderate CHF, RPF and apLAD>30 mm are predictors of adverse outcome, independently of the presence or severity of LV systolic dysfunction.
**P186**

**Spousal concordance for factors related to metabolic syndrome in families of patients with premature coronary heart disease.**  
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**Topic:** Risk factors and risk prediction  
**Purpose:** To elucidate risk factor concordance between spouses in families of patients with "premature" coronary heart disease (CHD).

**Methods:** We examined 374 spouse pairs. There were 174.5 pairs with prominent (onset before 55 years: CHD aged 32-63 years) and 174 their spouses aged 28-63 years. Among spouses 18.4% had angina pectoris only and 81.6% had history of myocardial infarction. There were 10 patients with CHD among spouses (5.75%). Characteristics studied included alcohol consumption, tobacco smoking, education, body mass index (BMI), waist circumference (WC), heart rate, systolic and diastolic blood pressure (DRBP), total, low and high density lipoprotein cholesterol, triglycerides (TG), apoprotein A-I and B, lipoprotein (a), blood glucose and insulin, homozygous model assessment-insulin resistance (HOMA-IR), fibrinogen, activity of plasminogen activator inhibitor type 1. Concordance of variables of continuous and ordinal type was estimated by Spearman’s rank correlation coefficients adjusted for sex and age. Pairs were divided according to profound age (32-47 and 35-63 years) and spousal concordance for characteristics studied was evaluated separately in 2 groups (probands 32-47, spouses 28-53 years, and probands 48-63, spouses 35-63 years) with presumably different duration of marriage/cohabitation.

**Results:** Registered characteristics of spouses except apo A-I correlated positively. Correlations between 9 characteristics were significant: education, insulin, HOMA-IR, WC (R=0.60, 0.424, 0.241, 0.29, all p<0.001), glucose (R=0.261, 0.0007), TG and fibrinogen (both R=0.222, p=0.0036 and 0.0064, respectively), BMI and DRBP (R=0.195 and 0.385, respectively, both p<0.016). PAI-1 activity was the only characteristic with different correlations in “younger” and “elder” pairs (R=0.535 and 0.320, respectively, p<0.042).

**Conclusion:** In families of patients with premature CHD we found various degree of spousal concordance mostly for factors considered to be related to metabolic syndrome.

**P188**

**Assessment of secondary cardiovascular prevention in Ukrainian urban area: comparison of risk factors profile and their control after ischemic stroke and myocardial infarction.**  
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**Topic:** Risk factors and risk prediction  
**Objectives:** Cardiovascular morbidity and mortality in Ukraine is one of the highest in Europe. To elucidate risk factor (RF) profile and after ischemic stroke and myocardial infarction. Study was performed to monitor prevalence and efficacy of RF control in patients (pts) after ischemic stroke (PostIS) and myocardial infarction (PostMI) in urban Ukrainian population.

**Methods:** Representative sample was selected from 2229 patients hospitalised between 2000 and 2011 with ischemic stroke and myocardial infarction in Lutsk city. The home-based questionnaire, drug treatment assessment, blood pressure (BP), anthropometric measurements and laboratory tests were performed.

**Results:** Totally 547 pts participated in RF assessment: 235 PostIS pts (124 men, mean age 62.6 ± 10.3 years) and 312 PostMI pts (218 men, mean age 62.2 ± 9.9 years). High prevalence of overweight (79.7% vs 79.2%), abdominal obesity (66.6% vs 57.6%) and hypercholesterolemia (73.2% vs 76.1%) was found according to PostIS and PostMI pts with no difference between groups. No difference was found in smoking (18.5% vs 17.9%), diabetes mellitus (15.3% vs 13.5%) as well as in lipids, glucose and high-sensitivity CRP levels. The most prevalent RF in both groups was arterial hypertension (AH) - 88.9% in PostIS pts and 83.6% in PostMI pts (p=0.04) with higher levels of BP in PostIS group systolic - 153.3 ± 26.6 mmHg to 150.4 ± 28.4 mmHg; p=0.005 and diastolic - 94.1 ± 13.6 mmHg to 90.3 ± 15.3 mmHg; p=0.003. Less prevalent controlled AH in PostIS group. Definitely insufficient number of pts took antithrombotic drugs, especially in PostIS group: 39.1% vs 52.6% in PostMI (p=0.008) and very few took statins: 1.7% PostIS vs 11.2% PostMI (p=0.001). Recommended target levels of BP, cholesterol, LDL-cholesterol was reached in less than 25% pts of both groups.

**Conclusion:** High prevalence of modifiable RF with poor control was found in pts after ischemic events in Ukrainian urban area. PostIS patients had higher prevalence of AH and worse control of both AS and TOD.

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**P187**

**Relation between arterial stiffness and target organ damage in treated essential hypertension.**  
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**Topic:** Risk factors and risk prediction  
**Purpose:** To study the influence of arterial stiffness parameters (AS) on target organ damage (TOD) in treated essential hypertension before and after antihypertensive treatment.

**Methods:** We studied 92 hypertensive patients (mean aged 60.72±6.4, 57.6% females, without diabetes) before and after 6, 12 months of treatment (ACEI or calcium channel blocker – "Indamipide"). AS was evaluated with Complior method (pulse wave velocity (PWV), aortic pulse pressure (PP)) and carotidian ultrasound (arterial stiffness index β). TOD was evaluated using carotidian IMT (threshold > 0.9 mm), LVMI defined as present/absent, LVMI (threshold) 125 g/m2 for men and 110 g/m2 for women and renal function (microalbuminuria, albumin-creatinine ratio). The results were adjusted for components of cardiovascular risk profile (ANCOVA) and t-test was used for comparative analysis.

**Results:** 1. PWV is related with carotidian IMT (r=0.36, p<0.05). 2. Global analysis for LVMI (absent/present) and LVMI in relation with PPV (p=0.002) and aortic PP (p<0.04) irrespective the gender; only LVMI is related with β index (p<0.05). 3. Presence of microalbuminuria is notable for abnormal values of PVW, while elevation of albumin-creatinine ratio correlates with PVW and aortic PP (t-test). 4. Only PWV is an independent risk factor for carotidian IMT and LVMI (ANCOVA). 5. After 12 months of treatment it is a significant difference between ACEI and calcium channel blocker regiments (t-test), because ACEI influence better carotidian IMT and LVMI, while calcium blockade is superior for PWV regression. The both regiments have a potent influence upon renal function.

**Conclusions:** 1. PWV is the most sensitive parameter for estimation of TOD in arterial hypertension. 2. All parameters of AS are related with TOD, but only PWV is an independent risk factor. 3. ACEI in the therapeutic regimen including ACEI and calcium blockade results in a better control of both AS and TOD.
Cold weather as a risk factor for acute myocardial infarction: differences between north and south european countries

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Topic: Risk factors and risk prediction

Several studies have underlined the association between cold weather and the incidence of respiratory and cardiovascular diseases. It has also been indicated that winter mortality is more pronounced in milder winter climates than in regions with severe winters. However, the studies of the impact of cold in the Mediterranean countries are very scarce and its influence on health and mortality is often left aside.

The highest winter mortality in Mediterranean countries is probably associated with the housing conditions, such as lack of heating. And thus, it might reveal signs of a greater exposition to colder environments during winter in these regions.

The purpose of this paper is to present the preliminary results of a study of the impact of cold weather in acute coronary syndromes in Portugal and to compare it with a north European country.

Monthly national Portuguese and Swedish diagnosis related groups (code 410-ICD ninth review) were analysed in order to understand the differences between such contrasting climates and the incidence of acute myocardial infarction.

The main results indicate that although Sweden has a significant higher absolute incidence of acute myocardial infarction (33 per 100.000 inhabitants in Sweden vs 10 per 100.000 inhabitants in Portugal), Portugal has a higher "excessive winter morbidity" incidence in acute myocardial infarction (19% increase in Portugal vs 5% increase in Sweden).

These results reinforce the winter vulnerability of southern European regions and highlight the need to assess thermal housing conditions and to establish protective measures in those areas. A better understanding of the contribution of cold on the incidence of coronary mortality may help to determine preventive policies and also to define critical thresholds and early warning systems that may trigger an emergency response during critical cold periods.

Young Heart - a study of cardiovascular prevention in schools

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Topic: Risk factors and risk prediction

The aim of this study was to evaluate the presence of cardiovascular risk factors in an adolescent school population of ages between 15 and 18 years old. We aim to alert parents and health governmental authorities to this growing problem of adolescence that can have serious implications in adulthood. This study was designed as a pilot study to gather field experience so a national study can be developed.

Until November 2008 a total number of 419 adolescent participated in this study (another 500 students will participate in this study in the next months), recruited from four schools: two private (284 students) and 2 public schools (125 student) in the Lisbon region. The sex and age distribution was homogeneous. Fasting total cholesterol, triglycerides and glucose were determined using an analyser capillary 8+ (finger prick). Also blood pressure was measured as well as height and weight to determine the Body Mass Index. A questionnaire of diet and life habits was fulfilled by all students and all parents gave written consent for their child to participate in the study. Also it was asked to the parents to fulfill a questionnaire about personal and family clinical information regarding cardiovascular disease (CVD) and personal risk factors.

Three major risk factors were found in a large percentage in this population: total cholesterol levels, systolic blood pressure and smoking habits. A high percentage (24,9%) of the adolescents participate in the study. Also it was asked to the parents to fulfill a questionnaire about personal and family health conditions, such as lack of heating. Furthermore, it might reveal signs of a greater exposition to colder environments during winter in these regions.

The purpose of this paper is to present the preliminary results of a study of the impact of cold weather in acute coronary syndromes in Portugal and to compare it with a north European country.

Monthly national Portuguese and Swedish diagnosis related groups (code 410-ICD ninth review) were analysed in order to understand the differences between such contrasting climates and the incidence of acute myocardial infarction.

The main results indicate that although Sweden has a significant higher absolute incidence of acute myocardial infarction (33 per 100.000 inhabitants in Sweden vs 10 per 100.000 inhabitants in Portugal), Portugal has a higher "excessive winter morbidity" incidence in acute myocardial infarction (19% increase in Portugal vs 5% increase in Sweden).

These results reinforce the winter vulnerability of southern European regions and highlight the need to assess thermal housing conditions and to establish protective measures in those areas. A better understanding of the contribution of cold on the incidence of coronary mortality may help to determine preventive policies and also to define critical thresholds and early warning systems that may trigger an emergency response during critical cold periods.
P193
Improvement of quality of treatment in the management of hypercholesterolemia in Asian patients with coronary artery disease

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Background: treatment gap in the management of hyperlipidaemia, meaning failure to achieve therapeutic goal recommended by treatment guideline, was estimated in several studies. This study was designed to evaluate the change of quality in the treatment of hypercholesterolemia in coronary heart disease (CHD) patients.

Methods: the patients with CHD who have received the treatment at ten tertiary cardiac centres of Korea were enrolled. Patients were enrolled when they were documented as having coronary artery disease by coronary angiography or stress tests or history of myocardial infarction or revascularisation. Medical records of more than thirty patients for each physician of 3 or more doctors were reviewed at ten tertiary hospitals. This survey was repeated with four year interval.

Results: findings from the survey of 1,000 patients with coronary heart disease showed the decrease of treatment gap since 2003. The proportion of CHD patients with lipid-lowering drugs increased from 57.9% in 2003 to 59.5% in 2007. The proportion of treatment goal achievement after treatment was changed from 51.3% to 76.2%. Mean LDL cholesterol reduction with lipid-lowering drug treatment was 26.5%. Increased prescriptions of high-potency statins, increased proportion of treated patients with drugs and educated patients were significantly associated with the increase of goal achievement rate.

Conclusion: significant treatment gap which had been confirmed in CHD patients of Korea in 2003 has been markedly decreased with treatment effort since that. Systematic, effective treatment approach to reduce this gap is warranted.

P194
A single centre experience: three years of acute coronary syndromes revisited.

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Background: the patients with acute coronary syndromes (ACS) has been under constant development. Do these new approaches affect patients outcome?


Methods: retrospective analysis of 1528 ACS patients who were admitted in a single ICU from 2004 to 2006 (2004 n=540, 2005: n=504, 2006: n=484). A clinical follow-up was made 1 year after discharge, focusing on survival and adverse event rates.

Results: M6 compared to M0, mean age showed a trend to increase. Left-ventricular function and metabolic profile were better among patients admitted in 2006, however, their renal function was worse. Coronary angiography was performed more often across the years, and number of totally revascularisation patients also increased. Regarding medical therapy, glycoprotein IIb/IIIa inhibitors, antiplatelet agents, enoxaparin, beta-blockers, ACE inhibitors and statins were used more often, unlike nitrates and diuretics. Antiplatelets and ACE inhibitors were increasingly prescribed at discharge, unlike beta-blockers. Patients discharged with all evidence-based drugs increased from 57.9% in 2003 to 59.5% in 2007. The proportion of treatment goal achievement after treatment was changed from 51.3% to 76.2%. Mean LDL cholesterol reduction with lipid-lowering drug treatment was 26.5%. Increased prescriptions of high-potency statins, increased proportion of treated patients with drugs and educated patients were significantly associated with the increase of goal achievement rate.

Conclusion: significant treatment gap which had been confirmed in CHD patients of Korea in 2003 has been markedly decreased with treatment effort since that. Systematic, effective treatment approach to reduce this gap is warranted.

P195
Novel integrated vascular prevention community-based programme for primary and secondary CVD prevention

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Topic: Prevention of CVD

Background: We have developed and piloted a community-based multidisciplinary vascular health programme. It is novel because it integrates patients with coronary disease, who are traditionally managed in hospital cardiac rehabilitation programmes, with asymptomatic high-risk individuals (e.g. those with diabetes and others at high multifactorial risk of developing the disease) from primary care. It provides these patients and their families with a professional multi-disciplinary lifestyle intervention, and appropriate risk factor and therapeutic management in a community leisure facility.

Methods: Coronary patients from hospital and individuals with a CVD risk ≥20% (HR) ≥40 years from primary care were invited with their partners to attend the programme. Measurements included lifestyle, anthropometry, 7-day physical activity recall, blood pressure and lipid profile. All patients and partners were assessed prior to (initial) and at end of programme (EOP).

Results: 206 patients (120 HRI, 86 coronary) and 91 partners attended the initial assessment. Table 1 shows mean changes over time in lifestyle and risk factors between initial and end of programme assessment.

Conclusions: This novel multidisciplinary community based programme achieved improvements in weight, shape and physical activity levels and better blood pressure and lipid levels. This overall impact was seen in both patient groups and in partners demonstrating that an integrated approach is effective in reducing CVD risk.

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P197
Myocardial infarction and stroke incidence rates related to secular trends of cardiovascular risk factors in Gothenburg, Sweden.
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Topic: Prevention of CVD

Purpose: It was previously reported that modifiable risk for myocardial infarction (MI) declined by 45% during 40 years in Gothenburg, and that the incidence rate of MI declined with about the same amount. Here we analyse whether a similar trend regarding stroke incidence rate is also seen.

Methods: The national hospital discharge registry was used to detect MI and stroke cases. It was previously reported that stroke incidence did not change but mortality declined during the years 1951 to 1987. The present report covers the period 1987 until 2006 with 1204 strokes among men and 15250 among women, in a population of 187266 men and 196166 women aged 20 years and even in the year 2006. Cardiovascular risk factor data in random population samples were available for men and women aged 50 years from 1963 to 2003, and were related to stroke incidence rates.

Results: Incidence and mortality rates for all strokes (ICD-10 I60-I64) were unchanged. Rates for subarachnoid hemorrhage declined for the age group 45-54 among men, but not significantly in any other age group. Incidence and mortality rates of intracerebral hemorrhage declined for women aged 65-74, but there were no significant changes in any other age group. Thromboembolic stroke incidence did not change, but mortality increased for men and women aged 75 and above. Mortality declined for the age group 20-44 among men. There were significant declines of smoking, total cholesterol and blood pressure levels in both sexes, but diabetes prevalence, body weight, and BMI increased among men and women, as well as triglycerides in men. In spite of the downward trend for MI, stroke incidence remained stable. The adverse risk factor trends (diabetes, obesity and triglycerides) as well as (possibly) insufficient anti-hypertensive treatment were apparently more important for stroke than MI incidence.

Conclusion: Continuous monitoring of diagnosis specific cardiovascular risk factors in the community is important.

P198
Is physical fitness more important than physical activity in controlling CVD risk factors?
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Topic: Prevention of CVD

Purpose: The relative importance of physical fitness (PF) and physical activity (PA) in relation to multiple risk factors (RF) of the metabolic syndrome is unknown. To explore the relative importance of average intensity of PA in METS and time spent on PA in hours, and secondly, the interrelationship between PA (METs, hours and overall PA in MET-hours) and CVD risk factors was investigated via influencing peak oxygen uptake (peak VO2), optimising the risk profile of people with CVD risk factors.

Methods: In the cohort Utrecht Police Lifestyle Intervention Fitness and Training study (UPLIFT), 116 policewomen and women were evaluated regarding CVD risk factors, PF and PA.

Results: In the UPLIFT-study the point prevalence of the metabolic syndrome was 19.9%. Respondents having 3 or more CVD RF had a significantly lower peak VO2, sedentary 5% of value, PA intensity in METS, PA hours, and PA (high) MET-hours. High peak VO2 was associated with lower odds ratios for CVD RF (beta=0.15, p<0.001), with PA MET-hours (beta=0.02, p<0.001), with PA and MET-hours (beta=0.02, p=0.001), and with peak VO2 (beta=0.36, p<0.001), with no significant differences for PA MET-hours moderate (4.6 MET’s hours) and PAMET’s hours low (<4.5MET’s hours).

This independent relationship between CVD risk score and PA METS and PA MET-hours (high) became non-significant after adjustment for peak VO2. In this cohort it was shown that in the interrelationship between PA and CVD risk score, 71-77% of the effect of PA METS and PA MET-hours high on CVD risk factors was via influencing peak VO2. 23-29% of the total variance in PA had a direct effect on the CVD risk score.

Conclusions: The present study shows in a large cohort that CVD RF are prevalent and are largely associated with PA, and to a lesser extent with PA. We found an indication that intensity of PA METS may be more important than time spent on PA in hours. Our study extends previous findings by detecting that though PA and PF are both associated with decreasing risk, higher levels of PA showed to have more impact on CVD RF. The major implication of this study is that PA should preferably increase peak VO2 in order to maximally influence CVD RF.

The therapeutic goal and recommendation for the management of CVD RF should preferably increase peak VO2 in order to maximally influence CVD RF.

P199
Poor control of arterial hypertension in patients after ischemic stroke in selected urban areas in Poland and Ukraine
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Topic: Prevention of CVD

Introduction: There is a high mortality rate in patients after stroke in Poland and Ukraine. Control of arterial hypertension (AH) is crucial for secondary prevention after atherothrombotic and lacunar ischemic stroke (IS).

Objective: To analyze control of AH in post-IS patients in urban populations in Poland and Ukraine.

Methods: The study was conducted in representative samples of post-IS patients of Gdansk (Poland) and Lutsk (Ukraine) who suffered from IS in years 2006-2010. The questionnaire, blood pressure (BP) measurements and laboratory tests were performed.

Results: The data of 244 subjects from Gdansk (G) (118 Women; 126 Males - M) and 255 from Lutsk (L) (111 W and 124 M) were collected. AH was found in 85% subjects in G and 90% in L (p=0.1). Awareness of AH was higher in G (0% of newly detected AH in G; 23% in L, p<0.05). Twice five percent of regularly treated for AH in G and 12% in L (p=0.04) had well controlled AH (target <140/90 mmHg). Blood pressure lower than 130/80 mmHg (suggested in 2007 ESC/ ESH Guidelines for post-IS) was found in 23.3% in G and 11.5% in L (p<0.06). The hydopsonic drugs used in post-IS subjects are shown in table 1. ACEI and diuretics were most commonly prescribed in G, and beta-blockers in L. ATI blockers were almost not used.

Conclusions: 1. Very high prevalence and insufficient control of AH was detected in post-IS patients in urban areas in Poland and Ukraine. These data indicate urgent need for complex educational interventions in patients, their families and medical staff. Post epidemiological situation in L calls for organisational changes of health service in Ukraine. The profile of hypotensive drugs prescribed follows ESC/ESH guidelines, but most patients are undertreated.

P200
What does a Polish teenager know about preventing heart diseases? M. Kraszewski1, A. Igtaszewska-Wyrzykowska1, J. Kuzior2
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Topic: Prevention of CVD

Introduction: Lifestyle is one of the most important factors moulding our health condition. Therefore altering current habits for health behaviour is a crucial element of preventing and curing cardiovascular diseases (CVD). However, changing routines of adults is really hard to perform and hence is so subjective to educate the young. To conduct an effective preventiv- inducement education we must possess information about level of their health consciousness and lifestyle.

The aim: Assessment of knowledge and behaviour of secondary school pupils.

Material and methods: The research was based on surveys conducted among pupils of 3 schools in Sopot (part of Gdansk’s agglomeration). We examined 524 children (265 boys), at the age 13 to 18 (mean value 15,06; SD=±0,86).

Results: 1. In reply to question “Which of the following products should be often eaten to maintain a good health?” 97% of respondents indicated vegetables and fruits, 85% milk and dairy products, 80% brown bread, 76% fish, 52% meat, 47% vegetable fats, and 12% animal fats. Simultaneously only half of them consume every day vegetables and fruits. Sweets are eaten every day by 36% and once a week by the next 40% of respondents. In a schoolhour more than a half of children buy sweets, 12% sweet drinks, 7% mineral water, 2% yoghurts and only 15 fruits. 2. 86% of boys and only 75% of girls regularly attend PE lessons. Moreover 91% of respondents spend more time in their free time. The time dedicated by children to watching TV amounts about 2,7 hours and to doing something on a computer another 3 hours. 3. We asked children to grade the following factors a scale of 1 to 10, the question was “Which of them is the most important in improving good health?” . The highest points were given to narcotics (8,5), cigarettes (8,2), alcohol (7,3), obesity (6,8), high blood pressure (6,8), low physical activity (6,1), stress (6,1) and sweets (5,8). 4. In answer to “What methods of preventing heart diseases (other than taking drugs) do you know?” quarter of respondents was not able to say anything. Physical activity and the proper diet were the most often mentioned ones by the rest of the young. More seldom mentioned were limiting smoking cigarettes and drinking alcohol, avoiding stress and restricting consumption of fats.

Conclusion: 1. Level of pupils’ knowledge about factors impairing and improving our health is rather satisfactory. 2. Possessed awareness does not translate into practice. Good example of this problem is a way of nourishing. 3. Particularly bothering is an amount of time, which children spend in front of TV and computer – almost six hours per diem!
P201 Secondary prevention of heart disease in general practice: a cluster randomised controlled trial of tailored practice and patient care plans

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Topic: Prevention of CVD

Objective: To test the effectiveness of a complex intervention designed, within a theoretical framework, to improve outcomes for patients with coronary heart disease (CHD).

Design: Cluster randomised controlled multicentre trial.

Setting: 48 general practices; three centres, two different healthcare systems.

Participants: Patients with known CHD.

Intervention: Involved: (1) tailored practice care plans (practice based training in prescribing and behaviour change, administrative support, quarterly newsletter); (2) tailored patient care plans (motivational interviewing, goal identification and target setting for lifestyle change) with four-monthly practice reviews. Control practices provided usual care.

Main outcomes: After eighteen months: blood pressure, total cholesterol, physical and mental health status (SF-12), hospital admissions.

Results: Of 903 participants, 83.8 (92.8%) participated in follow-up. At baseline 790 (82.7%: 95%CI 81.3 to 84.0%), 594 (66.4%: 95%CI 62.9 to 69.1%) and 672 (78.2%: 95%CI 75.0 to 80.7%) had diastolic and systolic blood pressure levels and cholesterol levels within recommended limits.

No treatment effect was found for systolic blood pressure, total cholesterol, physical or mental health status (mean differences between interventions and controls were, respectively, 3.3 mmHg; [95% CI -1.02 to 7.61], 0.13 mmol/dl [95% CI -0.03 to 3.03], -0.78 [95%CI -2.58 to 1.03], -0.02 [95% CI -2.40 to 2.35]). Hospital admissions were fewer for the intervention group: mean cardiovascular admissions over eighteen months were 0.11 less per patient (95%CI 0.01 to 0.21).

Conclusions: There was a significant reduction in hospital admissions after an intensive 18 month intervention but no other clinical benefits were shown, possibly because of a ceiling effect related to improved CHD management.

P202 Cholesterol control in a strict monitoring programme

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Topic: Prevention of CVD

Purpose: Several studies published last years have shown that a Secondary Prevention and Rehabilitation programme could be carried out in order to improve control of cardiovascular risk factors in patients with coronary disease and, in particular, in the control of dyslipidemia as one of the most important risk factors. Last year, a multidisciplinary team in our hospital started a programme of strict monitoring of those with the aim to control the risk factors.

Methods: Those patients with coronary disease admitted to our service were closely monitored initially for 3 months. The monitoring consisted of informative sessions, an exercise programme and medical consultation to control several of the cardiovascular risk factors. We specifically controlled the values of total cholesterol, LDL, HDL, triglycerides and ratio Cholesterol/HDL baseline, 3 months and a year after starting the Secondary Prevention Programme with a suitable treatment with statins.

Results: We studied 121 patient (78% male, 78% dyslipidemia, 40% diabetic and 40% smokers). After 3 months of monitoring, values of total cholesterol decreased significantly from 183±43 to 144±33 mg/dl, p=0.003 within 3 months and decreased to 142±36 mg/dl, p=0.003 within a year. LDL decreased significantly from 116±40 to 86±30 mg/dl, p<0.001 and decreased to 83±32 mg/dl, p<0.001, respectively, and triglycerides also fell from 170±48 to 106±62 mg/dl, p=0.01 within 3 months and decreased to 125±66 mg/dl, p=0.05 within a year. However, there were no significant differences between the values of total cholesterol, LDL and triglycerides after 3 months or after a year. HDL increased from 44±12 to 47±10 mg/dl, p=0.008 for the 3 months. The ratio Col/HDL decreased significantly both after 3 months and a year after starting the programme from 4.46±1.54 to 3.17±0.93, p=0.001 and from 4.34±1.52 to 3.11±1.18, p=0.001, respectively. According to the last recommendation of dyslipidemia from the European Prevention Guidelines, after one year more than 70% patients included in this programme achieved the recommendation. However, the recommendations in baseline level were only achieved by about 30% of the patients. Only 85 (64%) patients in our sample were readmitted for cardiac reasons.

Conclusions: The strict monitoring in our prevention programme has shown a significant decline in levels of total cholesterol, LDL, triglycerides and ratio cholesterol/HDL, and elevation of HDL. A low incidence of readmissions and recurrence of clinic cardiac events occurred after a year. We are sure that secondary prevention units improve the clinical course and prognosis.

P203 The relation between carotid atherosclerotic plaques and ischaemic stroke is critically conditioned by role of arterial hypertension as effect modifier

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Topic: Prevention of CVD

Background: Arterial hypertension (Hyp) plays a recognised role as risk factor for ischaemic stroke(IS), together with diabetes, smoking and high levels of serum cholesterol. Further factors of risk, derived from ultrasonic (u.s.) characterisation of carotid great vessels, have been recently proposed, as carotid media-intima thickness as well as carotid plaques (Pla) with potential of generating haematic emboli.

Aims: To evaluate the predictive value of some risk variables with regard to end point represented by IS.

Methods: A case control study was carried out, concerning the cases of acute ischaemic cerebral events-IS or transient ischaemic attack(TIA)-found among the pts population followed up at our centre from February 2006 to march 2008. For every patient with clinical history of previous IS or TIA, a suitable number of controls (1 to 2), all free from history of prior acute cerebrovascular event, was recruited from the same outpatient population employed as source of cases. The following variables were evaluated: Hyp, defined, on the basis of systolic values, as mild(140-159 mm Hg) or moderate-severe(> 160 mm Hg) Hyp; age, divided into classes 60-70/70-80 and c> 80-90 year; diabetes; u.s. finding of carotid atherosclerotic Pla, categorised as “soft” or “hard” Pla, according to structural classification, and in Pla achieving c>50% or moderate (50-70%) lumen narrowing, according to degree of carotid narrowing.

Results: 168 pts on the whole, whose 46 cases and 60 controls were analysed. In univariate analysis, moderate-severe Hyp, 80-90 years age class and a.u.s. finding of soft Pla were shown to be associated with increased risk of IS. In multivariable analysis only moderate-severe Hyp [OR:0.013, 95%CI 0.01-1.69] and eldest age [OR:14.54, 95%CI 1.63-58.8, p<0.0002] maintained a significant value as predictors of IS. The 2x2 contingency tables documented the soft Pla were associated with increased risk of IS in each age class but this relation was overthrown when Hyp was not present, thereby supporting the effect modification exercised by Hyp (i.e. the strong association observed with IS-OR:13.5, 95%CI 2.07-61.18) in carotid atherosclerosis coupled with Hyp was cancelled in atherosclerotic pts whose Hyp had been controlled by therapies [OR:0.63, 95%CI 0.03-1.97-qualitative interaction).

Conclusions: Moderate-severe Hyp and very old age are powerful predictors of IS. The u.s. finding of carotid soft Pla itself shouldn’t indicate the invasive treatment need in the presence of nonmotivative state achieved by well conducted therapy.

P204 Reasons for less successful nurse-led secondary prevention programme

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Topic: Prevention of CVD

Background: The importance of lifestyle changes on cardiovascular outcome has been well established. However, lifestyle changes dependent on motivation and social support, such as smoking cessation and losing weight are most difficult to achieve.

In our University hospital a nurse-led multidisciplinary secondary prevention programme for patients with cardiovascular disease has been established since 2006. Aims: To compare success rates of our nurse-led secondary prevention programme with the established EuroAction cardiovascular risk management.

Methods: Primary endpoints as defined in EuroAction (n=946) were compared to our outcome. Findings: Of the 101 patients included in the programme 22% quit smoking, 8% achieved a BMI c< 25 kg/m2, 28% had a blood pressure <130/80 mmHg and 22% achieved a serum total-cholesterol <4.5 mmol/l after one year of follow-up. Comparing these results with the EuroAction trial endpoints after 1 year follow-up (table 1).

Conclusions: Our prevention programme has led to lower success rates compared to the intervention group of EuroAction. Differences can be explained by less intensive counselling offered in our prevention programme. We learned that a nurse-led multidisciplinary, family-based cardiovascular disease prevention programme like EuroAction offers patients with cardiovascular disease great opportunities for successful risk management.

Difference in interventions

Interventions

Smoking

EuroAction

9

Radboud University

58

Mental Interviewing

Self reporting by patients and validated by breath carbon monoxide concentration

Anthropometry

Dietitian

19

Mental Interviewing

Blood pressure

Lifestyle advice and medication

65

Lifestyle advice and medication

Blood lipid

Lifestyle advice and medication

77

Lifestyle advice and medication

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P205
24-hours blood pressure monitoring in healthy Slovak children and adolescents - a multicentre study
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Topic: Prevention of CVD

Introduction: Ambulatory blood pressure monitoring (ABPM) is a valuable and irreplaceable diagnostic tool for juvenile hypertension. Until now, there are no ABPM reference levels in healthy children and adolescents and there is no categorisation of juvenile hypertension based on this method, in Slovakia.

Purpose: Measurement of normal ABPM levels in healthy children in Slovakia in dependence on body height and sex.

Methods: Study involved 86 children and adolescents [43 boys and 39 girls] at the age from 10 to 19 years. There were 86 children in each age group. Children originated from the cities of Bratislava, Martin and Kosice. Rural population were represented by children from Myjava. All children included in the study were healthy, without taking any medications. The measurements were done according to the same protocol and with the same type of blood pressure machine [BP One, Medizion], in all centres. The cuff size was adjusted according to the age of the child. The blood pressure has been measured every 20 minutes during the day and every 40 minutes during the night. Calculated were minimal, maximal and average blood pressure levels for all age categories, specifically for girls and boys.

Results: Systolic blood pressure is increasing significantly with increasing body height. The increase is most significant in boys than girls. The 50th percentile of systolic blood pressure in boys is increasing from 104 mmHg to 114 mmHg and in girls from 104 mmHg to 110 mmHg.

The 50th percentile of diastolic blood pressure is 69 ± 8 mmHg and does not depend on body height or sex. During night, there was 11 % drop in systolic blood pressure in both sexes and 21 % drop in diastolic blood pressure [22 % in boys and 19 % in girls].

Conclusion: This multicentre study provides normal ABPM levels in healthy children in dependence on body height and sex in Slovakia.

P206
The impact of strict glycemic control on endothelial function and skin microcirculation in patients with type 2 diabetes
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Topic: Prevention of CVD

Background: Endothelial dysfunction and impaired microcirculation are considered as early signs of cardiovascular engagement in patients with type 2 diabetes, with hyperglycaemia as a triggering factor. This study tested whether normalisation of glycaemic control may reverse such disturbances.

Methods: Two patient groups with type 2 diabetes (mean age 62±6 years, 59% females) and sign of cardiovascular dysfunction were randomly assigned to strict metabolic control by means of insulin (I-group; n=10) or oral agents. Whether it may be possible to improve vascular function in patients with more severe dysglycaemia or cardiovascular engagement remains to be established.

Results: Systolic blood pressure increased significantly with increasing body height. The increase is most significant in boys than girls. The 50th percentile of systolic blood pressure in boys is increasing from 104 mmHg to 114 mmHg and in girls from 104 mmHg to 110 mmHg.

The 50th percentile of diastolic blood pressure is 69 ± 8 mmHg and does not depend on body height or sex. During night, there was 11 % drop in systolic blood pressure in both sexes and 21 % drop in diastolic blood pressure [22 % in boys and 19 % in girls].

Conclusion: This multicentre study provides normal ABPM levels in healthy children in dependence on body height and sex in Slovakia.

P207
Awareness and usage of non-pharmacological methods of CVD prevention in middle-aged population in northern Poland. Results of the screening project SOPKARD
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Topic: Prevention of CVD

Aim: the aim of the study was to assess awareness and usage of non-pharmacological methods of CVD prevention in middle-aged population.

Methods: Since 1999, all 40-, 50- and 60-year-old citizens of Sopot were invited to participate in SOPKARD screening project. The response rate was 56%. From 1999 to 2006, 5617 subjects were examined. In all subjects anthropometric and blood pressure measurements as well as questionnaire interviews were performed. Moreover, in 4739 subjects (57% women, 43% men) fasting glucose and lipids were measured. All subjects answered an open-question ‘What methods of cardiovascular prevention do you perform?’

The answers were analysed in the following groups: 1 normal subjects (N), 2 patients aware of diabetes mellitus (DM), 3 patients aware of arterial hypertension (AH).

Results: There were 4.3% of patients with earlier diagnosed DM and 23.7% with AH. In 73% both DM and AH were excluded. Non-pharmacological prevention methods were performed by 71% subjects in group with DM, 69% in group with AH and 55% N. The most frequently performed methods in group with DM were regular physical exercise (43.6%), low-fat diet (40.2%), diet rich with vegetables and fruits (42.1%), regular lifestyle (13.7%), quitting or limit smoking (13.5%). Rarely there were declared weight reduction (9%), limit of alcohol consumption (9.3%), salt intake reduction (1.5%). The differences in group with and without DM/AH were as following: weight reduction 9.1% vs. 6.2% p=0.001, regular exercise 42.6% vs. 38.9% p=0.02, quitting smoking 12.6% vs. 11.5% NS, limit of alcohol consumption 8.1% vs. 6.9% NS, regular lifestyle 13.5% vs. 11.9% NS, low-fat diet 34.4% vs. 27.5% p=0.001, rich vegetables and fruits diet 22.3% vs. 18% p=0.001.

Conclusion: Non-pharmacological methods of CVD prevention are implemented very rarely, even in high-risk patients. Even though subjects with earlier detected DM or AH implemented non-pharmacological methods more often than normal subjects, the usage of these methods was very poor. Both patients and physicians still largely underestimate the role of non-pharmacological therapy in the treatment of DM and AH. This situation calls for effective interventions.
**P210**

**Objective:** The study was to investigate the relationship between self-reported health and cardiovascular risk.

**Method:** We used data from the INTERGENE study, a population-based programme of risk of chronic diseases, as well as trends in cardiovascular disease and risk factors in western Sweden. From the 5610 respondents we selected people without known cardiovascular disease (n=2675).

**Results:** Half of the female population had ≤1% risk of fatal cardiovascular disease within 5 years in the SCORE model and half of the male population had ≤2% risk in the SCORE model. 5% of females and 20% of males had more than 10% risk. With increasing risk a significantly higher proportion reported having poor health.

**Conclusion:** Overall indicates that self-reported health may reflect cardiovascular risk in otherwise healthy individuals. A possible explanation is that responders understand the link between poor lifestyle and cardiovascular risk.

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**P212**

**Objective:** To detect values of CVD risk factors in patients with different physical activity and diet.

**Methods:** We compared the severity of atherosclerosis (ASC) in coronary and carotid arteries in consecutive autopsy cases. We investigated whether carotid ultrasonography could predict the patient’s coronary status.

**Results:** Females were older than males (p < 0.0001). The analysis of 387 autopsy cases showed significant correlation between the severity of ASC in the two artery systems, both in males and females (p = 0.002 and p=0.013). We found more advanced morphological changes in the coronary arteries than in the carotid arteries. If severe ASC (category 3) appeared in the carotid artery, we found severe ASC in the coronary arteries in 80 per cent of the cases. In cases with mild carotid ASC (category 1), severe coronary ASC (category 3) was found in 44 per cent of the cases.

**Conclusions:** ASC is a generalised vascular disease, but its severity varies in different vascular areas. Our study showed that the severity of ASC is higher in the coronary arteries than in the carotid arteries. We conclude if carotid ultrasonography examination can demonstrate ASC in the carotid artery, then coronary artery is probably affected. On the basis of all these the carotid ultrasonography is a useful method for the diagnosis of preclinical ASC of coronary arteries.

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**Abstracts**

**S45**

**Early detection**

**P209**

**Objective:** To detect values of CVD risk factors in patients with different physical activity and diet.

**Methods:** In 773 outpatients, using interviews and self-appraisal method, daily physical activity was divided as follows: intensive (1), moderate (2), and low (3). Diet was evaluated as: healthy (1), unhealthy (2), and mixed (2). In persons with different physical activity and diet difference of means of the following parameters was detected: waist circumference (WC), body mass index (BMI), systolic and diastolic blood pressure (SBP and DBP), glucose, total cholesterol (TC), low and high density lipoprotein cholesterol (LDL-C and HDL-C), triglycerides (TG) and C-reactive protein (CRP) by using ANOVA.

**Results:** Association between intensive physical activity with significantly lower BMI (p=0.000), SBP (p=0.002) and smaller WC (p=0.000) was established. Diet was not associated with clinical parameters and showed only trend to smaller WC and SBP (p=0.089 and p=0.087 respectively).

**Conclusion:** Higher intensity of physical activity is associated with smaller WC, lower BMI, SBP, glucose and CRP. Healthy diet has weak association with CVD risk factors and is connected only with lower CRP.

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**S211**

**Objective:** To early detection of asymptomatic disease.

**Methods:** A population sample of men and women (18-69, n=1078) was examined in Novosibirsk (Russia). We measured carotid IMT and brachial FMD with ultrasound. The indices of digital volume pulse (stiffness index, SI and reflection index, RI) were measured by photoplethysmography.

**Results:** The age gradient was assessed by decades under 40, 40-49, 50-59, and above 59 years. The average value of IMT was 0.64mm (SE 0.01) in men and 0.59mm (0.01) in women, and consequently increased with age from 0.52 in youngest group to 0.57mm in oldest one among men, and from 0.46 to 0.79mm among women (p<0.001, each gender). The IMT increase per decade ranged from 0.05 to 0.17mm. The rate of thickening between the 3rd and 4th age decade was two times steeper in men than in women. In multivariate adjusted regression IMT was linearly related to age (β=0.007, p<0.001, both genders). The average value of FMD decreased from 9.2% in the youngest group to 6.2% in the oldest age among men, and from 13.8% to 11.0% among women. In crude and multivariate models the relationship of FMD with age was not linear (p=0.314 and p=0.343 for linear trend in men and women). However, after further controlling for SI we revealed significant declining of FMD with age in range of 40-69 years (p=0.047) among men. In male aged 45-69 the average SI was 9.5mm (0.14) and continuously increased with age from 9.4 to 10.4mm, p<0.001. The mean RI was 71.15±0.49, it did not increase less than 60 years and elevated in older decade, I=0.041. In multivariate-adjusted regression SI was linearly associated with age (β=0.012, p<0.001).

**Conclusion:** The value of IMT was linearly related to age although the rate of thickening was higher in men than in women under 45 years old. Among middle-age men we found linear relationship with age for stiffness index but not for reflection index. We observed non-linear relationship between brachial FMD and age, suggesting that FMD might not only reflect endothelial function but also be influenced by mechanical properties of vessel wall. The limitation of maximal vasodilation by arterial stiffening likely distorts the prognostic significance of FMD. Age related gradient and interaction of vascular indicators might contribute their implications for risk stratification.
P213

Is headache a warning symptom of serious cardiovascular disease? 
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Topic: Early detection of asymptomatic disease

Introduction: migraine is a risk factor for stroke. Artrial shunts, notably palmus ovalis and 
artrial septal defects (ASD), seem to be more prevalent in patients with migraine. Other types 
of cardiovascular disease, like atrial fibrillation (AF) and hypertension (HT) may lead to stroke if 
left untreated and headache may be one of the first unpecific clinical symptoms. Screening of 
these cardiac anomalies is not routinely performed in patients with headache. 

Objectives: to evaluate the prevalence ASD, AF and left ventricular hypertrophy (LHV) caused 
by untreated HT in patients with headache and no previous history of heart disease, in order to 
access if headache may in some cases be a warning symptoms of serious cardiovascular disease and 
decide if these cardiovascular diseases should be or not routinely assessed. 

Population and methods: prospective study of 296 patients (age 41.8±14.7 years, 189% men) 
followed in the Headache clinic at our hospital during one year and assessed by ECG. Of these, 
47 fulfilled previously defined ECG criteria for suspected cardiology and underwent trans-
thoracic echocardiogram (TTE). Due to a strong ASD suspicion on TTE, 8 patients underwent 
transesophageal echocardiogram (TEE) evaluation. 

Results: ECG findings revealed incomplete bundle branch block in 17 patients, complete 
bundle branch block in 4, right atrial hypertrophy in 8, right axis deviation in 3, atrial fibrillation 
in 3 and left ventricle hypertrophy in 16 patients. ASD was diagnosed in 4 patients after performance of TTE. The prevalence of ASD was over 10 times higher than in the general 
population (4/296 vs. 1/200; p < 0.001). These abnormal findings were more common in men 
4 men with ASD. 1 with AF and 11 with LHV (16/66 vs 7/240; p<0.001).

Conclusions: ASD seems to be more prevalent in this population. The prevalence of this heart 
disease in patients with headache seems far superior to what would be expected. According to 
these data, cardiovascular disease seems to be very prevalent in this population (7.79%) and 
ECG seems to be a useful screening method. Early diagnosis and treatment of this diseases may 
have a positive impact in primary prevention of stroke. However, these data need to be 
confirmed in larger populations.

P214 

Pulse wave velocity grows as metabolic syndrome items cluster 
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Topic: Early detection of asymptomatic disease

Introduction: usual cardiovascular risk factors are responsible for a substantial part of cardiovascular diseases. 
A cluster of three out of five anthropometric, biological and hemodynamic factors define 
metabolic syndrome, which is considered as a growing deleterious state leading to cardiovascular event. 
The components have different impacts on subclinical atherosclerosis. 

Pulse wave velocity is elevated in patients whose arteries become stiffer due to arterial structural 
and functional impairment which can be discussed by several means. 

We studied from January to July 2008 clinical, haemodynamic, anthropometric, and 
biological data from 348 patients (185 men and 163 women). These hypertensive patients entered 
the day hospital in order to have a cardiovascular checkup, because of the presence of one 
or several cardiovascular risk factors. We measured brachial and central blood pressure, augmentation 
index (25.2±3.1 m/s with 5 items.

Since precocious atherosclerosis occurs also in patients with achieved guidelines recommen-
dations from developing subclinical atherosclerosis. This can partly be attributed to poor compliance. 
Therefore cv disease can develop even in well treated patients. 

Results: 100/150 patients (66%) showed signs of subclinical atherosclerosis. LVMM was >130gr/m2 in 
13% of men (mean age 65y and 100 males (m), mean age 65y treated at least 5 (mean 12y) years for hypertension (37.3m), dyslipidemia (3w,28m), diabetes (1w, 7m) or combined risk factors (9w, 41m) were checked for signs of 
subclinical cv disease by sonographic examination of left ventricle, carotid arteries and 
infrarenal abdominal aorta.

Conclusions: Long-term therapy of risk factors and subclinical atherosclerosis 
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Topic: Early detection of asymptomatic disease

Introduction: Whereas diminishing of sympathetic-vagal drive of heart has been repeatedly 
described in diabetics mellitus, early timing of reciprocal-control withdrawal is not known. 
Auto- 
and cross-spectral analyses of RR and QT beat-by-beat variability hold promise to early detect 
autonomic informations in young patients (pts) whose different traffic is vividly modulated. 

Methods: 27 consecutive insulin-dependent pts, free of significant clinical CV or neurological 
invovlements, laid 10 min in relaxed rest (baseline - B), then experienced a stress-interview (SS) 
10 min, and finally stood up (ST): 7 min. A thoracic EGG lead was digitized at 1 ms, and RR 
and QT intervals were detected and Fourier-transformed over 3 minute steady state RR epochs to 
get low frequency spectral power (LF: 0.04 - 0.15 Hz). RR-by-QT mean square coherence (cross) spectrum was used to unveil the RR-independent (proper to ventricles or idio-ventricular, IV) fraction from the QT (auto) spectrum. In 16 pts we detected mild autonomic impairments in ST. RR-shortening > 200 ms (10 pts), normal RR-shortening but no RR variance (4 pts); still RR around 600 ms & no variance (2 pts), and excluded them. The other 11 pts (5 M and 6 F, 34.9±7 ± 6.7D, diabetes history of 7.5 ± 5.4 were compared with 11 healthy gendered 
paired controls (cts) (36.7± ± 6.01 from lab's data base.

Results: Averages of pts/cts groups under the same intervention (B, SS or ST), or of pairs of 
interventions within the same group were compared. Inter-groups mean RR differed signifi-
cantly in ST only, on a background of mild tachycardia in pts. RR-LF is significantly lower in 
diabetes vs controls in all interventions (e.g. B: +146 ms vs ±206 ms. p<0.01 of Mann-Whitney 
U-Wilcoxon). This held true for QT-LF (except ST) but did not for IV QT-LF. Inter-groups, there 
were similar responses to interventions in all variables, except pts/ crt mean RR that did not 
shortened under SS. 

In pts versus cts, significant decreases of RR-LF in every intervention paralleled by mild to moderate decreases of mean RR suggest withdrawal of vagal drive, known as vehicle of every RR 
modulation. Differently, similarity between cts and pts with respect to IV QT-LF response suggests 
protection of sympathetic drive to ventricles in current life. 

Conclusion: In type 1 young diabetics in the earliest phase of autonomic dysfunction spectral RR-by-QT analyses suggest preferential parasympathetic down-regulation while preservation of 
sympathetic drive to ventricles introduces a dishalance & early arrhythmic risk worth to be dealt 
with by secondary prevention.
P217 Subclinical cardiac involvement in early rheumatoid arthritis detected by TDI
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Topic: Early detection of asymptomatic disease

Background: Subclinical cardiac involvement diagnosis is important for long-term management of early rheumatoid arthritis (ERA) patients. Recently, two-dimensional speckle tracking echo (STE) allows non-invasive and angle-independent measurement of left ventricular (LV) regional myocardial strain. The aim of our study was to assess whether two-dimensional echo LV strain and displacement can be useful to detect subclinical cardiac involvement in ERA patients.

Methods: We studied 18 ERA patients (9M, 10 F, aged 50 ± 11 yrs) without clinical evidence of coronary artery disease (CAD) and 18 healthy controls matched for age and sex by STE. LV end-systolic longitudinal and radial strain from apical 4-chamber view, and LV end-systolic radial displacement from short axis view were analysed using available software (QLAB 6.0).

Results: Echo and Doppler parameters did not differ between the two groups. LV end-systolic radial strain of basal-lateral, basal- and mid-segment segments as well as LV end-systolic radial displacement of antero-lateral, anterior, antero-septal and infero-segmental segments were significantly reduced compared to controls (Table 3). There were no significant differences regarding LV longitudinal strain.

Conclusion: Our data show that LV end-systolic radial strain and displacement are reduced in ERA patients without CAD. Non-invasive evaluation of LV function by STE appears to be useful to detect subclinical cardiac involvement in comparison to conventional two-dimensional echo Doppler, representing a promising new modality to follow-up ERA patients for cardiac involvement.

Table 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>ERA</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV radial strain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read-segment</td>
<td>9.72 ± 0.51</td>
<td>8.68 ± 0.51</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mid-segment</td>
<td>15.19 ± 0.51</td>
<td>12.22 ± 0.51</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LV radial displacement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antero-lateral segment</td>
<td>0.85 ± 0.26</td>
<td>0.81 ± 0.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Antero-segment</td>
<td>0.76 ± 0.26</td>
<td>0.81 ± 0.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Antero-septal segment</td>
<td>0.54 ± 0.26</td>
<td>0.32 ± 0.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Infero-segment</td>
<td>0.73 ± 0.26</td>
<td>0.52 ± 0.26</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

P218 Early detection of right ventricular diastolic dysfunction in well chelated b-thalassemia major patients with preserved left-ventricular function
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Topic: Early detection of asymptomatic disease

Aim: We investigate the reliability of classic and novel echocardiographic indices in the assessment of RV function of beta thalassemia major (bTh) patients with well preserved left ventricular (LV) systolic function and absence or past history of heart failure.

Methods: Forty well chelated bTh patients (18 male, aged 29±9.5 years) were compared with 33 normal subjects (15male, aged 30±13.5 years). We registered conventional echocardiographic indices and performed Tissue Doppler Imaging (TDI) evaluating systolic, diastolic and global RV function.

Results: According to modern MRI indices, bTh patients had normal myocardial (mean T2*Heart:31.5msec) iron concentration and normal LV myocardial function with preserved LV function. Mean pulmonary artery systolic pressure value was increased in bTh patients compared to controls (23.3±4.2 vs 20.1±3.9 mmHg, p=0.001). Truncated annular plane systolic excursion (APSE) of LV and RV systolic function expressed as %RVAPSE of LV patients wasn’t severely affected (2.18±1.09 vs 2.48±0.53, p=0.102). Additionally, TDI systolic RV myocardial velocity (Sm) appeared to be in normal range compared to controls (14.2±3.39 vs 13.3±3.79mm/sec, p=0.97). Visc-echo, ENPm tissue Doppler diastolic ratio showed a significant decrease (1.05±0.35 vs 1.34±0.31, p=0.012). Finally, Myocardial performance index (MPI), that represents global RV performance, was significantly reduced compared to controls (1.05±0.51 vs 1.34±0.31, p=0.012).

Conclusion: RV diastolic dysfunction is more sensitive and reliable diagnostic tools in its early detection.

P219 Cost-effectiveness of screening for asymptomatic carotid artery stenosis in the general population.
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Topic: Health economics

Purpose: Current evidence indicates that screening for severe carotid artery stenosis and subsequent carotid endarterectomy in asymptomatic subjects might be beneficial. This study aimed to determine in which subgroup screening for asymptomatic carotid artery stenosis (ACAS) may be cost-effective.

Methods: a Markov model was developed to estimate the number of strokes and deaths prevented, quality-adjusted life-years (QALYs) and costs in the screen versus no-screen scenario over a lifetime horizon. All analyses were conducted in hypothetical cohorts of 1,000,000 men aged 55, 65 or 75 years with increasing prevalence of severe asymptomatic carotid stenosis (1%, 3% or 5%). Estimates of the effectiveness of endarterectomy in asymptomatic patients, incidence of diagnosis and surgery-related complications, costs and quality-of-life outcomes were derived from the literature. Treatment was considered cost-effective below an incremental cost-effectiveness ratio of 20,000 euros per QALY gained.

Results: Screening of men aged 55 years and a prevalence of ACAS of 1%, prevented 1.3% of all strokes (15,660 vs 15,266 strokes), slightly increased quality-adjusted life-expectancy (from 22.34 to 22.36 years), increased costs (from 962 euros to 976 euros per patient) and the incremental cost-effectiveness ratio was 5219 euros per QALY. Screening of men aged 65 years and a prevalence of ACAS of 3%, prevented 3.7% of all strokes (15,059 vs 14,553 strokes), slightly increased quality-adjusted life-expectancy (from 14.52 to 14.56 years), slightly reduced costs (from 7825 to 7823 euros per patient) and the incremental cost-effectiveness ratio was -977 euros per QALY.

Conclusion: Screening for ACAS appeared cost-effective for a broad range of asymptomatic individuals. Particularly, costs and strokes were saved in persons whose prevalence of severe carotid artery stenosis was 3% or higher.

P220 Current risk stratification protocols fail to identify the majority of sudden arrhythmic death victims secondary to Brugada syndrome.
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Topic: Sudden Cardiac Death

Objective: risk stratification for sudden death in Brugada syndrome and hence indications for implantation of an internal cardiac defibrillator are based on the presence of a spontaneous type-I electrocardiogram (ECG) pattern, in association with unexplained syncope or documented polymorphic ventricular tachycardia. Increasing awareness of sudden death in the young and implementation of pre-participation screening protocols in asymptomatic athletes with the Brugada phenotype. We evaluated the predictive accuracy of symptoms, particularly unexplained syncope in victims of sudden death from Brugada syndrome.

Methods: over the past 3 years we identified 30 victims of sudden arrhythmic death secondary to Brugada syndrome. We evaluated the predictive accuracy of symptoms, particularly unexplained syncope in victims of sudden death from Brugada syndrome.

Results: In survivors of sudden death with normal findings at post mortem and the identification of the type-I Brugada ECG pattern in first-degree relatives (spontaneous or following an Ajmaline provocation test), the entire relatives underwent 12-lead ECG, echocardiography, exercise testing, 24-hour Holter monitor and biochemical tests. Cardiac magnetic resonance imaging and coronary angiography were performed when appropriate.

Conclusions: risk stratification protocols fail to identify the majority of sudden death victims secondary to Brugada syndrome.

Abstracts

S47
Preclinical atherosclerosis and global cardiovascular risk: role of asymptomatic carotid lesions in the risk assessment, estimated according to the Italian algorithm Progetto Cuore

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Topic: Prevention of CVD

Purpose: global cardiovascular risk represents a simple mean for estimating the probability of a first cardiovascular event in 10 years, through the evaluation of risk factors for atherosclerosis. The aim of our study was to demonstrate that Italian cardiovascular risk score underestimated the risk of cardiovascular events and that echocardiograph of carotid arteries may provide additional information in risk stratification of patients with atherosclerosis.

Methods: we evaluated 538 patients during the period from 1990 to 2006, 235 patients (42% of total population) were males and 323 (58%) females. The average age of patients was 58 ± 9.48. All the traditional risk factors for atherosclerosis were assessed for each patient and the risk score was calculated according to the Italian "Progetto Cuore". Then the real incidence of fatal and non fatal event in a 10 years follow-up was compared with that expected with the risk score.

Results: according to the Italian score "Progetto Cuore" the patient population was divided into three different risk categories: 16% of patients presented a high cardiovascular risk, 6% belonged to an intermediate risk category and 78% presented a low-risk. Doppler US, used to study carotid arteries, identified 183 patients with intima-media thickness > 0.9 mm and asymptomatic plaques in 147 patients. The data we collected during the follow-up showed that 153 patients (27%) among 558 developed cardiovascular events: 67 patients developed Acute Myocardial Infarction, 39 angina pectoris, 25 stroke/TIA. Moreover 6 patients died during the follow-up period for cardiovascular events while 16 subjects performed percutaneous or surgical revascularisation. Incidence of cardiovascular events seemed to reflect, in our study, the 3 risk profiles of cardiovascular events and that ecocolordoppler of carotid arteries may provide additional information in risk stratification of patients with atherosclerosis.

Conclusions: according to our experience, the risk of cardiovascular events is near the risk categories identified by "Progetto Cuore", without atherothrombotic asymptomatic lesions of carotid arteries (4%, 14%, 20% respectively). On the other hand, the presence of preclinical atherosclerosis increases significantly incidence of cardiovascular events, with increasing rates respectively of 35%, 46% ± 68% for low, intermediate and high-risk classes.

The aim of our study was to demonstrate that Italian cardiovascular risk score underestimates the risk of cardiovascular events and that ecocolordoppler of carotid arteries (4%, 14%, 20% respectively). On the other hand, the presence of preclinical atherosclerosis increases significantly incidence of cardiovascular events, with increasing rates respectively of 35%, 46% ± 68% for low, intermediate and high-risk classes.

The aim of our study was to demonstrate that Italian cardiovascular risk score underestimates the risk of cardiovascular events and that ecocolordoppler of carotid arteries may provide additional information in risk stratification of patients with atherosclerosis.
P225 Influence of exercise training on haemodynamics and ankle brachial index in hypertension
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1University of Medicine, Timisoara, Romania, 2West University, Timisoara, Romania, 3University of Medicine Timisoara, Timisoara, Romania
Topic: Cardiovascular rehabilitation
Purpose: We wish to show that exercise training, part of the cardiovascular rehabilitation, may slow down the arterial stiffening in time.
Methods: We studied 175 patients, aged 50-70 years, with essential hypertension grade 1 and 2, and with 2 (or less) additional risk factor. They were under unchanged medication at least 2 months and at target blood pressure value. This patients who evaluated clinically, by lab. tests and by an exercise stress test. We study the haemodynamic parameters at brachial artery: Systolic blood pressure (SBP), diastolic blood pressure (DBP), mean blood pressure (MBP), pulse pressure (PP), heart rate (HR), ambulatory arterial stiffness index (AASI) defined as 1-s (regression slope between TAD and TASS), at the office and by 24h blood pressure monitoring. For the initial ABI evaluation, we divided the patients into 2 groups. A with ABI<0.9 and B with ABI>0.9. All those parameter where evaluated before and after the rehabilitation programme.
Results: After a 3 month physical training we obtained the following results: The SBP has decreased from 135.4mmHg to 129.7mmHg (p=0.0125), the DBP has decreased from 80.6 to 76.0mmHg (p=0.0064), the DBP has decreased from 72.2 to 75.3mmHg (p=0.0070) NS; the DBP/24h has decreased from 63.8 to 58.8mmHg (p=0.1135) NS; the MBP has decreased from 96.5 to 93.4mmHg (p=0.05974) NS; the MBP/24h has decreased from 98.5 to 83.1mmHg (p=0.0199) NS; the PP has decreased from 57.7 to 54.4mmHg (p=0.0300) NS; the PPA has increased from 30.4 to 31.1mmHg (p=0.0065) NS; the HR has decreased from 79.5 to 76.7b/min (p=0.0010) with CR group B has decreased from 71.2 to 68.6b/min (p=0.0123) NS; the AASI has decreased from 0.69 to 0.58 (p=0.0042); the ABI in A group has increased from 0.929 to 0.981 (p=0.00622); the ABI in group B has decreased from 1.165 to 1.055 (p=0.0028) NS. We also obtain correlation between the hypertension and ABI*< OR 3,17 (p=0,037).
Conclusions: Physical training is a good method to improve some of the haemodynamic parameters and ABI at hypertensive patients. Other parameters with descriptive arterial stiffness such as AASI or PP can also be improved with controlled exercise training. Physical training, part of the cardiovascular rehabilitation, plays an important role in slowing down the arterial stiffening in time, at essential hypertension. We noticed no statistical improvement in DBP, DBP/24h and MBP.

P226 A systematic review of telehealth interventions for coronary heart disease.
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Topic: Cardiovascular rehabilitation
Background: Telehealth interventions provide effective risk factor reduction and secondary prevention by those who do not access CR and could help to close the evidence practice gap.
Methods: A prospective study, using a multi-level design of 1268 coronary artery disease outpatients recruited within 97 cardiologists (33% of all in Ontario, Canada). Participants completed a baseline sickle cell disease survey, and reported CR enrollment in a second survey 9 months later. Geographic information systems were used to generate drive times to the closest CR site from participants' homes. Logistic regression analysis was used to test the threshold in drive time affecting CR enrollment using 10-minute increments.
Results: Overall, 469 (37.0%) outpatients reported enrolling in CR. 917 (72.1%) outpatients lived within a 30-minute non-stop drive time to a CR programme. Logistic regression analysis (p<0.001) revealed that a more appropriate threshold for accessible CR may be 60 minutes (OR=2.26). In the overall sample, 1,133 (89.6%) outpatients lived within a 60-minute drive time of a CR programme. Among regional categories, 720 (97.7%) urban outpatients lived within 60 minutes of CR, compared to the mixed and rural categories with 379 (86.3%) and 34 (38.2%) outpatients less than 60 minutes to the closest CR site, respectively (p<0.001).
Conclusions: Based on empirical considerations, our data suggest that CR enrollment is unaffected with drive times of less than 60 minutes, and that approximately 90% of this broad sample meet this criterion. Home-based CR referrals may be warranted where CR services are unavailable within this threshold, particularly for rural outpatients.

P227 Drive time to cardiac rehabilitation: at what point does it affect enrolment?
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1York University, Toronto, Canada, 2Queen’s University, Kingston, Canada, 3London Health Sciences Centre, Kingston, Canada
Topic: Cardiovascular rehabilitation
Purpose: A 30-minute drive time threshold has often been cited as indicative of accessible health services. Cardiac rehabilitation (CR) is an outpatient disease management programme, and geographic barriers to utilisation are often cited. The purpose of this study was to empirically test the appropriateness of a 30-minute threshold for CR.
Methods: A prospective study, using a multi-level design of 1268 coronary artery disease outpatients recruited within 97 cardiologists (33% of all in Ontario, Canada). Participants completed a baseline sickle cell disease survey, and reported CR enrollment in a second survey 9 months later. Geographic information systems were used to generate drive times to the closest CR site from participants' homes. Logistic regression analysis was used to test the threshold in drive time affecting CR enrollment using 10-minute increments.
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Conclusions: Based on empirical considerations, our data suggest that CR enrollment is unaffected with drive times of less than 60 minutes, and that approximately 90% of this broad sample meet this criterion. Home-based CR referrals may be warranted where CR services are unavailable within this threshold, particularly for rural outpatients.

P228 Calcium channel blocker and diuretic therapy are predictors of all-cause mortality in patients undergoing outpatient cardiovascular rehabilitation
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Topic: Cardiovascular rehabilitation
Background: Little data exist about the association of calcium channel blocker (CCB) and diuretic therapy and the prophylaxis of patients completing outpatient cardiovascular rehabilitation (OCR).
Methods: Analysis of 2146 consecutive outpatients completing a 12 weeks exercise-based OCR between March 1999 and March 2007. Medical data were asses at the beginning of OCR.
Results: Of the 1762 patients, 1255 (71%) were alive at OCR follow-up and data were also available from the authors. Cox regression analysis revealed the following independent predictors of death: CCB (HR 1.732, 95% CI 1.06-2.81, p=0.026), and diuretics (HR 1.628, 95% CI 1.15-2.29, p=0.005). Patients with CCB were more likely to be treated with aspirin (72% vs 67%; p=0.04) and less likely to be treated with oral anticoagulants (27% vs 35%; p=0.01), inhibitors of the renin-angiotensin-aldosterone system (69% vs 59%; p=0.07), CCB (14% vs 7%; p=0.001), and statins (68% vs 84%; p=0.001) but more likely to be treated with beta-blockers (85% vs 90%; p=0.12).
Conclusions: In patients completing OCR, calcium channel blocker and diuretic therapy were independent predictors of all-cause mortality. These medications might be a marker for more severe arterial hypertension or difficult to control arterial bleeding.

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Influence of two models of cardiac rehabilitation on quality of life and exercise tolerance in patients with heart failure in early phase after discharge
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Topic: Cardiovascular rehabilitation
Quality of life (QoL) and exercise tolerance are an important element in the assessment of a given cardiac rehabilitation (CR) method.

Purpose: To evaluate QoL and effectiveness of two models of CR in heart failure (HF) patients (pts) in the early phase after discharge. Model 1 - endurance, interval training on ergometer in out-patient facilities, Model 2 - home tele-ECG-monitored specially prepared walking training.

Methods: The study group comprised 132 pts (mean 58.7±9.8 years) with HF (NYHA II and III; EF<40%). After three weeks of clinical stability, the pts were randomised into two groups and underwent an 8-week CR. Group 1 (60 pts) underwent Model 1. Group 2 (72 pts) underwent Model 2. The programmed workload level for two groups was 40% - 70% of peak VO2. Fatigue was not to exceed 11 in Borg scale. In order to perform Model 2, a special device was created which made it possible to: (1) do the training according to a preprogrammed plan, (2) send ECG via mobile phone to the Monitoring Centre.

CR effectiveness assessment included: QoL based on Medical Outcome Study Short-Form (SF-36); improvement in NYHA class (NYHA), duration of exercise (t) and peak oxygen consumption (pVO2).

Results: The groups were comparable in terms of demographic data, baseline clinical parameters, and pharmacotherapy. CR significantly improved all parameters studied in both groups. Impact of CR on QoL:
In Group 1 SF-36 was -12.23 (±31.53) points p = 0.0012. In Group 2 SF-36 was -8.33 (±25.60) points p = 0.0006. The difference between Group 1 and Group 2 was statistically insignificant.

CR effectiveness:
In Group 1 NYHA was -0.19 (±0.42) p = 0.001, t was + 51.64 (±76.35) (sec) p = 0.0001, pVO2 was + 1.06 (±2.5) (ml/kg/min) p = 0.0021. In Group 2 NYHA was -0.42 (±0.50) p = 0.0001, t was + 69.22 (±59.72) (sec) p = 0.0001, pVO2 was + 1.83 (±2.6) (ml/kg/min) p = 0.0001.

The differences between Group 1 and Group 2 were statistically insignificant in t and pVO2.

Conclusions: (1) QoL is improved in HF pts as a result of a home tele-ECG-monitored walking training as significantly as after a traditional ergometer training performed in out-patient facilities. (2) CR based on home tele-ECG-monitored walking training improved exercise tolerance as significantly as did a traditional ergometer training performed in out-patient facilities. (3) Due to the limitations associated with the disease a home tele-ECG-monitored training seems an optimal form of comprehensive cardiac rehabilitation.
Can a short cardiac rehabilitation programme influence novel markers of cardiovascular risk evaluated by computed tomography imaging? - Preliminary results of a randomised clinical study

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Topic: Cardiovascular rehabilitation

Purpose: To evaluate the impact of a short course (8 weeks), moderate intensity cardiac rehabilitation programme (CRP) on markers of systemic inflammation and cardiovascular risk (total adipose tissue (TAP), subcutaneous adipose tissue (SAT), visceral adipose tissue (VAT) at abdominal level) by computed tomography imaging (CT-scan).

Methods: Fifty-four postinfarction patients were randomised into two groups: group R comprised of 30 patients (17 men, mean age 55.3 years, mean EF 52.1); group NR comprised of 24 patients (18 males, mean age 57.7 years, mean EF 49.9%). We did not enter any CRP being only followed in an outpatient basis. CT-scan was performed before and after the programme and the evolution of the different parameters of CT-scan in the two groups was analysed.

Results: After the CRP, group R patients did not show any significant improvement in total adipose tissue when compared with group NR patients (p=0.9). Total VAT and TAP were statistically significant in group R patients (p=0.9); subcutaneous adipose tissue (SAT) in group NR, p=0.59). Visceral adipose tissue decreased in group R (−8.8%) while has increased in group NR (≥21%), but this difference was not statistically significant (p=0.64).

Conclusion: In our population an 8 week CRP did not significantly affect the adipose tissue. However, at 3-month, we can observe a slight trend toward reduction in visceral adipose tissue. The limited duration of the programme and the "low" intensity loads applied may have accounted for these results. More intense and prolonged comprehensive CR programmes are probably needed to obtain an impact, mainly in the visceral adipose tissue.

Predators of survival after coronary artery bypass graft surgery in young and elderly patients after cardiac rehabilitation

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Topic: Cardiovascular rehabilitation

Aim of the study was to investigate the prognostic value on survival of distance walked in 6 min (6MWT) by patients (< 65 years), EF is predictive in the group of patients with age < 65 years (HR = 0.994; 95% CI =0.988-0.999; p=0.040). Our result was consistent with a previous study method for the evaluation of patients who were referred to our institution soon after CABG. A standardised echocardiography and 6MWT was performed at baseline and at discharge. All patients were followed up since April 2006. Mean age of the 882 patients were 63.8 ± 8.9 years (range 34-84), 48.9% with age <65 years. Mean EF was 52.1 ± 9.5%. Equally, there were no significant differences between the groups on subcutaneous adipose tissue (SAT), VAT at abdominal level) by computed tomography imaging (CT-scan) in postinfarction patients. After the CRP, group R patients did not show any significant improvement in total adipose tissue when compared with group NR patients (p=0.9). Total VAT and TAP were statistically significant in group R patients (p=0.9); subcutaneous adipose tissue (SAT) in group NR, p=0.59). Visceral adipose tissue decreased in group R (−8.8%) while has increased in group NR (≥21%), but this difference was not statistically significant (p=0.64).

Conclusion: In our population an 8 week CRP did not significantly affect the adipose tissue. However, at 3-month, we can observe a slight trend toward reduction in visceral adipose tissue. The limited duration of the programme and the "low" intensity loads applied may have accounted for these results. More intense and prolonged comprehensive CR programmes are probably needed to obtain an impact, mainly in the visceral adipose tissue.

Interval aerobic exercise training in CHF rehabilitation

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Topic: Cardiovascular rehabilitation

Purpose: To examine prospectively the association between lifestyle related cardiovascular risk factors and sickness absence from work.

Methods: In a sample of 20496 male and female workers aged 35-59 years from the BELLS- TRESS Study, the level of physical activity, smoking behaviour and alcohol consumption were assessed by means of self-administered questionnaires. Height, body weight and waist size were measured during clinico-laboratory examinations. Data of registered sickness absence from work during one calendar year following the baseline visit were collected. A total number of at least 10 days absence over one year was considered as high sickness absence, which corresponds to the upper quartile of the distribution. Independent associations between lifestyle factors and sickness absence were identified through multivariate logistic regression analysis.

Results: High sickness absence was more prevalent in men and women with regular obesity (body mass index ≥30 kg/m²), central obesity (waist size ≥102 cm in men and ≥88 cm in women), low physical activity during leisure time (no or only light physical activity during most weeks), regular smoking and excessive alcohol consumption (average weekly consumption of at least 22 units in men and 15 units in women). After adjusting for age, educational level and occupation, these associations remained statistically significant, except the one with sickness absence in women. In a multivariate model including socio-demographic variables (age, educational level, occupation, company), health indicators (lifestyle factors, health perception, symptoms of depression), work-related factors (job strain, physical job demands) and social support in private life, we identified central obesity (OR (95% CI) 1.21 (1.05-1.39) in men and 1.30 (1.03-1.64) in women) and regular smoking (OR (95% CI) 1.28 (1.16-1.41) in men and 1.41 (1.18-1.68) in women) as significant independent predictors of high sickness absence. The proportion of high sickness absence in the study population that can be attributed to central obesity was 3.6% in men and 4.4% in women; the population attributable risk of regular smoking was 5.2% in men and 3.4% in women.

Conclusion: We found clear associations between lifestyle related cardiovascular risk factors and objective data of sickness absence from work during one year follow-up. Central obesity and regular smoking were identified as independent predictors of high sickness absence from work in middle-aged men and women. Findings like these should motivate employers and trade unions to implement lifestyle intervention programmes in the work environment.
M274
Gender differences in cardiac rehabilitation programmes from the Italian survey on cardiac rehabilitation (ISYDE-2008)
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Topic: Cardiovascular rehabilitation

In recent years epidemiological and clinical evidence have shown gender disparities in several aspects of cardiovascular disease. Aim of the study was to identify gender differences in the clinical profile and management of patients admitted to cardiac rehabilitation (CR) programmes.

Methods: The ISYDE-2008 is a multicentre, longitudinal, prospective national registry, designed by the Italian Association for Cardiovascular Prevention Rehabilitation and Epidemiology (IMPR-CICR) to collect data on current organisation and core components of CR in Italy. The study population consisted of 2284 consecutive pts, discharged from 165 (87%) Italian CR centres from Jan 28th to February 10th 2008.

Results: 604 pts (26.5%) were women. Compared to men, women were older (70.8±11.5 vs 65.6±11.3, p<0.0001), were more frequently admitted after infraarterial surgery (27.8% vs 11.5%, p<0.0001) and heart failure (15.9% vs 11.3%, p=0.0034), and referred to in-hospital CR programmes (74.5±16.4% vs 60.0001). Women presented a higher prevalence of orthopedic (16.7±6.3%, p<0.0001) and neurological (4.1 vs 2.5%, p=0.0073) diseases, and a lower prevalence of myocardial infarction (14.8% vs 24.7, p=0.003), prior PTCA (6.8% vs 11.0%, p=0.0484) and carotid disease (4.5 vs 7.9%, p=0.0142 and PAD (4.1 vs 7.5%, p=0.001). Women showed a more complicated acute and rehabilitative course, with higher prevalence of atrial fibrillation (14.6 vs 8.6%, p=0.0001), anemia (9.0 vs 6.4%, p=0.0422), sternal wound revision (0.8 vs 0.2%, p=0.0085) and need for intravenous support (1.8 vs 0.7%, p=0.007). During rehabilitation, women underwent less frequently exercise tests, except for the 6-minute walking test (45.3 vs 42.3% or admission, ns). At discharge, women received less frequently β-blockers (63.7 vs 70.5%, p=0.002), statins (51.1 vs 71.1%, p=0.0001), omega-3 (18.4 vs 18.9%, p=0.0001), antiplatelet agents (72.7 vs 94%, p=0.0001), and more frequently digoxin (9.1 vs 4.1%, p=0.0001), amiodarone (9.5 vs 4.4%, p=0.001), diuretics (63 vs 47%, p<0.0001), oral anticoagulants (37.9 vs 22.4%, p=0.001), insulin (11.6 vs 8.4%, p=0.02) and anti-depressive drugs (9.1 vs 5.5%, p=0.026) the prescription rate of ACE-ARBS was similar. The in-hospital length of stay of CR programmes was not influenced by sex (29±50 days vs 34±27.6, ns). Women showed a trend towards greater wellbeing and less persistent smoking. Two thirds of participants were anointed with hearts related to the cardiac rehabilitation programme. Regular physical activity on an individual basis was the main reason for non-participation in heart groups. Regression analyses showed significant predictors for selected outcome variables: low BMI (for wellbeing, and regular physical activity); good exercise capacity (for wellbeing); stable partnership and previous cardiac surgery (for non-smoking). Heart group participants a trend towards better wellbeing and non-smoking was noted. None of the variables was predictive for hospital readmission.

Conclusions: Four years after successful outpatient CR a majority of patients are well, physically active, with good exercise capacity and remain non-smokers. Heart group participants have a similar profile. A low BMI, stable partnership, good exercise capacity and previous cardiac surgery are independent predictors for wellbeing and healthy lifestyle.

M275
Efficiency of telephone educational programme in patients with mild and moderate arterial hypertension
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1National Re For Preventive Medicine, Moscow, Russian Federation, 2Moscow, Russian Federation

Topic: Cardiovascular rehabilitation

Aim: To study efficiency of a telephone educational programme in patients (pts) with mild-moderate arterial hypertension (AH).

Materials and methods: 100 pts with mild-moderate AH (aged 40-65 years; mean 51.4±6.04) were randomised into 2 groups: main and control, 50 pts each. All pts received a usual care in an out-patient clinic, pts of main group participated in a telephone educational programme (TEP). TEP consisted of 6-10 telephone talks once in two weeks within 3 months. Each talk was devoted to 1-2 cardiovascular risk factors: overweight, obesity, central obesity, unhealthy food, excessive salt and alcohol intake, smoking, stress, diabetes, obesity, low level of physical activity. Follow-up period was 12 months, in main group it started after completion of TEP. Pts' physical capacity was studied by means of exercise stress test, psychological state - by Spielberger test and Beck Depression Inventory (BDI), quality of life - by SF-36 test.

Results: On 1-year follow-up pts of main group had significantly higher level of medical knowledge about disease, risk factors, complications (p<0.05), better self-monitoring of blood pressure (BP) (33% vs 24% pts regularly measured BP, p=0.05), better compliance (91% vs 50%, p=0.05), significantly lower level of systolic (132±20 to 127±18, 0.93±2.2, p=0.001) and diastolic BP (83.5±12 to 81.9±12.1, 3.6±6.1, p=0.003), higher physical capacity (124.4±58 vs 117±4±23 Vt, p<0.05) and longer duration of exercise test (15.3±5.84 vs 12.7±6.0 min, p=0.04). Also in main group there were significantly more pts who reached target levels of BP (90% vs 55%, p<0.05) and blood lipids (40% vs 26%, p=0.05), more pts with body mass < 25 kg/m2 (95% vs 9%, p=0.05). Stopped smoking 8% of pts in main and nobody in control group. On 1 year follow-up pts of main group had lower level of personal anxiety (38.6±2.19 vs 44.3±5.10, p<0.001 and reactive anxiety (33.8±9.5 vs 41.6±2.16, 34.8±7.4, p=0.05), lower level of depression (6.21±1.78 vs 8.0±1.96, 4.6±2, p=0.001), in main group there were less pts who had subclinical depressive symptoms (10-18 BDI score): 10% vs 31%, p=0.01. Pts of main group also showed significantly better quality of life: total index of physical health (78.0±2.04 vs 69.1±2.88, p=0.001) and mental health (77.2±2.04 vs 66.4±2.88, p=0.001).

Conclusion: Study has shown that TEP performed in AH pts significantly increased pts' level of medical knowledge, better self-monitoring of BP, control better of main risk factors and substantially improved pts quality of life.

M276
Lifestyle and risk factors years after cardiac rehabilitation
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Topic: Cardiovascular rehabilitation

Objective: Cardiovascular rehabilitation (CR) has excellent short-term results. We investigated lifestyle and morbidity a mean of 4 years after CR, particularly in regard to peer-support group activities.

Methods: A total of 2199 consecutive pts who participated in a 12-week outpatient CR programme between 1999 and 2007 were followed. Wellbeing, physical activity, smoking, body weight and hospital admissions were assessed by questionnaires and these data were correlated to medical data from the records. This analysis was based on 1017 completed questionnaires after exclusion of pts with foreign language (597), nonrespondents (511) and deaths (74).

Results: Of the 1017 pts 84% were male, mean age (± SE) was 62±10 years. 85% were in a stable partnership. 92% of the pts had CAD, 38% had cardiac surgery preceding CR. 65% had undergone a catheter procedure. At the end of CR LVEF was 58±12% (mean±SD), exercise capacity was 157±44 W; risk factors were: former smoking 59%, persistent smoking 13%, hypertension 56%, diabetes 13%, hypothyroidism 59%, BMI≥26 in 4%; During a median follow-up time of 53 months (95% range 43)-27% were hospitalised for cardiac reasons. At follow-up BMI was 26±4, 17% were persistently smokers, 62% indicated regular physical activity (≥2 times ≥30 minutes per week), 79% reported good wellbeing, whereas depressive symptoms were present in 17%. Only 8% of the pts were participants in peer-support heart groups. These were not different from the other pts in regard to all of the variables except that they significantly more often lived in a stable partnership (94 vs 85%, p<0.05). They also showed a trend towards greater wellbeing and less persistent smoking. Two thirds of patients were anointed with hearts related to the rehabilitation programme. Regular physical activity on an individual basis was the main reason for non-participation in heart groups. Regression analyses showed significant predictors for selected outcome variables: low BMI (for wellbeing, and regular physical activity); good exercise capacity (for wellbeing); stable partnership and previous cardiac surgery (for non-smoking). In heart group participants a trend towards better wellbeing and non-smoking was noted. None of the variables was predictive for hospital readmission.

Conclusions: Four years after successful outpatient CR a majority of patients are well, physically active, with good exercise capacity and remain non-smokers. Heart group participants have a similar profile. A low BMI, stable partnership, good exercise capacity and previous cardiac surgery are independent predictors for wellbeing and healthy lifestyle.
Addition of inspiratory muscle training to aerobic training improves cardiorespiratory responses to exercise in patients with heart failure and inspiratory muscle weakness: a randomised trial

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Topic: Cardiovascular rehabilitation

Background: both inspiratory muscle training (IMT) and aerobic training (AT) improve functional capacity in patients with chronic heart failure (CHF), but inspiratory muscle function had not been previously shown to improve with AT.

Objectives: the present clinical trial was conducted to test the hypothesis that the addition of IMT to aerobic training (AT) results in further improvement in cardiorespiratory responses to exercise than those obtained with AT in patients with CHF and inspiratory muscle weakness (IMW).

Methods: twenty-four patients with CHF and IMW (maximal inspiratory pressure < 70 % of predicted) were randomly assigned to a 12-week programme of aerobic exercise-training plus inspiratory muscle training programme (AT + IMT, n=12) or to aerobic exercise training alone (AT, n=12). Before and after intervention, the following measures were obtained: maximal inspiratory muscle pressure (PImax), peak oxygen uptake (VO2 peak), circulatory power, oxygen uptake efficiency slope (OUES), ventilatory efficiency, ventilatory oscillation, oxygen uptake kinetics during recovery (T1/2 O2), 6-min walk test distance, and quality of life scores.

Results: compared to AT, AT+IMT resulted in additional significant improvement in PImax, VO2 peak, circulatory power, OUES, ventilatory efficiency, ventilatory oscillation, and T1/2 O2. Six-minute walk distance and quality of life scores improved similarly in the two groups.

Conclusion: this randomised clinical trial demonstrates that the addition of IMT to AT results in improvement in cardiorespiratory responses to exercise in patients with CHF and IMW.

Attendance in an early discharge clinic with symptom limited maximal exercise testing is safe and improves cardiac rehabilitation participation among low-risk STEMI patients

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Topic: Cardiovascular rehabilitation

Purpose: survivors of an acute coronary syndrome (ACS) event remain at high-risk for future cardiac events, disability and death. Secondary risk factor management, as provided through comprehensive cardiac rehabilitation (CR) programming, significantly reduces cardiac related morbidity and death and thus represents a critical element of coronary artery disease management. Unfortunately, the majority of ACS survivors do not participate in CR programming, accentuating the secondary prevention neglect in this high-risk population. The purpose of this study is to evaluate the effectiveness of attendance in an early discharge clinic (EDC) on CR participation among a low-risk ACS cohort.

Methods: One hundred and ninety-six patients who were diagnosed with a ST elevation myocardial infarction, and subsequently deemed low-risk (CADILLAC score 0-2), participated in this analysis. Eighty four subjects (87% male, age: 56.6 ±8.8 years) were enrolled in the EDC arm, housed within a CR facility and capable of performing symptom-limited maximum exercise testing (GXT). Subjects were seen in the EDC between 4-14 days following hospital discharge where they underwent GXT and were oriented to the CR programme. One hundred and twelve subjects (78% male, age: 58.0 ±11.2 years), identified retrospectively and matched for EDC criterion, served as the control group. Risk factor profiles (diabetes, tobacco use, family history, previous MI, hypertension and dyslipidemia) were comparable between groups (p>0.15 for all comparisons).

Results: All results are reported EDC vs. control group. Time to attending CR orientation and undergoing a GXT (8.7 ±4.2 vs. 35.3 ±35.9 days, p<0.001) was significantly lower while the percent of subjects ultimately participating in CR (88.1% vs. 48.2%, p<0.001) was significantly higher in the EDC group. Abnormal haemodynamic (27.2% vs. 25.0%, p=0.77) and ECG (21.0% vs. 24.6%, p=0.61) responses during initial GXT were comparable between groups and no subject suffered a life threatening adverse event in either group.

Conclusion: Orientation into CR within 2 weeks of hospital discharge from an ACS event through the EDC model dramatically improves ultimate CR participation rates compared to the traditional programming model. Moreover, while the present guidelines recommend GXT after a minimum of 14 days following an ACS event, the present investigation suggests this procedure can be performed sooner without increased abnormal response rates or increased risk for adverse events in a select group of low-risk ACS patients.
SBP was 131.3 mm.Hg compared with counterparts from control group. The number of hypertensive subjects in IA group was 15 (25.4%), 18 (41.86%), 10 (17.87%) and 16 (34.13%) whereas between IIA and IIB groups was statistically significant (p < 0.05). It was detected in 59% of normotensive veteran athletes aged 35-45 who have age-related mean. Higher sports activity correlates positively with a higher pVO2 (4.27 ml/min/kg) and higher aerobic capacity (3.32 ml/min/kg, p < 0.05).

**Table 1.**

<table>
<thead>
<tr>
<th>ICD-10</th>
<th>Diagnosis</th>
<th>FIFA World Cup 2006 - 31 days</th>
<th>Before FIFA World Cup 2006 - 68 days</th>
<th>After FIFA World Cup 2006 - 20 days</th>
<th>All control periods - 242 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 21</td>
<td>myocardial infarction</td>
<td>68</td>
<td>72</td>
<td>74</td>
<td>68</td>
</tr>
<tr>
<td>I 46</td>
<td>cardiac arrest</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>I 47</td>
<td>paroxysmal atrial tachycardia</td>
<td>19</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>I 48</td>
<td>atrial fibrillation</td>
<td>64</td>
<td>70</td>
<td>75</td>
<td>65</td>
</tr>
<tr>
<td>I 49</td>
<td>other arrhythmias</td>
<td>14</td>
<td>16</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>all of the above</td>
<td>168</td>
<td>174</td>
<td>174</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>p-values</td>
<td>1 (n.s.)</td>
<td>0.98 (n.s.)</td>
<td>0.99 (n.s.)</td>
<td></td>
</tr>
</tbody>
</table>

Cardiovascular events during FIFA World Cup Soccer and control periods, all data shown in events per day; n.a. denotes not significant.

**Conclusion:**

The rates of arrhythmia and cardiovascular events were not significantly different between IA and IIB groups. However, differences were significant between IA and IIA groups. Further studies are needed to investigate the role of acute exercise on cardiovascular events in athletes.
M284
Changes in pro-inflammatory cytokines and markers of myocardial injury vary with duration and intensity of exercise.
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1University of Melbourne, University of Leuven, Melbourne, Australia, 2St Vincent’s Hospital, Melbourne, Australia, 3University Hospital Leuven, Leuven, Leuven, Belgium

Topic: Sports cardiology

Objectives: cytokines and neuropeptide peptides (cortisol and vasopressin-AVP) have been noted to increase following exercise. Though up-regulated in heart disease, their association with cardiac markers (tropinin I-1 and B type natriuretic peptide-BNP) following exercise is unknown.

Methods: Blood samples were taken from 40 athletes at 3 time points: baseline, post short duration maximal exercise (MXT) and after either an endurance sporting (2 - 5 hours duration, n=27) or an ultra event (> 8.5 hours, n=13). IL-1α,IL-6,IL-10 and TNF were assayed by flow cytometry, cortisol, AVP, BNP and cTnI by nephelometry.

Results: Following MXT, AVP and BNP increased and cytokines were unchanged (see Table).

After prolonged exercise cTnT, CK, IL-6, IL-10, IL-6 and cortisol increased. A differential effect was seen in BNP. CK and some cytokines such that they increased with ultra but not with endurance exercise. In the ultra group, there was a strong correlation between the increases in cTnT and BNP (r = 0.74). Both of these cardiac markers correlated with increases in cytokines but not AVP or cortisol.

Conclusion: muscle injury (both skeletal and cardiac) and systemic inflammation are increasingly apparent with longer duration exercise.

### Table

<table>
<thead>
<tr>
<th>Baseline (n = 40)</th>
<th>Post MXT (n = 40)</th>
<th>Post prolonged exercise (n = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cTnI (µg/L)</td>
<td>0.09 ± 0.03</td>
<td>NA</td>
</tr>
<tr>
<td>CK (µL)</td>
<td>2.5 ± 2.10</td>
<td>NA</td>
</tr>
<tr>
<td>BNP (µg/L)</td>
<td>15.3 ± 0.14</td>
<td>28.3 ± 0.26</td>
</tr>
<tr>
<td>AVP (pmol/L)</td>
<td>1.04 ± 0.25</td>
<td>1.44 ± 0.06</td>
</tr>
<tr>
<td>Cortisol (nmol/L)</td>
<td>170 ± 190</td>
<td>270 ± 140</td>
</tr>
<tr>
<td>IL-1 (pg/ml)</td>
<td>5.0 ± 0.3</td>
<td>5.3 ± 2.5</td>
</tr>
<tr>
<td>IL-6 (pg/ml)</td>
<td>5.2 ± 0.5</td>
<td>5.3 ± 2.5</td>
</tr>
<tr>
<td>IL-10 pg/ml</td>
<td>4.6 ± 0.29</td>
<td>4.3 ± 2.2</td>
</tr>
<tr>
<td>IL-12 pg/ml</td>
<td>5.3 ± 1.0</td>
<td>5.4 ± 2.8</td>
</tr>
<tr>
<td>TGF (pg/ml)</td>
<td>5.7 ± 3.6</td>
<td>5.1 ± 2.3</td>
</tr>
</tbody>
</table>

p < 0.05 compared with baseline, † p < 0.05 compared with endurance athletes

M286
Significant elevations in D-type natriuretic peptide (BNP) during maximal exercise in athletes but not sedentary controls.
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Topic: Sports cardiology

Background: during exercise athletes have the capacity to substantially increase cardiac preload. This unique physiology may be reflected by increases in BNP which have previously only been associated with cardiac pathology.

Methods: 40 endurance athletes and 15 age and sex matched non-athletes completed incremental exercise to exhaustion on a supine bicycle. BNP was measured on baseline and peak exercise blood samples using a rapid bedside assay. Echocardiography was used to exclude baseline or inducible cardiac pathology.

Results: athletes completed exercise of greater duration and intensity than non-athletes (22 ± 3 mins, 284 ± 34W vs. 14 ± 2 mins, 190 ± 30W, p<0.001). BNP was significantly greater in athletes at rest and post exercise. Athletes, but not non-athletes, demonstrated a significant increase in BNP with exercise (see figure). 18 athletes vs. 1 control (p<0.05) had increases in BNP of >10ng/L, a value previously reported to suggest pathology.

Conclusion: in athletes, BNP increases with exercise to an extent which has previously only been associated with pathology. These increases may be due to the high ventricular filling pressures which athletes are able to generate. In a clinical setting, physiological increases in BNP might be considered as a possible false positive when using this test to identify cardiac pathology.

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M287
Prolongation of the QT interval - possibility of early transmural ischaemia or simply electrophysiological appearance.
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Topic: Sports cardiology

Context: the pre-participation screening of young athletes obtained with a 12 lead ECG is still controversial and number of issues are largely debated, including the prevalence and spectrum of EGG (electrocardiographic) abnormalities found in individuals. Are there some changes on electrophysiological level as a sign of adaptation of myocardial tissue at top players or first sign of potential transmural ischemia? Well established clinical criteria for diagnosing asymptomatic early sign of transmural ischemia (STE: 1mm in 2 contiguous leads), prolonged QT > 440 ms, T-wave changes.

Aims: QT, ST, and T-wave abnormalities at professional players. Where are the limits of normal prolonged QT interval in sport cardiology which we still treat as a normal.

Methods: the sample included 117 professional players - 21 athletic and 96 football (14 to 18 years old). The second group - 143 recreative players and the third group 162 sport non active children. The ECG were analysed using 3 methodologies: the QT interval (we used 12 leads ECG). Results: in this selected population of young athletes results obtained with ECG screening wasn’t statistically significant, but we found ST -0.08 (29 cases), QTc -440ms (30), QT > 500ms (13). In the third - control group of 162 children - we didn’t have any case of ST elevation or T-wave changes, or QT > 440 ms. The only statistically important measure was QT > 440 ms with y¨ E`2(chi-square) = 39, 47 at the level of significance .001.

Conclusion: although we haven’t found statistically significant differences for all parameters, we still think that in some cases length of QT interval is much longer than normal 440 ms and might be an important parameter for further investigation of prolonged repolarisation, even if the reason is probably at the physiological level.
Influence of marathon running on functional and structural myocardial parameters of healthy male amateur runners

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Topic: Sports cardiology

Introduction:
The cardiovascular risk of marathon running is currently being controversially discussed. To further elucidate the issue we investigated functional and structural parameters of potential myocardial stress and/or injury as well as parameters indicating oxidative stress as a result of marathon-running in middle-aged male physicians.

Methods:
Sixteen cardiopulmonary healthy male amateur marathon-runners (Age: 48.9 ± 7.2 y; Weight: 76.8 ± 7.3 kg; Height: 180.4 ± 8.0 cm) were examined. Each individual underwent an exercise testing by ergospirometry directly before the marathon and six months later. The mean 24-hour relative maximum VO2 was determined as being 49.6 ± 4.2 ml per min and kg. Before and directly after the marathon a venous blood sample was taken and a colour-coded echocardiography with Doppler tissue imaging (Vivid I-System GE) performed and the following parameters determined: Troponin-T, CK-MB, GOT, CK-NAC, hsCRP, d-Rom, BAP; Strain, Strain Rate, MV E/A wave, E', E/E' and Tissue Tracking.

Discussion:
The Doppler-echocardiographic findings refer to a functional myocardial impairment in terms of a diastolic dysfunction irrespective of the cardiopulmonary performance capacity. The lack of a significant Troponin-T increment associated with moderately but significantly increased CKMB and GOT serum levels directly after the marathon, again irrespective of the cardiopulmonary performance capacity, leaves the question of a structural, myocardial damage caused by marathon-running unsettled. The lack of oxidative stress indicates that healthy middle-aged males seem to be capable of counterbalancing the production of free radicals during a marathon and, thus, of preserving an equilibrium of the oxidative system.

Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Troponin-T</td>
<td>mg/ml (p=0.068)</td>
<td>0.01±0.002</td>
</tr>
<tr>
<td>CK-MB</td>
<td>mg/dl (p=0.001)</td>
<td>9.35 ± 2.7</td>
</tr>
<tr>
<td>GOT</td>
<td>U/l (p=0.001)</td>
<td>26.0±5.6</td>
</tr>
<tr>
<td>CK-NAC</td>
<td>U/l (p=0.001)</td>
<td>158.7±66.4</td>
</tr>
<tr>
<td>MV E/A</td>
<td>m/s (p=0.001)</td>
<td>1.42±0.36</td>
</tr>
<tr>
<td>E'</td>
<td>cm/sec (p=0.001)</td>
<td>10.3±1.6</td>
</tr>
<tr>
<td>LVEF %</td>
<td>(p=0.023)</td>
<td>70.1±8.2</td>
</tr>
</tbody>
</table>

NT-proBNP in senior athletes detects severe cardiovascular disease

A Sahlen1, A Rubulis1, M Stahlberg1, T Fux1, TP Gustafsson1, T Marklund1, B Braunschweig1
1Stockholm, Sweden

Topic: Sports cardiology

Objectives:
though sudden death occurs rarely in athletes, senior participants run the highest risk. The best strategy for pre-participation screening (PPS) has not been fully established. Cardiac biomarkers are predictive of death in other settings but their role in PPS is not known.

Methods:
we assessed 185 participants (132 (71%) male) aged 55 or above (mean 62 ys) at a 30 km cross-country race, after carefully excluding anyone with a known cardiovascular disorder using a written questionnaire. The following biomarkers were analysed before the race: N-terminal pro-Brain Natriuretic Peptide (NT-proBNP; normal <194 ng/L); high-sensitivity CRP. Those with abnormal levels of NT-proBNP were subsequently invited to undergo non-invasive cardiac work-up.

Results:
levels of NT-proBNP were 53 (median; range: 8 ' 2250) ng/L and levels of CRP were 0.4 (0.2 ' 7.4) mg/L. Abnormal NT-proBNP was found in a subgroup of 15 subjects (302; 198 ' 2250 ng/L). Cardiovascular disease was found in 4 subjects (27% of subgroup, 2.2% of whole sample; Table 1), of which 1 sadly died of sudden heart death while training, a few months after participation (post-mortem findings in Table 1). The remaining 3 were disqualified from intense sports for fear of death and/or disease progression. Minor cardiac disorders were found in 6 (40%). There were 3 (20%) false positives.

Conclusions: in senior, self-reportedly healthy endurance athletes, severe cardiovascular disease may be more common than previously believed. NT-proBNP identifies a subset of athletes with elevated cardiovascular risk. Our data provide a rationale for larger studies evaluating the role of NT-proBNP in pre-participation screening.

<table>
<thead>
<tr>
<th>Subject</th>
<th>NT-proBNP</th>
<th>CRP</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male 57y</td>
<td>219</td>
<td>0.2</td>
<td>BP 176/108; LVH; ascending aortic aneurysm 47mm</td>
</tr>
<tr>
<td>Male 74y</td>
<td>2250</td>
<td>2.6</td>
<td>Severe LVH; LVEF 30%; asymptomatic atrial fibrillation</td>
</tr>
<tr>
<td>Male 65y</td>
<td>339</td>
<td>2.4</td>
<td>Severe coronary artery disease (CAD) leading to GARB</td>
</tr>
<tr>
<td>Male 68y</td>
<td>363</td>
<td>2.0</td>
<td>Sudden heart death; severe LVH; severe CAD; scar from previous MI</td>
</tr>
</tbody>
</table>
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POSTER SESSION III
Friday, 8 May 2009, 8:30–12:30 Location: Poster Area

P290

Intracardiac relationship of serum uric acid levels with leukocytes and coronary atherosclerotic burden

SA Kocaman1, A Sahinarslan1, M Cemri1, T Timurkaynak1, B Boyaci1, A Cengel1
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Background: Epidemiological studies have shown that increased serum uric acid level (SUA) is associated with coronary artery disease (CAD). Leukocytes have been shown to take an important role in atherosclerotic process. The aim of the study was to investigate whether there is any relationship among SUA, total and differential leukocyte counts and coronary atherosclerotic burden in patients with a suspicion of CAD.

Methods and Results: Patients who underwent coronary angiography at consecutive manner were included in the study. We enrolled 690 eligible patients with CAD or normal coronary arteries (NGA) and investigated the effect of SUA on total and differential leukocyte counts and CAD-SUA levels (5.57 ± 1.64 vs 6.43 ± 1.27 mg/dl; p < 0.001) and leukocytes were higher in patients with CAD than those with NGA. When we divided the patients into four groups according to the quantities of serum uric acid, the monocyte count was prominent related with uric acid level (478±165, 553±177, 365±199 and 467±229 mm ³/µl to Q4; p < 0.001). We observed that, SUA was an independent predictor of monocytes (OR, 1.290 vs 1.097 vs 1.687; p < 0.05), and in multivariate analysis. When we performed multiple linear regression analysis for determining the independent predictors of inflammatory cells in blood, we found a strong positive independent relationship between SUA with neutrophils and monocytes.

Conclusion: Our study results demonstrate that neutrophils and monocytes which play an important role in inflammation and atherosclerosis are independent related to SUA. This finding may explain the possible causative role of uric acid in atherosclerotic process.

P291

Impact of elevated lipoprotein (a) concentration after acute coronary syndrome on one-year prognosis in patients referred for cardiac rehabilitation

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1Klinik Am See, Rudersdorf, Germany, 2MD Sharp & Doehn GmbH, Heer, Germany, 3gersh GmbH, Munich, Germany

Topic: Lipids and atherosclerosis

Introduction: Elevated lipoprotein (a) concentration (Lp(a)) is associated with a 3-4-fold increased risk of myocardial infarction. Little is known about the prognostic impact of elevated Lp(a) on secondary prevention of CAD. We aimed to determine the frequency of investigation of Lp(a) and the incidence of increased values in patients after acute coronary syndrome (ACS).

Methods: During 2005 to 2006, 1,614 consecutive patients (14.1% female, 55 ± 10 years; 189 days after ACS, were included in a nationwide registry (TROL registry). Depending on the faculative determination of Lp(a) two groups were studied (group 1: conducted; group 2: not conducted). The mean follow-up was 13.4 months. Univariate comparison between groups was performed by Chi-square test, multivariate logistic regression Cox models with backward elimination were used to analyse follow-up event data.

Results: In 393 patients (24.3%) the assessment of Lp(a) was performed (group 1). In 88 patients (5.5% of all 224.4% of determined) the concentration was >300 and <1200 mg/dl in 28 patients (1.7±1.9); >1200 mg/dl in 60 patients in group 1 and 54 patients in group 2 (35.5% vs 22.4% of determined) the concentration was >300 and <1200 mg/dl in 28 patients (1.7±1.9) vs 12 patients (1.7±1.9); >1200 mg/dl in 60 patients (3.5±3.5) vs 27 patients (3.5±3.5); patients in group 1 were significantly younger (p < 0.001) with a greater proportion of women (p < 0.001). The proportion of hypertension (p = 0.015), arterial hypertension (p < 0.001) and positive family history (p < 0.001) was significantly higher. Target values of blood pressure were achieved by 82.7% and 94.0% of group 1 and 2, 23.5% of group 1 and 2. Lp(a) > 100 mg/dl in 82.0% and 75.2% of group 1 and 2, and 78.9% in patients with Lp(a) > 1200 mg/dl. 21 patients (1.5%) died during the follow-up, 291 patients (20.5%) were rehospitalised. While history of stroke (p < 0.001), cerebrovascular lesions (p = 0.002) and reduced ejection fraction (p < 0.013) were independent prognostic indicators of death, neither investigation of Lp(a) nor Lp(a) >1200 mg/dl was associated with death, rehospitalisation or combined endpoint. Risk of death was more frequent in patients of advanced age (p < 0.006), reduced ejection fraction (p = 0.009), reduced BMD (p = 0.008), PAD (p < 0.001) and positive family history (p = 0.004).

Conclusion: During cardiac rehabilitation in every fourth patient an assessment of Lp(a) was performed routinely. The proportion of values >1200 mg/dl was 78%. While the study was of sufficient power to demonstrate the association of conventional risk factors with one-year mortality and rehospitalisation, it failed to demonstrate any association with Lp(a).

P292

Statin/niacin combination therapy may be better than statin therapy alone in reducing low-density lipoprotein particle concentration as measured by nuclear magnetic resonance.

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Topic: Lipids and atherosclerosis

Introduction: Increased low-density lipoprotein particle (LDL-P) concentration is a predictor of coronary heart disease (CHD) risk even in the setting of LDL-Cholesterol (LDL-C) at current National Cholesterol Education Programme (NCEP) goals. Veterans Affairs HDL-Cholesterol Intervention Trial showed significant reduction in major cardiovascular events with gemfibrozil therapy in patients with CHD. The effects of gemfibrozil on Nuclear Magnetic Resonance (NMR)-measured LDL and HDL particle subclasses help to explain the demonstrated benefit of this therapy. Niacin is more effective than fibrates in favorably altering lipoprotein profile. We hypothesise that statin/niacin combination therapy (group SN) may be better in lowering LDL-P concentration than statin therapy alone (group St).

Methods: We identified 32 consecutive patients (SN = 17, St = 15) presenting at a preventive cardiology clinic in a tertiary care academic hospital who were at/near NCEP ATP III goal for LDL-C (mean LDL-C = 85 mg/dl) and had NMR lipoprotein profile measured twice with duration of at least 6 weeks of lipid-altering therapy between measures.

Results: Baseline characteristics of the two groups were similar. Most subjects were obese white men of 65 to 75 years of age. During the treatment (mean follow-up = 20.7 weeks), the reduction in total and small LDL-P concentration was significant in both groups and significantly more in subjects receiving nafenac in addition to statin (mean total LDL-P reduction: 1257 to 1023 group St, 702 to 749 group SN; mean small LDL-P reduction: 986 to 754 group St, 683 to 402 group SN; p value throughout < 0.05). At baseline measurement 695% patients (97% group St, 93% group SN) had total LDL-P>100 mg/dl. At follow-up only 31% had LDL-P above goal (67% group St, 8% group SN).

Conclusions: A significant number of patients at/near LDL-C goal had elevated LDL-P concentrations. Treatment decisions following NMR measurement resulted in significant reduction in LDL-P concentration with statin/niacin combination therapy showing a greater effect than statin therapy alone. There was no difference in LDL-C lowering between the two groups. This suggests while statins are good at lowering LDL-C, niacin may be better at lowering LDL-P.

P293

Effect of ezetimibe with orlistat or simvastatin in statin-intolerant overweight/ obese patients with dyslipidemia

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Topic: Lipids and atherosclerosis

Purpose: To assess the effect of ezetimibe in combination with orlistat or simvastatin on anthropometric and lipid parameters in overweight/obese, high-risk patients with dyslipidemia and a history of statin-intolerance.

Methods: All patients (n=30) received a hypocaloric diet (800 kcal/day deficit) and were randomly allocated to combination of ezetimibe (10 mg/day) with orlistat (120 mg, 3 times a day with meals) (EO group) or simvastatin (40 mg/day) (St group). Anthropometric and lipid profile were assessed at baseline and 3 months post-treatment.

Results: Significant similar reductions in body weight, body mass index and waist circumference were achieved in both groups (-8.3%, -8.0% and -5.2% in the EO group and -7.3%, -7.2% and -6.7% in the ER group, p < 0.01 for all changes versus baseline). Low-density lipoprotein cholesterol (LDL-C) reduction was more pronounced in the EO group than in the ER group (-24.8% versus -5.3%, respectively; p < 0.05 for the comparison between groups). Triglycerides decreased more in the ER group compared with the EO group (-20.4% versus -14.1%, p < 0.05 for the comparison between groups). High-density lipoprotein cholesterol levels decreased in EO group by 7.5% (p < 0.05), while not altered with ER treatment. Apolipoprotein B levels were equally reduced in both treatment groups.

Conclusions: For the same body weight reduction the combination of ezetimibe with orlistat is more efficient in LDL-C lowering, whereas the combination of ezetimibe with simvastatin is more potent in terms of improving atherogenic dyslipidemia.
Topic: Lipids and atherosclerosis

Background: Aortic valve sclerosis (AVS) and mitral annular calcification (MAC) are chronic, degenerative processes characterized similar to atherosclerosis for cardiovascular risk factors. Epicardial adipose tissue thickness (EAT) is important determinants for the development of coronary artery disease (CAD). The purpose of this study was to reveal the association between AVS, MAC and CAD with coronary artery disease in patients.

Methods: We identified 140 patients who underwent coronary angiography due to chest pain and/or an abnormal stress test were enrolled and their baseline characteristics are summarised in the table.

Results: EAT prevalence was significantly higher in patients with CAD than in those without CAD (EAT: 7.9±3.7 mm versus 6.2±2.8 mm p=0.007, respectively). Prevalence of AVS was significantly higher in patients with CAD than those without CAD (60.8% versus 34.2% p=0.005, respectively). The prevalence of MAC is similar among CAD group and control group.

Conclusion: EAT thickness, AVS and MAC which are easily and non-invasively evaluated by transthoracic echocardiography can be an adjunctive marker to classical risk factors for the prediction of CAD.

Between groups characteristics

<table>
<thead>
<tr>
<th></th>
<th>CAD (n=102)</th>
<th>CAD=6=38</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years, mean ±SD)</td>
<td>66.5±11.1</td>
<td>61.6±13.1</td>
<td>NS</td>
</tr>
<tr>
<td>Female/Male %</td>
<td>73.5%/26.5%</td>
<td>50/50%</td>
<td>0.008</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.6±4.3</td>
<td>29.3±5.5</td>
<td>NS</td>
</tr>
<tr>
<td>LVM index (g/m²)</td>
<td>132±31.0</td>
<td>122.4±41.0</td>
<td>NS</td>
</tr>
<tr>
<td>EF %</td>
<td>53±10.9</td>
<td>56.0±16.6</td>
<td>0.015</td>
</tr>
<tr>
<td>EAT (mm)</td>
<td>7.9±3.7</td>
<td>6.2±2.8</td>
<td>0.007</td>
</tr>
<tr>
<td>Total cholesterol (mg/dL)</td>
<td>175±53.6</td>
<td>175.5±38.2</td>
<td>NS</td>
</tr>
<tr>
<td>HDL-C (mg/dL)</td>
<td>38±10.5</td>
<td>45.7±11.3</td>
<td>NS</td>
</tr>
<tr>
<td>LDL-C (mg/dL)</td>
<td>115±34.8</td>
<td>104.5±34.6</td>
<td>NS</td>
</tr>
<tr>
<td>Triglyceride (mg/dL)</td>
<td>193±130.6</td>
<td>177.3±19.1</td>
<td>NS</td>
</tr>
<tr>
<td>AVS n%</td>
<td>62.0±8.9</td>
<td>13/34.2%</td>
<td>0.005</td>
</tr>
<tr>
<td>MAC n%</td>
<td>43±42.2%</td>
<td>10±26.3%</td>
<td>NS</td>
</tr>
</tbody>
</table>

*BMI body mass index,LVM index=left ventricular mass index, HDL-C=high-density lipoprotein-cholesterol, LDL-C=low-density lipoprotein-cholesterol, AVS=Aortic valve sclerosis, MAC=mitral annular calcification, EF=Ejection fraction, NS=NonSignificant Values are means ± S.D. p<0.05.

Effects of omega-3 fatty acids on lipoprotein profiles and heart rate variability in patients with mixed dyslipidemia

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Topic: Lipids and atherosclerosis

Background: omega-3 fatty acids showed the effect of decreasing triglyceride level, stabilising atheromatous plaque and improving survival in patients with coronary artery diseases. Omega-3 fatty acids have been considered beneficial for autonomic cardiovascular function. This study was designed to evaluate the effects of omega-3 fatty acids on lipoproteins and heart rate variability in patients with mixed dyslipidemia.

Methods: this study was a prospective, randomised, open label study. Patients who had mixed dyslipidemia with high triglyceride level (200-499 mg/dL) and total cholesterol level over 200 mg/dL were enrolled. After run-in period of 6 weeks, patients were randomised to two groups and received combination treatment with omega-3 fatty acids 4 g and simvastatin 20 mg daily or monotherapy with simvastatin 20 mg for 6 weeks. The primary objective was to compare the change of triglyceride level from baseline to week 6 between two groups. The secondary objectives were to compare the other lipoprotein profiles including apolipoprotein(a)/apolipoprotein B ratio and high sensitivity C-reactive protein (hsCRP) and the change of parameters of heart rate variability.

Results: 217 patients were screened and 62 patients (mean 58 years of age, male 41%, BMI 25.6 kg/m²) were randomised to two treatment groups. After 6 weeks’ treatment, triglyceride level decreased 41.0% in combination treatment and 5.5% in simvastatin monotherapy group (from 309.2 mg/dL to 177.7 mg/dL in combination treatment, from 294.6 mg/dL to 238.3 mg/dL, p=0.0007). No significant differences were seen in the changes of low density lipoprotein cholesterol, high density lipoprotein cholesterol, total cholesterol, apolipoprotein B/apolipoprotein Al ratio and hsCRP levels between two groups. Neither combination therapy nor simvastatin monotherapy induced significant changes in the parameters of heart rate variability. Tolerability profiles were not significantly different between two groups.

Conclusion: combination therapy of omega-3 fatty acids and simvastatin decreased triglyceride level more significantly than simvastatin alone. The effect of omega-3 fatty acids on heart rate variability was not demonstrated in this study.

Dose-dependent effect of rosuvastatin on HDL-subfraction profile in patients with primary hyperlipidemia

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Topic: Lipids and atherosclerosis

Purpose: to investigate the effect of rosuvastatin treatment on HDL subfraction phenotype in patients with primary hyperlipidemia.

Methods: subjects with primary dyslipidemia and no evidence of cardiovascular disease were randomly allocated to therapeutic lifestyle modification plus rosuvastatin at 10 (RSV10 group, N=65) or 20 mg/day (RSV20 group, N=65). We assessed the effect of rosuvastatin on the cholesterol mass of HDL subfractions at baseline as well as after 12 weeks post-treatment.

Results: rosuvastatin treatment dose-dependently increased the HDL-cholesterol (3.1% versus 5.2% in the RSV10 and RSV20 groups respectively, p=0.01). A dose-related effect of rosuvastatin treatment on the cholesterol concentration of the large HDL particles was also noted (increased by 10.4% in RSV10 group vs. 21.3% in the RSV20 group, p=0.008). Either dose of rosuvastatin treatment exerted no effect on the cholesterol mass of the small HDL subfractions.

Conclusion: rosuvastatin dose-dependently increases HDL-cholesterol levels. This effect may be attributed to a dose-related increase in the cholesterol mass of the larger HDL particles following rosuvastatin treatment.

Status of plasma lipids peroxidation in patients with congestive heart failure

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Topic: Lipids and atherosclerosis

Background and objectives: Congestive heart failure (CHF) is a syndrome characterised by chronic and progressive left ventricular (LV) systolic or diastolic dysfunction. Recently, the role of oxidative stress has been explored as such as mechanism of the disease progression. The aim of this study was to determine the status of lipid peroxidation in plasma of patient with CHF (functional class II & IV) and compare with healthy subjects.

Material & Methods: This case-control and cross-sectional study was carried out in 30 patients with CHF hospitalised in cardiac ward of hospital in Babol and 30 healthy subjects (matched by age, sex and social status). Plasma concentration of MDA was measured with spectrophotometric method to estimate lipid peroxidation of blood plasma in all subjects. We analysed the data with statistical software, SPSS(version 13), T-Test and Pearson correlation coefficient.

Results: Mean of plasma concentration of MDA in patient with CHF hospitalised in cardiac ward of hospital in Babol and 30 healthy subjects (matched by age, sex and social status) Plasma concentration of MDA was measured with spectrophotometric method to estimate lipid peroxidation of blood plasma in all subjects. We analysed the data with statistical software, SPSS(version 13), T-Test and Pearson correlation coefficient.

Mean of plasma concentration of MDA in patient with CHF was significantly higher than healthy subjects (p<0.012). Also, there was significantly increase of plasma MDA in Functional class IV than Functional class III (p=0.006).

Conclusions: Our results indicate increase of lipids peroxidation in CHF patients and a positive correlation between the status of lipids peroxidation (that measured with plasma concentration of MDA) and severity of CHF.
P299
Two subfractions of low density lipoprotein in patients with ACS
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Topic: Lipids and atherosclerosis

Aim: To estimate atherogenic risk in patients with Acute Coronary Syndrome (ACS) from the plasma levels of two subfractions of Low Density Lipoprotein (LDL) - LDL_A and LDL_B.

Material and methods: 37 pts with ACS and 70 health controls were studied. The isolation of the subfractions of LDL was done by sucrose ultracentrifugation. LDL_A at density 1.025-1.030 g/ml and LDL_B at density 1.030-1.063. The number of LDL particles in LDL_A and LDL_B is determined by the composition of ApoB in these subfractions. The ratio ApoB-1.025 g/ml and ApoB-1.030 g/ml was accepted as a measure of prevalence of LDL_A and LDL_B respectively in each one of the studied patients. Phenotype A of LDL, people with predominant number of LDL_A when ApoB-1.025 g/ml/ApoB-1.030 g/ml ratio is <0.97 and phenotype B of LDL, people with predominant number of LDL_B when ApoB-1.025 g/ml/ApoB-1.030 g/ml ratio is >1.08. Plasma and lipoprotein apo AI and apo B100, total cholesterol (T), triglycerides (Tg) and HDL cholesterol (HDL-C) were estimated by CHOD-PAP and GPO-PAP method, and ApoA-I and ApoB with turbidometric methods.

Results: In ACS pts decreased number of LDL particles (25.8±12.4 and 44.6±13.5, p<0.001) and increased number of LDL particles (75.2±25.3 and 36.4±12.3 p<0.001) was found. Phenotype A was 60.0% and phenotype B was 23.3% in controls, in ACS phenotype A was 5.4%, phenotype B 94.4%. C levels were 204±47.4 in ACS and 185±26.6 in controls, p<0.02. Tg were respectively 231±177 and 79±13±70 p=0.001.

Conclusions: In pts with ACS considerable changes in the number and composition of the LDL_A, LDL_B and LDL particles was found. It may be helpful for detecting patients in risk. UKw words: ACS, LDL_A, LDL_B, HDL.

P300
HDL-cholesterol and common carotid/femoral arteries intima-media thickness in adolescents and young people
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1Russian State Medical University, Moscow, Russian Federation, 2Research Institute Physicochemical Medicine, Moscow, Russian Federation

Topic: Lipids and atherosclerosis

Purpose: To evaluate the association between HDL-C and intima-media thickness (IMT) in young people.

Methods: 143 young people (15-25 y.o., mean age 19.1±2.45 y.o.) were examined. Body mass index (BMI) was 18-50 kg/m^2 (mean 30.9±5.6 kg/m^2). We analysed anthropometric parameters, common carotid artery (CCA) and femoral artery (FA) IMT, serum concentrations of high-density lipoprotein (HDL) cholesterol.

Results: We did not observe any differences between female and male groups in CCA IMT, FA IMT, HDL-C (table). HDL-C did not significantly correlate with BMI, waist circumference (WC), waist/hip ratio. In overall group and in males there were no significant correlation between CCA IMT, FA IMT and HDL-C. In females HDL-C correlated with CCA and FA IMT (r=0.31, p<0.05). The results of univariate linear regression analysis in females also showed strong correlation between CCA IMT and BMI (r=0.53), WC (r=0.40), hypertension (r=0.29), and between FA IMT and BMI (r=0.33), systolic blood pressure (r=0.33) (p<0.05). On multivariate analysis, BMI (beta=0.41), WC (beta=0.41), HDL-C (beta=0.35) were found to be independent predictors of CCA IMT values; and BMI (beta=0.30), HDL-C (beta=0.34) and hypertension (beta=0.29) were found to be independent predictors of FA IMT in females (p<0.05).

Conclusion: Low HDL-C concentrations independently associated with increased CCA and FA IMT in adolescent females and young women, but not in adolescent males and young men. It is important to determine HDL-C for evaluation of cardiovascular risk in young female patients, as well as BMI, WC and blood pressure.

Subject characteristics

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Men</th>
<th>Woman</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>143</td>
<td>74</td>
<td>69</td>
</tr>
<tr>
<td>CCA IMT, mm</td>
<td>0.50±0.09</td>
<td>0.50±0.09</td>
<td>0.50±0.09</td>
</tr>
<tr>
<td>FA IMT, mm</td>
<td>0.48±0.12</td>
<td>0.48±0.12</td>
<td>0.48±0.10</td>
</tr>
<tr>
<td>HDL-C, mmol/l</td>
<td>1.36±0.28</td>
<td>1.39±0.26</td>
<td>1.33±0.30</td>
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</tbody>
</table>

P301
Implication of the new goals in dyslipidemia management in acute coronary syndromes.
TM Livieratos1, AR Tziovos1, KYR Grammatikopoulos1, PAN Koustas1, GE Kordosis1
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Topic: Lipids and atherosclerosis

Until 2004, a goal LDL of <100mg/dl was recommended for secondary prevention. To meet this goal patients with LDL-C<150mg/dl required a 33% reduction, achievable with all statins. An optional LDL goal of <70mg/dl for acute coronary syndrome patients (pts) has been proposed but it is not known if this is achievable with only statins. Aim: to assess LDL-C in acute coronary syndromes patients at the time of presentation and to evaluate the degree of LDL lowering required to meet the prior 100mg/dl and newer 70mg/dl goal in order to appreciate the difficulty to achieve the new goal.

Methods: our study included 488 consecutive patients admitted with ACS to a regional general hospital in western Greece. We assessed lipid profile within 24 hours after admission. We classified ACS patients based on the degree of LDL lowering to meet the prior 100mg/dl and newer 70mg/dl goal as follows: goal, <33%, 33-40%, 41-50% and >51% lowering.

Results: the initial diagnosis was STEMI in 34%, NSTEMI in 30%, unstable angina (UA) in 36% and 22% had a history of coronary disease. LDL distribution is shown in the figure 1. For an LDL goal of <100mg/dl only 5% of pts had an LDL requiring >51% reduction to meet goal. In contrast, using a goal LDL of <70mg/dl 50% of pts would require >51% in LDL and therefore likely require 2 lipid lowering drugs.

Conclusions: to meet the more aggressive LDL goal of 70mg/dl more than half of ACS patients require an LDL reduction of >51% not easily achievable with mono-therapy.
endothelial dysfunction is an important aspect in the therapy of ischemic heart failure. Many studies have shown that long-chain omega-3 polyunsaturated fatty acids (n-3 PUFAs) may protect against heart disease mortality and morbidity. Furthermore, consumption of fish and n-3 PUFAs seems to affect cardiac haemodynamics, which may benefit the clinical course of heart failure patients. The purpose of this study was to evaluate the role of n3-PUFA supplementation on the left ventricular diastolic function of patients with chronic ischemic cardiomyopathy.

Methods: We enrolled 50 consecutive patients (mean age 61±13 years old) with chronic compensated heart failure, due to ischemic or dilated cardiomyopathy, NYHA classification III, under optimal medical treatment. We randomised them on 1000 mg n-3 PUFAs supplementation. Echocardiographic assessment was performed in all patients at their first visit before randomisation and 6 months after. Left atrial kinetic energy (LAKE), an index of left atrial function, was calculated, using the equation $\frac{1}{2}kL^2vAv2$, where $LAV$ is left atrial systolic volume and $Av$ is the $A$-wave velocity of transmitral flow. Furthermore, flow propagation velocity of the early transmitral filling (vpt) by colour M-mode was calculated. Results: General linear model analysis revealed no statistical difference before and after intervention in all echocardiographic parameters in the whole group of patients. When we stratified our analysis according to the anatomy of cardiomyopathy, patients with ischemic cardiomyopathy (n=20), those who received n-3 PUFAs, showed a significant improvement in LAKE (5.5% vs 23%, between ischemic and dilated cardiomyopathy, p=0.01) and vpt (18.8% vs 30.2% between ischemic and dilated cardiomyopathy, p=0.05) compared to those who did not receive n-3 PUFAs, while no such statistical difference occurred between patients with dilated cardiomyopathy, after adjustment for sex, age, body mass index and serum creatinine levels. Conclusion: Omega n-3 PUFAs supplementation seems to improve left atrial function and left ventricular function, indicating an improvement of end-diastolic pressure, in patients with ischemic chronic heart failure. This finding may illustrate the beneficial role of omega-3 on the haemodynamic course of ischemic cardiomyopathy; although, there was no such benefit detected in patients with dilated cardiomyopathy.

Endothelial function in patients with ischemic heart failure treated with Rosuvastatin EE Babes1, VV Babes1, MI Popescu1, AR Ardelean1 1Faculty of Medicine, Oradea, Romania

Objective: A great number of previous studies have shown that endothelial dysfunction is comprom-
sed in patients with heart failure and coronary heart disease. It is also known that treatment with
statis improves endothelial function in patients with hypercholesterolemia. This study investigated
effects of statins on endothelial function and left ventricular ejection fraction in patients with ischemic heart failure.

Methods: We studied 48 patients with ischemic heart failure (32 males and 16 females aged 65,6
± 5,2 years). All patients were NYHA II to IV and ischemic etiology of heart failure was
documented from a history of acute coronary syndrome, coronary angiography or both. Patients were
divided in two groups: Group A (26 patients) received 10 mg Rosuvastatin for 6 weeks while
group B (22 patients) received placebo for 6 weeks. In all patients we evaluated endothelial
dysfunction by determination of the changes in brachial artery diameter at baseline, during
reactive hyperemia and after NTG. There were no significant differences between the two
groups at the end of the study regarding NMD.

Results: At baseline there were no statistically significant differences between the two groups regarding the left ventricular ejection fraction, the diameter of brachial artery at baseline, after reactive hyperemia and after NTG. There were no significant differences between the two groups regarding left ventricular hypertrophy. After 6 weeks blood pressure, heart rate, basal diameter of brachial artery and body weight remained unchanged in both groups. FMD - endothelial dependent was significantly increased in group A (5,2±2,9% vs 9,6±2,7%, p<0,01), while remained unaffected in group B (5,3±2,7% vs 6,0±3,1% p>NS). There were no statistically significant differences between the two groups at the end of the study regarding NMD - endothelial independent. Ejection fraction was also improved in group A (from 28,1±2,2% to 30,2±2,2%, p<0,05) and remained unaffected in group B (from 27,5±2,1% to 28,3±2,9%).

Conclusions: These findings indicate that Rosuvastatin treatment for 6 weeks significantly
improves endothelial function and left ventricular ejection fraction. These findings may provide evidence for an additional effect of statins beyond lipid lowering, while improvement of endothelial dysfunction is an important aspect in the therapy of ischemic heart failure.

P034 HDL cholesterol is an independent protective factor in all ages groups and particularly in older women

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Topic: Risk factors and risk prediction

Background: elevated high density lipoprotein cholesterol (HDL-C) levels are known to protect
toward the development of cardiovascular disease (CVD). This independent, inverse relation-
ship has been consistently demonstrated in several studies of middle-aged men and women
and elderly men. Studies in elderly women are much more limited and results in longitudinal
studies have been inconsistent. The SCORE dataset contains sufficient longitudinal data on
elderly women to reliably investigate the relationship.

Purpose: to assess the relationship between HDL-C and CVD mortality in each age group in
men and women in the SCORE dataset.

Methods: the SCORE dataset contains 121,112 European cohort studies, 3 years included in this
analysis. Cox proportional hazards model was used to assess the effect of HDL-C on CVD
mortality adjusted for total cholesterol, systolic blood pressure, diabetes, smoking and body mass
index in the entire group and in each age group. Analyses were stratified by gender and country.

Results: numbers included in each age group and the hazard ratios for CVD mortality are shown
in the table below. HDL-C remained a significant, independent protective factor in each age
group in men and women. The relationship was strong and graded, stronger in women than
men. The magnitude of the protective effect was greatest in elderly women with a hazard ratio
of 0.53±0.42 to 0.60 for 0.5 mmol/l increase in HDL-C.

Conclusions: HDL-C is an independent protective factor in all age groups, and particularly in
older women. In contrast, cholesterol level loses its effect in older persons. The public health
implications of these findings require debate.

Hazard ratios* for CVD mortality

<table>
<thead>
<tr>
<th>Age</th>
<th>Number</th>
<th>Hazard ratio (95% CI)</th>
<th>Age</th>
<th>Number</th>
<th>Hazard ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 55</td>
<td>5,489</td>
<td>0.62 (0.42 to 0.91)</td>
<td>55-65</td>
<td>8,448</td>
<td>0.69 (0.53 to 0.85)</td>
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<td>65-75</td>
<td>11,385</td>
<td>0.70 (0.62 to 0.80)</td>
<td>75-85</td>
<td>6,245</td>
<td>0.79 (0.64 to 0.98)</td>
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<tr>
<td>All</td>
<td>40,282</td>
<td>0.70 (0.59 to 0.89)</td>
<td>All</td>
<td>49,711</td>
<td>0.76 (0.70 to 0.83)</td>
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</tbody>
</table>

*Hazard ratios are per 0.5mmol/l increase in HDL-C adjusted for age, smoking, total cholesterol, systolic blood pressure, diabetes and body mass index; CI: Confidence interval

P035 Oxidised LDL as a marker of rapid progression in aortic stenosis

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Topic: Risk factors and risk prediction

Background: some studies have proposed several markers of rapid progression in aortic stenosis (AS) to divergent findings.

Objective: To analyse the role of biomarkers of rapid progression in aortic stenosis

Material and methods: prospective study of 155 patients with moderate to severe AS. We determined as possible markers of rapid progression: C Reactive Protein (hs-CRP), oxidised LDL cholesterol (oLDL), Creatinine, Phosphorus-calcium product (PaCa), calciotonye, parathormone (PTH). We considered as slow progressors: patients with reduction of Aortic Valvular Area (AVA) lower than 0.05 cm2 and/or increase in Maximal Velocity lower than 0.15 m/s. Rapid progression occurs: patients with reduction in AVA more than 0.05 cm2 and/or increase of Aortic Velocity >0.15 m/s in a 6-month period.

Results: mean age was 76±11 years, 54% were women. Echocardiographic parameters: mean Gradient 43±116 mm/Hg, Aortic Valve Area 0.790±113±cm2 and AVA Index 0.480±16±cm2/m2. 48 patients (31.5%) showed rapid progression. Mean CRP was 5.21 (7.9) mg/dl, oLDL 48.8 (32.2) mg/dl, calciotonye 4.27 (7.2) pg/ml, creatinine 1.05 (0.9) mg/dl, PTH 69.9 pg/ml (52). In multivariate analysis oLDL was related to rapid progression (p=0.01), CRP, renal function, PaCa, calciotonye and PTH were not related to progression velocity (pNS).

Conclusions: oLDL is a marker of rapid haemodynamic progression velocity in patients with moderate to severe AS. We have found no independent relationship with other suggested markers.
P307 Plasma phospholipid fatty acids and CHD in older men: The Whitehall Study of London Civil Servants R Clarke, M Shipley, W Harris 1University of London and Kingdom, 2University of London, London, United Kingdom, 3South Dakota, United States of America

Objective: To assess the relevance of plasma phospholipid fatty acid (PL-FA) composition that reflects dietary intake of fatty acids for risk of coronary heart disease (CHD).

Methods: We assessed HDL mortality associations with PL-FA (Saturated [SFA], polyunsaturated [PUFA], and monounsaturated [MUFA] fatty acids) levels measured in a nested case-control study of 116 cases of CHD death and 239 controls that were frequency matched for age and employment grade. The study design involved a nested case-control study of men with no known history of CHD and who participated in the 1956 Whitehall study of London Civil Servants. Participants had plasma levels of total cholesterol, LDL-cholesterol (LDL-C), HDL-cholesterol (HDL-C), apolipoprotein B (Apo B), and apolipoprotein A1 (Apo A1). G-c reactive protein (CRP) and fibrinogen were recorded.

Results: SFA levels were significantly positively correlated with total cholesterol, LDL-C, Apo B, CRP protein and fibrinogen. By contrast, PL-PUFA were inversely associated with CRP, but not with any of the lipids. A higher SFA concentration of CHD mortality was associated with a 2-fold higher risk of CHD (Odds ratio [OR] 3.5; 95% confidence interval [CI] 2.1, 95%CI: 1.5–6.4), and an equivalent difference in PUFA was associated with a halving risk in CHD (OR 0.26, 95%CI: 0.1, 0.7), and a higher SFA concentration of CHD mortality was associated with a lower risk of CHD (OR 0.5, 95%CI: 0.2, 0.9; p = 0.001). More non-diabetics than diabetics reported freedom from angina and dyspnea (CCS 0: 82.4% vs. 76.5%, p = 0.001; NYHA 0-1: 90.7% vs. 82.8%, p = 0.001).

Conclusions: Higher levels of saturated fat and lower levels of polyunsaturated fats were each associated with a higher risk of CHD on elderly men and these associations were partly explained by their effects on blood lipids and biomarkers of inflammation.

Diabetes

P309 Less than half of the diabetic population reach targets for metabolic control, blood pressure and physical activity at 12 months after myocardial infarction K Hambraus1, P Tyden2, B Lindahl3, 1Falun Hospital, Falun, Sweden, 2University Hospital of Malmo, Malmo, Sweden, 3University Hospital of Uppsala, Uppsala, Sweden

Objectives: To study attainment of target levels for blood pressure, metabolic control and physical activity, and to study differences in heart symptoms and quality of life at 12 months after an acute myocardial infarction (AMI) in diabetic vs. non-diabetic patients.

Methods: Data were recorded in the Internet-based national registry of Secondary Prevention after Heart Intensive care Admissions (SEPHIA) in Swedish hospitals in 2005-2007. Patients with AMI and age below 75 years of age were included, and follow-up was performed at an outpatient visit or by telephone at 6-10 weeks and at 12-14 months after discharge. Angina and dyspnea were recorded using CCS-classification, adjusted to include CCS 0 (no angina), and NYHA-classification, adjusted to include NYHA 0 (no symptoms and no objective signs of heart failure).

Conclusions: More non-diabetics than diabetics reported freedom from angina and dyspnea (CCS 0: 82.4% vs. 76.5%, p = 0.001; NYHA 0-1: 90.7% vs. 82.8%, p = 0.001).

Conclusion: Higher levels of saturated fat and lower levels of polyunsaturated fats were each associated with a higher risk of CHD on elderly men and these associations were partly explained by their effects on blood lipids and biomarkers of inflammation.
PS10  
Serum glucose levels at entry predict left ventricular systolic dysfunction in non diabetic patients with an acute coronary event.  
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Topic: Diabetes  
Introduction: The purpose of this study was to evaluate the impact of serum glucose levels at entry on the development of left ventricular systolic dysfunction (LVSD) in non-diabetic patients with an acute coronary syndrome (ACS).  
Methods: During 2006-2008, 814 consecutive patients with an acute coronary event were enrolled. For the purpose of the current study we finally analysed the data of 452 (66% were males, 21% females) non diabetic post ACS patients. From them 203 developed LVSD after the cardiac event and 249 patients did not. Detailed information regarding their medical records were recorded. Serum glucose levels, plasma brain natriuretic peptide (BNP) and serum C reactive protein (CRP) were measured at entry; while from the echocardiographic evaluation, which was performed during the first 24 hours of their hospitalisation, the left ventricular ejection fraction was calculated. An ejection fraction below 40% characterized LVSD.  
Results: 357 (79%) of the non-diabetic patients were defined as having myocardial infarction; while the rest of them as having unstable angina. Patients having glucose levels at the higher tertile (>155 mg/dl) were older (66±13 vs 61±13, p<0.004), less physical active (49% vs 63%, p=0.026), had higher troponin levels (147±39.7 vs. 56±13.5, p=0.033), higher BNP levels (510.39±392.33 vs. 213±13±301.14, p=0.008), higher CRP levels (42.60±55.20 vs. 26.40±38.18, p=0.044), higher white blood cells count (1341±16420 vs. 931±10±520, p=0.001), lower creatinin clearance levels (0.7±±1.32±6 vs. 0.8±±1.45±3.15, p=0.009), lower left ventricular ejection fraction (40% vs 45%, p=0.003), higher prevalence of myocardial infarction as a discharge diagnosis (88% vs. 69%, p=0.044), higher blood glucose levels (165±357 vs. 116±324, p=0.038). In the regression analysis after controlling for several confounders revealed that higher values of glucose were positively correlated with the occurrence of lower left ventricular ejection fraction (β=3.46±1.3, p<0.001) and TIMI scores. No differences were elicited regarding type of ACS, exclusion strategy or number of coronary lesions as none regarding discharge aspirin and ACE inhibitors prescription.  
Conclusions: Although with worse risk profile, diabetic ACS patients previously on GDT have a significantly lower mortality during the follow-up. This study highlights the protective role of GDT to improve outcomes in these patients, whose benefit is clear after an acute event.  

PS12  
Pre-acute coronary syndrome guideline-driven therapy in diabetics: the key to improve long-term outcomes.  
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Topic: Diabetes  
Aim: to determine, in a group of diabetic patients admitted for ACS (acute coronary syndrome), if those previously medicated with guideline-driven therapy (GDT) (aspirin, any statin or any ACE inhibitor) differs in outcomes from patients who were not under such therapy before the ACS.  
Methods: a total of 1329 ACS patients were enrolled and 227 diabetes studied. An 1-year mortality and major cardiac adverse events (MACE) were made and 3 groups were created: A - no previous medication (n=65); B - medicated with at least 1 or 2 drugs (n=134); C - medicated with the 3 drugs (n=28).  
Results: no significant differences among groups were elicited regarding age, gender, prior history of hypertension, smoking habits or heart failure. Interestingly, group C patients were more dyslipidemic (97% vs. 73%; p<0.05) and had more coronary artery disease than group A patients. They also had significantly higher admission glycemia (279.3±197.8 mg/dL; p<0.05) and TIMI scores. No differences were elicited regarding type of ACS, exclusion strategy or number of coronary lesions as none regarding discharge aspirin and ACE inhibitors prescription.  
Conclusions: although with worse risk profile, diabetic ACS patients previously on GDT have a significantly lower mortality during the follow-up. This study highlights the protective role of GDT to improve outcomes in these patients, whose benefit is clear after an acute event.

PS11  
Gender aspects on the prognosis in patients with myocardial infarction and type 2 diabetes: a report from the DIGAMI 2 trial  
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1Stockholm, Sweden  
Topic: Diabetes  
Background and aim: Diabetes (DM) is associated with a markedly increased cardiovascular risk but gender-specific data on the combined effects of DM and myocardial infarction (MI) is less explored.  
Materials and methods: The DIGAMI 2 trial recruited 837 men and 416 women with type 2 DM admitted due to MI and followed for a median of 2.1 years. DM-specific risk factors, modulating effects of risk predictors (previous MI, heart failure, ventricular fibrillation, cardiogenic shock, smoking, age, creatinine, DM-complications, admission blood glucose, HbA1c and DM-duration) were examined (stepwise logistic regression model). The interaction between risk factors and an unfavourable outcome (death, sereatunation, stroke) was evaluated from a gender perspective.  
Results: Between 837 men and 416 women, men had significantly older age, more end organ damage, diabetes mellitus and DM complications. Men have lower male sex hormone levels and more hypertension and dyslipidemia. No gender differences were seen for smoking, age, DM duration, admission blood glucose and HbA1c. Survival analyses revealed that female sex and hypertension were associated with worse outcome.  
Conclusions: Women had worse baseline clinical characteristics (older with a higher prevalence of heart failure, hypertension and diuretic treatment). In hospital therapy did not differ between the two genders. Total mortality was not statistically different between sexes. The composite end point death, myocardial infarction and stroke was more common in women (20.9% vs. 12.5%). This difference disappeared after age adjustment. Age and previous heart failure were independent predictors in both genders, whereas diabetes complications and previous myocardial infarction were additional in women. Hyperglycaemia was an independent predictor of diurnal outcome in men but not in women.  

PS13  
One-year prognosis of patients with type 2 diabetes following acute coronary syndrome and cardiologic rehabilitation  
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1Klinikum am See, Ruderforder, Germany, 2Klinik Am See, Ruderforder, Germany, 3MDS Sharp & Donahue GmbH, Haar, Germany, 4Eves pharma GmbH, Munich, Germany, 5University Medical Centre, Hamburg-Eppold, Germany  
Topic: Diabetes  
Background: Diabetes and patients with impaired glucose tolerance have a poorer prognosis than nondiabetics following acute coronary syndrome (ACS). The extent to which these differences persist after participation in cardiac rehabilitation (CR) is not adequately known at present.  
Methods: Between 2005 and 2006, 1,614 consecutive patients (14% women, 55±10.3 years) were enrolled 18.9 days after ACS and classified according to known diabetes (Group 1: n=268), GDT (Group 2: n=185) or normal glucose regulation (Group 3: n=1,171). Mean follow-up was 13.4 months. Univariate comparisons of the groups were evaluated by chi square test. Logistic regression models with backward elimination were used to analyse independent predictors of death and cardiovascular rehospitalisation.  
Results: Patients in Group 1 and 2 were significantly older and reached more end organ damage (LV hypertrophy, LV systolic dysfunction, renal impairment, and PAD). Despite similar treatment for secondary prevention, target values for blood pressure were reached in 48.9% of the patients in Group 1, in 91.3% in Group 2, and in 98.9% in Group 3 (p<0.0001). While LDL, cholesterol targets were achieved in 50.8%, 80.8%, and 81.5%, resp. (p<0.0001). With a lost to follow-up rate of 1.2%, 21 patients (1.3%) had died after one year. Glucometabolic status was found to have a no influence in the multivariate analysis, while history of stroke, PAD, and chronic arthritis were associated with an increased risk (OR 6.5, 4.5, and 20.0). The combined endpoint of death and cardiovascular rehospitalisation occurred in 291 cases (20.5%) and did not differ between the groups. Age (OR 1.018; 95% CI [1.004-1.030]; p=0.013) and PAD (OR 2.534; 95% CI [1.465-4.301]; p<0.001) had a negative effect. By contrast, an increase in BMI (OR 0.962; 95% CI [0.962-0.973]; p=0.000) was positively associated with the improved prognosis.  
Conclusions: Although target values of blood pressure and lipids are significantly less likely not to be met in diabetics, the short-term prognosis of all patients with ACS is good following inpatient CR and predominantly determined by end organ damage, irrespectively of glucose metabolism.
P314
The relationship of endothelial dysfunction and diastolic left-ventricular function and the presence of complications in diabetes mellitus type 2
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2University Hospital Inselspital, Berne, Switzerland

Topic: Diabetes
Background: Endothelial dysfunction plays a key role in the pathogenesis of diabetic vascular disease and is an early phase of atherosclerosis. Likewise, the presence of diabetes mellitus (DM) type 2 has been associated with left ventricular (LV) diastolic dysfunction. However, diastolic dysfunction in asymptomatic patients with diabetes mellitus type 2 or in relation with other complications such as endothelial dysfunction, microangiopathy and level of glycemic control remains unclear.

Objective: The main objective of this study was to determine the relationship between endothelial dysfunction and left ventricular diastolic function and the presence of microvascular complications in patients with DM Type 2.

Methods: A total of 56 Filipino patients with type 2 diabetes mellitus were included in the study and grouped into those with microvascular complications (group 1: n=40) and without microvascular complications (group 2: n=16). Endothelium function, measured by flow-mediated dilation of the brachial artery using ultrasound, was calculated in the two groups. Left ventricular diastolic function was assessed by classical methods of pulse and tissue Doppler imaging.

Results: The patients with complications had significantly longer duration of DM and higher HbA1c than the patients without complications with a p value of 0.01 and 0.03 respectively. There was a significant association between glycemic control and the presence of microvascular complications with a p value of 0.04. Flow-mediated dilation was lower in patients with microangiopathy, however this finding was not statistically significant. FMD negatively correlated with HbA1c (r = -0.374, p = 0.005) and negatively correlated with IVRT (r = -0.268, p = 0.033) regardless of the presence or absence of microvascular complications. However, FMD was not significantly correlated with the presence of microangiopathy. The level of glycemic control (HbA1c) is positively correlated with the presence of microvascular complication (OR=2.691, p=0.011). Logistic regression analysis showed that HbA1c was the only significant predictor of the presence of microvascular complications.

Conclusion: Flow-mediated dilation is negatively associated with HbA1c regardless of the presence or absence of microvascular complications. It was also significantly and negatively correlated with IVRT. HbA1c had been shown to be the only clinical predictor of the microvascular complications among type 2 DM patients.

P315
Long-term results of a 12-week comprehensive outpatient diabetes rehabilitation programme
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1University Hospital Inselspital, Berne, Switzerland
2University Hospital Inselspital, Lugano, Switzerland

Topic: Diabetes
Background: Short-term results of ambulatory lifestyle intervention programmes are reasonably good in patients with type 2 diabetes. However, reports on long-term results are rare and controversial.

Methods: 102 consecutive pts with type 2 diabetes attended a 12 week outpatient diabetes rehabilitation programme 3 times / week including exercise training, nutrition and diabetes counselling, medical therapy and psychosocial support. Pts were followed for a mean of 1.2 years.

Results: c.f. Table 1

Conclusions: A 12-week multidisciplinary outpatient diabetes rehabilitation programme leads to significant improvements of physical activity, exercise capacity and glucose control. However, these beneficial effects are not maintained long-term. Strategies to improve long-term adherence to a healthy lifestyle in particular in regard to food intake should be developed.

Table 1. Outcome parameters

<table>
<thead>
<tr>
<th>Start programme</th>
<th>12 weeks</th>
<th>1 year</th>
<th>Signif. Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>1-2</td>
</tr>
<tr>
<td>weight (kg)</td>
<td>93.8</td>
<td>91.6</td>
<td>93.0</td>
</tr>
<tr>
<td>total cholesterol (mmol/l)</td>
<td>5.0</td>
<td>4.83</td>
<td>4.58</td>
</tr>
<tr>
<td>triglycerides (mmol/l)</td>
<td>2.05</td>
<td>2.17</td>
<td>2.02</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>7.2</td>
<td>7.0</td>
<td>6.86</td>
</tr>
<tr>
<td>exercise capacity (Watts)</td>
<td>115.2</td>
<td>123.6</td>
<td>127.7</td>
</tr>
<tr>
<td>step count / week</td>
<td>38’748</td>
<td>39’520</td>
<td>39’804</td>
</tr>
</tbody>
</table>

P316
Value of post-systolic motion index in detecting "silent heart risk" in diabetic patients
M Deljakic1, N Ilic1, M Zdarovkovic1, V Stosic1
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2Clinical Centre Brankovska kosa, Belgrade, Serbia

Topic: Diabetes
The aim of the study was to assess whether quantification of post-systolic motion index (PSMI), using pulsed wave Doppler myocardial imaging (PWI-DMI) during dobutamine echocardiography (DE), improves detection of myocardiial ischemia in diabetic patients (pts).

Methods: In the study group of 55 pts with type 2 diabetes and without symptoms of coronary artery disease, DE (from 5 up to 40 mcg/kg/min, plus atropine up to 1 mg, if needed) was performed. DE identified ischemia by the occurrence of wall-motion abnormality (WMA) and/or post-systolic motion (PSM) with stress. A 11-segments left ventricular (LV) model was utilised. At baseline and after DE in each adequately visualised LV segment, we have analysed the presence of PSM and from apical approach, we have measured peak myocardial velocity of systolic and PSM wave using PW DMI. PSM was assessed as followed: (peak S velocity at peak stress - peak velocity at peak stress) / peak velocity at peak stress.

Results: We have analysed 330 (87.6%) out of 382 possible LV segments. During DE 68 LV segments in 22 pts demonstrated WMA, while in 23 pts WMA did not appear. Out of 68 segments with DE provoked WMA, 36 (53.3%) were hypokinetic, 27(39.7%) were akinetik and 5(7.3%) were dyskinetic. PSM was present in all segments with DE induced WMA. Value of PSM was significantly lower in hypokinetic than in akinetik segments (0.21±0.04 vs 0.62±0.05, P=0.001) and in akinetik than dyskinetic segments (P<0.001). Out of 462 LV segments without WMA, in 14 segments (4 pts) occurrence of PSM after DE was detected. Value of PSM in those segments was 0.19±0.02 (range from 0.16 to 0.24) indicating the presence of unrecognised hypokinesia.

Conclusion: PSM is superior than WMA in detecting myocardial ischemia during DE. Quantification of PSM improves the detection and evaluation of the severity of "silent heart risk" in asymptomatic diabetic patients.

P317
Predictors of MACE in diabetic patients presenting with acute coronary syndromes
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Topic: Diabetes
Purpose: Diabetes are at increased risk of adverse events following acute coronary syndromes (ACS). The aim of our study was to characterise, among diabetic patients presenting with ACS, those who had major adverse cardiovascular events (MACE) within one year after hospital discharge and to determine independent predictors of MACE on follow-up.

Methods: Retrospective analysis of 412 consecutive diabetic patients hospitalised for ACS in a single centre. Patients were divided in 2 groups: those who had not (A, n=326) and those who had (B, n=84) MACE at one year follow-up. We use Cox-regression analysis to determine the independent predictors of MACE on follow-up.

Results: Group B patients presented more often with higher Killip classes, 3 vessel disease and had lower left ventricular ejection fraction. They were less often previously treated with statins, clopidogrel; they were also less frequently submitted to invasive strategy and rates of complete revascularisation were lower in this group. Group B had lower MACE free survival within all periods considered: one month, one year, and 18 months (p<0.001). Female gender, invasive strategy and BMI≥35.59 kg/m2 were independent protective factors of MACE at one month; LVEF≤51.5% was the independent predictor of MACE at 6 months, although previous treatment with statins and invasive strategy were protective factors; invasive strategy was also a protective factor of MACE at one year, whereas glycosia on admission; 130.5 mg/dl and LVEF<49.5% were the independent predictors of MACE at one year.

Conclusions: Absence of an invasive strategy was the most consistent predictor of MACE in all periods of follow-up considered. Moreover, systolic dysfunction was a powerful predictor of MACE, while statins prevented them. These data suggest that diabetes should not be denied of recommended cardiovascular interventions, especially if they have LV dysfunction.
Endothelial dysfunction in healthy first-degree relatives of subjects with type 2 diabetes is related to metabolic factors

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Purpose: To evaluate vascular reactivity in healthy first-degree relatives (FDRs) of type 2 diabetes (T2D) in the absence of concomitant metabolic disorder. Our hypothesis is that vasodilatory function of FDRs without metabolic disorders is similar to a control group without family history of T2D.

Methods: Biochemical tests (glucose, insulin, total cholesterol, LDL, and HDL, triglycerides, leptin and C-reactive protein) were conducted after 12 hours of fasting. An oral glucose tolerance test (OGTT) was performed on the same occasion; samples for glucose and insulin were drawn at 0, 30, 60, 90 and 120 min after ingestion of 75 g of dextrose. Area under the curve for OGTT and HOMA index were calculated. On a second day, vascular reactivity was assessed by forearm venous occlusion plethysmography before and after 5 min of circular arrest (reactive hyperemia) HR. Blood flow was determined as the area under the curve and conductance calculated as blood flow/mmHg arterial pressure.

Results: FDRs (n=42; 79% women; age 33 ± 9 years) and control group (CG; n=45; 78% women; age 34 ± 9 years) were similar for anthropometric and biochemical variables (P > 0.05) except for HOMA (FDRs: 1.25 ± 0.68; CG: 1.05 ± 0.71; P = 0.029), glucose at 90 min (FDRs: 91 ± 19; CG: 101 ± 25 mg/dL; P = 0.047) and 120 min (FDRs: 89 ± 17; CG: 94 ± 17 mg/dL; P = 0.044). No differences were found between groups for forearm blood flow before or during RH (P = 0.05) but conductance during RH was lower in FDRs (FDRs: 31.32 ± 6.72 ml/(%100mL/min/mmHg); P = 0.032) and inversely correlated with RH conductance (r = 0.27; P = 0.05). When data were re-analysed adjusting for the variables that were different between groups, no effect was observed for RH conductance.

Conclusion: In the absence of metabolic disorders, vascular reactivity of FDRs is similar to that of healthy controls. Thus, considering that FDRs have endothelial dysfunction, represented by diminished vasodilatory response during RH, the presence of metabolic disorders may be inadequate. Therefore, family history of type 2 Diabetes does not seem to be a risk factor per se for vascular dysfunction, but a consequence of metabolic disorders that are more common in these subjects.

Endothelial dysfunction and diabetes mellitus in a population without clinical atherosclerosis.

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Purpose: Endothelial dysfunction (ED) has been demonstrated in both type 1 (IDDM) and type 2 (NIDDM) diabetes and is an early predictor of coronary artery disease. We still know little about the prevalence of ED in a healthy population. The aim of our study was to find the prevalence of ED in diabetics without clinical manifestations of atherosclerosis, compared to healthy non-diabetics.

Methods: As part of the Nord-Trøndelag Health Survey 3, we measured endothelial function as FMD of the brachial artery in 4761 healthy adults. All had a brief interview with a physician who assessed family history of T2D.

Results: The prevalence of DM in our sample (1.5%) was lower than expected from the general population (3.2 %) (p < 0.001), indicating that a significant part of the diabetics in the population had established lifestyle manifestations of atherosclerosis and hence excluded from our study. Recent studies show that ED may precede the development of overt DM and that elevated fasting plasma glucose level is associated with impaired endothelial function and this may explain the lower FMD we found in diabetics.

Characteristics of sample

<table>
<thead>
<tr>
<th></th>
<th>Non-Diabetes (n=3424)</th>
<th>Diabetes (n=337)</th>
<th>IDDM (n=210)</th>
<th>NIDDM (n=127)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endothelial Dysfunction</td>
<td>781</td>
<td>18</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>n (total 799)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal endothelial function (n=6489)</td>
<td>3907</td>
<td>55</td>
<td>16</td>
<td>38</td>
</tr>
<tr>
<td>Mean FMD and (standard deviation)</td>
<td>4.9 (4.3)</td>
<td>3.5 (3.8)</td>
<td>3.4 (3.8)</td>
<td>3.6 (3.8)</td>
</tr>
<tr>
<td>Mean Age and (standard deviation)</td>
<td>49 (14)</td>
<td>59 (13)</td>
<td>47 (13)</td>
<td>64 (10)</td>
</tr>
</tbody>
</table>

Values during oral glucose tolerance testing (OGTT) are displayed as mean ± standard deviation.
Conclusion: discharge (TMI 2.5 and SEMI 2.2; p=0.4) or after 3 months (TMI 2.2 and SEMI 2.4; p=0.7).

IR did not differ between TMI- and SEMI-patients day 2 (3.3 and 2.8; p=0.6), at hospital testing in patients with myocardial infarction.

P323

The effect of reduction diet in obese patients with type 2 diabetes mellitus

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Topic: Diabetes

Introduction: insulin resistance is a state of impaired insulin action. The main cause is central obesity. Excess abdominal adipose tissue has been shown to release increased amounts of tumour necrosis factor a and free fatty acids, which directly affect insulin signaling, diminish glucose uptake in the muscle, drive exaggerated triglyceride synthesis and induce gluconeogenesis in the liver. These manifestations represent strong risk factors for diabetes mellitus type 2 in obese individuals. Life style changes (moderated weight and physical activity) decreased incidences of diabetes type 2.

Objective: the purpose of the study was to establish the effect of reduction diet on overweight, glucose concentrations and insulin secretion in obese patients.

Methods: we included 30 obese patients, who were treated on a Department for Internal Disease. Patients included in the study had the Body Mass Index > 30 kg/m2. They were treated with reduction diet, 1800 kcal/day and increased physical activity. After six months of treatment blood biochemistry was tested again and BMI was also determined.

Results: the study included 30 obese patients, 23 women (69%) and 7 men (21%), 52 years old (mean age). Mean weight was 94.7 kg, mean waist circumference was 111.5 cm. After treatment weight loss was 5.7 kg, mean waist circumference was 106.3 cm (p < 0.001). P-2 days were different before and after 6 months diet implementation. Percent changes of weight and waist circumference were - mean LDL cholesterol levels were - mean LDL cholesterol levels 4. 51±3.0 μmol/L, median cholesterol level 6. 98±2. 31±5.79, 1.89 mmol/L, serum triglycerides (mean) 3.8±2.0±1.52±2. 2.63±1.3±2.02.

Conclusion: dietary modification and life style changes may be the first therapeutic option in prevention of the diabetes mellitus type 2. Reduction diet produces beneficial changes in glycaemia control, and moderate weight, lipids and insulinaemia.

P324

Obesity and diabetes transition in elderly people of Southern Italy

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1Maugeri Foundation, Telese Terme, Italy, 1st School of medicine, 2University of Naples, Naples, Italy

Topic: Cardiovascular epidemiology

Obesity, diabetes and subsequent metabolic syndrome became pandemic in the last 20 years. Thus, epidemiological survey is extremely relevant in Western communities. It is well established the surveys of elderly people selected from Observatorio Geriatrico Campano and the Italian Project on Epidemiology of Alzheimer's disease (IPREA) both resident in Southern Italy. We investigated trends in BMI, WC and obesity as well as diabetes from 1992 to 2003. The Observatorio Geriatrico Campano is a longitudinal study enrolling a random sample of 1288 elderly subjects aged 65-90 years selected from the electoral rolls of Campania, and IPREA is a study investigating a random sample of 4800 elderly subjects aged 65-84 years selected from the registries of 12 Italian rural and urban municipalities. In both studies, we analyzed data derived from the same area of Southern Italy (Regione Campania) from 1288 subjects of the Observatorio Geriatrico Campano and 296 subjects enrolled in the IPREA. Notably, mean BMI increased from 25.5±3.3 to 27.6±3.8 in men and from 26.7±4.6 to 28.2±3.8 in women (each P<0.001). In men, the prevalence of obesity (defined as BMI≥30) and type II diabetes increased from 12.5% and 10.0%, respectively, in 1992 to 23.4% and 26.7%, respectively, in 2003 (each P<0.001). In women, the prevalence of obesity and type II diabetes increased from 17.2% and 15.4%, respectively, in 1992 to 36.8% and 23.7%, respectively, in 2003 (each P<0.001).

Accordingly, waist circumference increased over the time from 91.3±11.9 to 106.5±11.9 (P<0.001). Therefore, obesity and diabetes increased progressively of 50.3% and 53.9%, respectively, during the 1990s. Since there concerning increased trends, both preventive and effective treatment strategies are necessary to decrease pandemic obesity and diabetes in elderly people resident in Southern Italy albeit mediterranean diet which often excels in carbohydrates and unsaturated lipids.

P325

Is a unified definition of metabolic syndrome needed? Comparison of three definitions of metabolic syndrome in 60-year-old men and women

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Topic: Cardiovascular epidemiology

Purpose: there are three commonly used definitions of the metabolic syndrome: European Group for the Study of Insulin Resistance (EGIR), International Diabetes Federation (IDF) and National Cholesterol Education Programme Adult Treatment Panel III (ATP). The prevalence of metabolic syndrome differs depending on the definition used and reflects the fact that different definitions regard a specific characteristic the dominant cause. EGIR regards insulin resistance, whereas the IDF definition regards waist circumference essential. Hence, the prevalence of the metabolic syndrome in different populations is solely dependent on the prevalence of these basic characteristics - relevant or not. There are also gender differences and morbidity as well as mortality of the metabolic syndrome is higher in women by all three metabolic syndrome definitions. The aim of this paper was to study agreement in prevalence of the metabolic syndrome defined by EGIR, IDF and ATP definitions in Swedish men and women, and to analyse definition and gender differences in associations between metabolic syndrome and metabolic, socio-economic and lifestyle factors.

Methods: a population-based cross-sectional study of a total of 4232 participants, 2109 men and 2193 women, aged 60 years was utilised. Medical history, socio-economic and lifestyle data were collected by a questionnaire. A medical examination including laboratory tests was performed. Significant factors for the metabolic syndrome were calculated by logistic regression.

Results: forty-five percent of men and 30% of women met the criteria for the metabolic syndrome by at least one of the three definitions. The highest agreement was found between IDF and ATP definition. There were many gender differences, however, two significant associations were identified in both men and women by all three metabolic syndrome definitions: former smokers were highly associated with the metabolic syndrome (Odd Ratio (OR) 4.5) and regular physical activity (OR 40.6) were inversely associated with the metabolic syndrome.

Conclusion: the metabolic syndrome definitions identified different individuals as having the metabolic syndrome. This affects the reliability of interpretations to be made from scientific studies. Unified criteria taking into account the effects of physical activity are warranted. Clinicians facing physically inactive former smokers may consider diagnosing metabolic syndrome.
Post acute myocardial infarction outcome: admission glycaemia says it all

**Population and methods:** The series included 381 patients (199 men and 182 women; median age 66 years; age range 50-86 years) with a mean duration of diabetes of 9 (SD 8) years. Standard physical examinations and laboratory tests were administered to all patients. Modified National Cholesterol Education Program III criteria for defining MS were used. High-sensitivity CRP was estimated by immunoturbidimetry and other laboratory tests using standard methods.

**Results:** hs-CRP significantly positively correlated (Spearman's correlation) with body mass index and waist size, fasting plasma triglyceride levels, apo-B, HDL, insulin resistance (evaluated by homeostasis assessment model), and fibrinogen, negatively with HDL-cholesterol. However only waist (r=0.001), fibrinogen (r=0.001), apo-B (r=0.01) and GMT levels (r=0.05) appeared to be associated with hs-CRP in multiple regression model analyses. Diabetic patients with MS (n=305, 80%) had significantly higher hs-CRP level (3.8, SD 3.2) than diabetics without MS (2.5 mg/L, SD 2.2; p <0.001). Hypertriglyceridemic waist (i.e. TG>1.7 mmol/L; OR=1.5, 1.0-2.5) and waist >88 cm in men >102 cm and in women >89 cm (OR=2.5, 1.4-4.2) appeared to be a major independent factor for an increased hs-CRP≥5mg/L. (Multiple logistic regression: step-wise model).

**Conclusions:** The hypertriglyceridemic waist contributes to the MS and is most likely an important factor resulting in an increase in hs-CRP levels and consequently, relative coronary risk in patients with type 2 diabetes of any age and sex.

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**Topic:** Risk factors and risk prediction

**Purpose and Objectives:** Combined cardiovascular disease (CVD) risk factors lead to multiplied rather than additive CVD risk. Despite a variety of screening tools available for identifying subjects at risk, the majority of subjects with hypertension and dyslipidemia remain unidentified and those who are diagnosed are often poorly treated. We examined the CVD risk factor profile and medication for CVD among middle-aged subjects with new-onset diabetes mellitus (DM), identified in a screening-project.

**Methods:** In the population-based MalMiN Preventive Project Re-examination Study (n=18,280, 2002-2006), 316 subjects (mean age 68.3±6.1 years, 77% men) were diagnosed with previously unidentified DM. We compared the CVD risk factor profile in subjects with and without current prescription medication for CVD or CVD risk factors (drugs used for treating high blood pressure (BP), lipid lowering or anti-platelet drugs).

**Results:** Among the 316 subjects, 169 (53.5%) were prescribed drugs for CVD or CVD risk factors. 76.3% of the treated subjects vs 79.6% of the untreated subjects (p=0.3) had at least three uncontrolled CVD risk factors (hyper tension, dyslipidemia, overweight/obesity, current smoking or insufficient physical activity). 73.8% of the treated subjects and 80.1% of the untreated subjects had uncontrolled hypertension (>140 mmHg systolic and/or >90 mmHg diastolic BP). There was no difference in systolic BP between treated and untreated subjects (133.6 vs 134.4 mmHg, p=0.7), adjusted for age and sex. 93.5% of the treated subjects were overweight or obese (waist circumference ≥102 cm [men] or ≥88 cm [women] or BMI ≥25 kg/m2) compared to 89.5% of the untreated subjects (p=0.1). Total cholesterol (5.5 vs 6.4 mmol/L, p<0.0001) and LDL (2.0 vs 2.3 mmol/L, p<0.0001) were lower in the treated subjects. The percentages of current smokers (20.7 vs 19.7%, p=0.3) and subjects reporting physical inactivity (20.8 vs 20.7%, p=0.9) were similar in the treated and untreated subjects.

**Conclusions:** Despite current prescription medication for CVD or CVD risk factors, indicating established physician contact, the overwhelming majority of subjects with new-onset DM had multiple other risk factors for CVD that were not better controlled than in subjects with new-onset DM who were without an established physician contact. With the exception of better controlled dyslipidemia, subjects receiving treatment had uncontrolled hypertension, were overweight, smoked and reported lower levels of physical activity to the same extent as the ones not receiving treatment. These results indicate poor adherence to guidelines for CVD prevention.

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**Topic:** Biomarkers

**Purpose:** High sensitivity C-reactive protein (hs-CRP) is considered as an important biomarker of systemic inflammation and a cardiovascular risk predictor. We studied how increased hs-CRP contributes to the cardiovascular risk of patients with type 2 diabetes with or without concomitant metabolic syndrome (MS).

**Methods:** The series included 381 patients (199 men and 182 women; median age 66 years; age range 50-86 years) with a mean duration of diabetes of 9 (SD 8) years. Standard physical examinations and laboratory tests were administered to all patients. Modified National Cholesterol Education Program III criteria for defining MS were used. High-sensitivity CRP was estimated by immunoturbidimetry and other laboratory tests using standard methods.

**Results:** hs-CRP significantly positively correlated (Spearman's correlation) with body mass index and waist size, fasting plasma triglyceride levels, apo-B, HDL, insulin resistance (evaluated by homeostasis assessment model), and fibrinogen, negatively with HDL-cholesterol. However only waist (r=0.001), fibrinogen (r=0.001), apo-B (r=0.01) and GMT levels (r=0.05) appeared to be associated with hs-CRP in multiple regression model analyses. Diabetic patients with MS (n=305, 80%) had significantly higher hs-CRP level (3.8, SD 3.2) than diabetics without MS (2.5 mg/L, SD 2.2; p <0.001). Hypertriglyceridemic waist (i.e. TG>1.7 mmol/L; OR=1.5, 1.0-2.5) and waist >88 cm in men >102 cm and in women >89 cm (OR=2.5, 1.4-4.2) appeared to be a major independent factor for an increased hs-CRP≥5mg/L. (Multiple logistic regression: step-wise model).

**Conclusions:** The hypertriglyceridemic waist contributes to the MS and is most likely an important factor resulting in an increase in hs-CRP levels and consequently, relative coronary risk in patients with type 2 diabetes of any age and sex.
Changes induced by the programme

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal</th>
<th>Obese</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
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</thead>
<tbody>
<tr>
<td>Body Mass Index</td>
<td>21±1.8</td>
<td>21±2.0**</td>
<td>28±1.3</td>
<td>25±1.6*</td>
<td>31±2.4</td>
<td>29±2.5**</td>
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<td>BMI (kg/m²)</td>
<td>20.8±4</td>
<td>17.6±5.8***</td>
<td>89.2±8</td>
<td>83±6.7**</td>
<td>105±14</td>
<td>95±12***</td>
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<tr>
<td>Systolic Blood</td>
<td>151±5.1</td>
<td>134±5.1</td>
<td>181±1.2</td>
<td>151±11*</td>
<td>133±12</td>
<td>130±16</td>
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<tr>
<td>Diastolic Blood</td>
<td>82.6±5</td>
<td>70±7.9</td>
<td>78±8.9</td>
<td>73±8.4**</td>
<td>84±9.4</td>
<td>80±9.3**</td>
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<td>Pressure (BP) (mmHg)</td>
<td>120±7.6</td>
<td>96±7.2*</td>
<td>72±6.9</td>
<td>67±4.1*</td>
<td>71±6.1</td>
<td>66±9.3</td>
<td>65±8.7</td>
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<tr>
<td>Heart Rate (bpm)</td>
<td>62±5.9</td>
<td>59±5.9</td>
<td>58±5.8</td>
<td>55±5.8**</td>
<td>54±5.9</td>
<td>52±5.9*</td>
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<tr>
<td>Glucose (µg/mL)</td>
<td>14.5±6.8</td>
<td>13±3.7*</td>
<td>17±12</td>
<td>10±5.5**</td>
<td>26±17</td>
<td>13±6.6***</td>
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<tr>
<td>Insulin (µU/mL)</td>
<td>11.5±6.4</td>
<td>11.3±3.0</td>
<td>10.5±1.2</td>
<td>10±1.2</td>
<td>13±0.4</td>
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<td>2h Glucose (mg/dL)</td>
<td>77±3.8</td>
<td>68±6.1</td>
<td>66±8.1</td>
<td>61±3.9</td>
<td>67±10.7</td>
<td>74±14**</td>
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<tr>
<td>2h Insulin (µU/mL)</td>
<td>130±63</td>
<td>134±61</td>
<td>202±140</td>
<td>130±65*</td>
<td>303±209</td>
<td>162±61*</td>
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<tr>
<td>HOMA-β</td>
<td>0.124±0.04</td>
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<tr>
<td>VO2max (ml/kg/min)</td>
<td>38.6±4.9</td>
<td>39.6±4.9</td>
<td>40.6±4.9</td>
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<tr>
<td>% Body Fat (%)</td>
<td>19.7±3.5</td>
<td>17.1±3.5</td>
<td>25±6.3</td>
<td>20±2.2*</td>
<td>27±1.3</td>
<td>23±2.3*</td>
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<tr>
<td>Iris the Criterion (ADMA/Urinary Creatinine)</td>
<td>0.81±0.10</td>
<td>0.81±0.10</td>
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</tbody>
</table>

Values are means±SD. Pre/post differences p<0.001***, p<0.01**, p<0.05*.

P331 Impaired regenerative capacity of circulating endothelial progenitor cells and vascular dysfunction as an early stage of atherosclerosis in obese children

R Hoelfigl1, S Erbl1, A Linske1, D Friebe2, W Kiess2, C Walther1, G Schuler1, A Kuznek1
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Topic: Obesity

The rising prevalence of obesity in childhood precedes the development of atherosclerosis and the increased incidence of cardiovascular diseases in adulthood. Moreover, coronary artery disease (CAD) and classical risk factors for CAD are known to be associated with an impaired regenerative capacity of circulating endothelial progenitor cells (EPCs) and vascular dysfunction. Therefore, the aim of the present study was to evaluate whether obese children (compared to lean controls) are characterised by vascular damages and altered regenerative capacity of EPCs as an early indicator of developing atherosclerosis.

Methods: In 66 obese (11.9±2.5 years of age, BMI-SDS 2.1±0.52) and 64 lean control children (12.4±3.2 years of age, BMI-SDS 0.3±0.6) insulin sensitivity was evaluated by oral glucose tolerance testing (OGTT). Peripheral flow-mediated dilatation (FMD) and intima media thickness (IMT) of the carotid artery were assessed as measures of vascular integrity.

Results: In obese children the number of EPCs was significantly reduced compared to lean children (535±15,800 cells/µl, blood, p<0.05) and correlated inversely with BMI-SDS (r=−0.26, p<0.05). The migratory capacity of EPCs appeared mildly reduced in obese children but without statistical significance.

Moreover, obese children showed a significantly reduced FMD compared to lean children (reactive hyperaemia index 1.3±0.3 vs. 2±0.8, p<0.05) and a gain in IMT (0.4±0.1 mm vs. 0.3±0.1 mm in lean, p<0.05). Already in childhood, obesity was accompanied by an impaired insulin sensitivity (serum insulin in OGTT after 120 min: 633±56 pmol/L, in obese vs. 26±37 pmol/L in lean, p<0.05).

Conclusion: In childhood, obesity is associated with an impaired regenerative capacity and evidence of endothelial dysfunction. These early alterations may in part contribute to the pathomechanism of cardiovascular sequelae of obesity.

P332 The relationship between overweight and obesity and blood pressure levels. The results of WOBASZ Study

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Topic: Obesity

Objectives: the relationship between overweight and obesity, and hypertension (HT) occurrence.

Materials and methods: data comes from The Multicentre All-Polish Health Survey (WOBASZ Project) carried out from 2003 to 2005. Into analysis included 12382 people (5964 men and 6418 women) who were not hypertension treated. BMl index and waist were used to determine overweight and obesity. The use of logistic regression model allowed to estimate of predictive value of BMl and waist (AUC) on HT occurrence. The BMI and waist cut-off points, that allow classification to the proper HT group with biggest specificity and sensitivity, were determined using receiver operating curves and Youden criteria.

Results: average SBP and DBP grow together with the level of obesity. The HT frequency grows in conjunction with BMI and came to be 20.3% in men and 9% in women, within normal weight group, 52% and 54% within obesity group and also according to waist was 24.5% in men and 10.5% in women with correct waist and 48.4% and 32.6% with incorrect waist. Together grow of BMI and waist, grows the percent with mild, moderate, and hard HT. The most common category of blood pressure in men and women with obesity is high-normal blood pressure and mild HT. The waist has better prediction on HT occurrence. AUC estimated for waist was about 10% bigger than estimated for BMI index for men and women. The best cut-off points for BMI were: 26.5 m in 24.4 m, and for waist, adequately, 93.0 and 86.0 cm.

Conclusions: the HT frequency grows with incorrect parameters describing overweight and obesity. The most common type of HT in people with incorrect body weight is mild HT. Waist has bigger predictive value on HT occurrence. The threat of HT occurs within the groups with lower than or so far established obesity norms.

P333 CD34 positive cells are associated with endurance performance, not with percentage body fat in obese children and adolescents

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1 German Sport University, Cologne, Germany, 2 University of Cologne, Cologne, Germany

Topic: Obesity

Juvenile obesity is paralleled by cardiovascular risk factors. In adults cardiovascular risk factors and obesity are associated with a decreased number of endothelial progenitor cells (EPC). In contrast, a higher physical fitness seems to correlate with a lower cardiovascular morbidity and mortality. Little is known about the association between body composition, endurance performance, and EPCs in obese children and adolescents. The aim of this cross-sectional study is to analyse possible correlations.

Method: CD34 positive and KDR/Flk1, CD34, CD133/c-kit, and CD117/CD34 double positive progenitor cells were measured by fluorescence activated cell sorting (FACS) in peripheral blood of obese children and adolescents (12 female; age: 13.5±1.9 years, height: 1.5±0.12 m, weight 81.5±23.1 kg, BMI 30.6±3.4 kg/m², waist 95.3±18.2 cm, body fat 25.3±2.0%) participating in the CHILT III programme. Percentage body fat was assessed by skinfold thickness. Maximal relative oxygen uptake (VO2max in ml/kg/min) was registered via spirometry. Statistical analyses were performed with Spearman correlation.

Results: There were no gender differences in all parameters. Mean VO2max was 22.6±5.1 ml/kg/min. Only CD34 positive cells did correlate with VO2max (r=0.703, p<0.005), while no correlations were found between parameters of body composition and double positive progenitor cells.

Conclusion: A higher endurance performance, but not less body fat, is associated with a higher number of CD34 positive cells. These findings indicate that circulating progenitor cells may serve as markers for cardiovascular risk even in children and adolescents with obesity, and support that physical fitness and cardiovascular risk in high-risk populations are inversely related. Additional research in larger populations is warranted to clarify the strength of this association and longitudinal effects of a multicomponent obesity programme.

Abstracts S67
Background: Though increased BMI represents a risk factor for developing heart failure, in heart failure patients it paradoxically increases survival. This effect wasn’t studied until now, in relationship with BNP and ACE mutations, especially DEI.

Methods: there were studied 50 patients (p), aged 64.96±13.24 years, 68% men, and 32% women, with chronic stable heart failure, functional class NYHA III and IV. We determined BNP in all patients, ACE genetic mutation using PCR method, and also the plasmatic levels of BNP fragment (8-29), using the ELISA method, in all patients.

Results: mean plasmatic BNP was 1591.62±1088.96 pg/ml and BMI 29.09±7.59 kg/m² with a strong negative correlation between the two parameters (r= 0.40). The correlation was stronger in women (r = 0.79), than in men (r = 0.32) and it was absent for the patients with BMI between 25-30 kg/m² (r = 0.08), being in turn registered in both normal weight (r = 0.67) and obese (r = 0.81) patients. This results in a significant higher plasmatic level of BNP in non-obese (2140.72±866.36 pg/ml) in comparison with obese (1547.74±1135.24pg/ml) patients (p =0.05). The explanation could be that BNP is cleared by Np receptor - NPR-C- and destroyed by neutral endopeptidase, both abundantly secreted by human adipocytes. Consequently, the plasmatic level of BNP could be decreased, even if the BNP secretion is high. The distribution of ACE mutation was as follows: DD allele - 36% (18p), II allele -24% (12p), and ID allele- 40% (28p), but without significant differences of the BNP levels in the three groups, independently of body weight-table.

Conclusion: in heart failure patients, there is an inverse correlation between BNP fragment plasmatic value and BMI, obese patients having the lowest BNP values, but the relationship is not influenced by ACE polymorphism.

Central fat is more important than total body fat in the assessment of cardiac autonomic nervous function in obese and overweight girls.

Method: The sample was constituted by 24 young obese women (BMI: 33.4 ± 7.14 kg/m²) from 18-24 years of age (21.4 ± 1.2 years), students of the West University Timisoara, Romania. VO2 peak was determined after performing a maximal cardiopulmonary exercise test (breathe by breath device) with individualized ramp protocols on bicycle ergometer. Multifrequency segmental impedance device was used to analyse body composition. VO2peak (ml/min/ kg) was compared with, body fat mass (BFM, kg), visceral fat area (VFA, cm²), fat free mass (FFM, kg) and skeletal muscle mass (SMM, kg) using Pearson’s correlation test (p<0.05).

Results: There were negative significant correlations between VO2peak and BMI (r=-0.79, p<0.0001) and between VO2peak and VFA (r=-0.74, p<0.0001). However, no significant correlation was found between VO2peak and lean body mass (FFM and SMM). Nevertheless, we found a poor correlation between “aerobic muscle quality” (VO2peak/SMM - amount of oxygen consumed per skeletal muscle mass) and BFM (r=-0.35, p=0.035). Conclusions: In young obese women a higher BFM and its central distribution (VFA) leads to reduced VO2peak. Despite of a greater amount of FFM and SMM, we found no relations with VO2peak which may indicate that in young obese women we have a decreased skeletal muscle performance. The low VO2peak/SMM results indicate a poor muscle quality and can be related to lean body mass training. Therefore, in evaluating the effects of body composition variables on VO2 peak in young obese women, the fat indicators should be taken into consideration and cardiorespiratory fitness should be interpreted in terms of kilogram of body fat mass and its distribution, not in terms of lean body mass.
Caffeine increases systolic and mean blood pressure as well as total peripheral resistance and decreases arterial compliance in habitual users at commonly consumed doses (1-2 cups of tea or coffee).

Method:
Twelve participants (10 female; mean age 36 years) abstained from food and drink, except water, for 2 hours before testing. A 96s continuous recording of the finger pulse wave was made with Finometer in the supine posture prior to ingestion of a caffeine capsule and at 30 and 60 minutes after ingestion in a double-blind, placebo controlled repeated measures design. The mean baseline change from the baseline caffeine was compared with placebo using the related samples t-test (parametric distributions) or Wilcoxon test. If the mean baseline change was not significant then the maximum baseline change was compared with placebo.

Results:
Caffeine exhibited a dose dependent biphasic profile across a number of cardiovascular parameters—see table.

Conclusion:
Caffeine ingestion by habitual users at levels commonly consumed in 1-2 cups of tea or coffee (the preferred consumer level) is vasoactive increasing both systolic and mean blood pressure as well as total peripheral resistance and decreasing arterial compliance. The significant changes occurred at either 67 and 133mg and not 200mg. These results do not support the adenosine tolerance theory or the accepted log S dose response curve as many parameters exhibit a biphasic response. These results have implications for hydrometric testing when carried out in the presence of caffeine.

Mean change in parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline (Mean ± SD)</th>
<th>Caffeine 67mg (Mean ± SD)</th>
<th>Caffeine 133mg (Mean ± SD)</th>
<th>Caffeine 200mg (Mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean arterial pressure</td>
<td>121 ± 19</td>
<td>123 ± 21</td>
<td>126 ± 23</td>
<td>130 ± 25</td>
</tr>
<tr>
<td>Systolic pressure</td>
<td>127 ± 20</td>
<td>130 ± 22</td>
<td>133 ± 24</td>
<td>136 ± 26</td>
</tr>
<tr>
<td>Diastolic pressure</td>
<td>79 ± 14</td>
<td>81 ± 15</td>
<td>84 ± 17</td>
<td>87 ± 19</td>
</tr>
</tbody>
</table>

SP: systolic blood pressure (mmHg), MP: mean blood pressure (mmHg), TPR: total peripheral resistance (μM), AC: arterial compliance (μM), SD: standard deviation, p.p. value, d/Cohen’s d(pooled), α/0.05, ‘A’/Wilcoxon, ‘≥’/maximum.

P339
The trends of dietary cholesterol intake and its food sources among workers and farmers aged 35-59 in early 1980s to late 1990s
L Zhao, J Hu, R Zheng, X Tian, F Ren, Y Wu
Cardiovascular Institute and Fu Wai Hospital, Beijing, China, People’s Republic of, 2Ningxia Medical University, Yinchuan, China, People’s Republic of, 3Shougang Hospital, Peking University, Beijing, China, People’s Republic of, 4Beijing University, Beijing, China, People’s Republic of, 5Peking University, Beijing, China, People’s Republic of

Topic: Nutrition

Objective:
To find the trend and status of dietary cholesterol intake and its food sources from the early 1980s to the late 1990s among workers and farmers in Beijing.

Methods:
Dietary intake of adults and urban farmers and rural farmers aged 35-59 in Beijing were obtained with 24-hr recalls over 3 consecutive days in 1983-84, 1993-94 and 1998. A total of 483, 587 and 203 participants were surveyed in each of the three surveys, respectively.

Results:
Average dietary cholesterol intake was 284mg, 342mg and 399mg for workers and 173mg, 277mg and 457mg for farmers in 1983-84, 1993-94 and 1998, respectively, which was significantly increased (both P values for trend <0.05). Dietary cholesterol and its increasing mostly came from eggs and meat products (table). Although the average amount of organ meats intake was increased 3.5g/d for workers and 4.2g/d for farmers between 1983-84 and 1998, it also had an important influence on increasing of dietary cholesterol intake.

Conclusion:
From the early 1980s to the late 1990s, the dietary cholesterol intake was significantly increased among workers and farmers in Beijing. The amount of eggs intake should be limited moderately and the other animal products, including the kinds and amount, should be selected carefully to reduce cholesterol intake and keep healthy diet.

Changes of cholesterol intake by foods

<table>
<thead>
<tr>
<th>Food</th>
<th>1983-84 (mg)</th>
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<th>Change</th>
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<th>1998 (mg)</th>
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<td>16.3</td>
<td>-13.7</td>
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<td>Organs meat</td>
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<td>132.0</td>
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P340
Dietary intake of long chain n-3 fatty acids and cardiovascular events in patients with coronary artery disease
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Topic: Nutrition

Objective:
Several, but not all, prospective cohort studies in the general population and randomized controlled trials in patients with cardiovascular disease (CVD) have found an inverse association between long chain n-3 fatty acid intake and risk of CVD and mortality. Few studies have been able to investigate the clinical effect of long chain n-3 fatty acid intake of patients diagnosed with coronary artery disease (CAD) treated with lipid lowering therapy.

Subjects and Methods:
This was a prospective cohort study nested in a vitamin supplementation trial (the Western Norway B-vitamin Intervention Trial) in 3000 patients (85% stable angina) who underwent a diagnostic coronary angiography at baseline. Diet was assessed by a 169 item quantitative food frequency questionnaire (FFQ) on their baseline visit and was returned by 80.4% of the patients. The primary endpoint was a composite of all cause death, non-fatal acute myocardial infarction (AMI), acute hospitalisation for unstable angina pectoris, and non-fatal thrombembolic stroke. Secondary endpoints included the components of the primary endpoint and angiographic progression of atherosclerosis in patients with unstable angina. Cox proportional hazards were used to estimate survival by quartiles of long chain n-3 fatty acid intake as a percentage of total energy intakes.

Results:
The mean age of the participants was 61.7 years, 80.5% were male and 89% used statins. Median length of follow-up was 38.4 (19.3-55.0) months. Mean long chain n-3 fatty acid intake in quartile 1 was 0.58 ± 0.29, 0.83 ± 0.30, 1.36 ± 0.44, and 2.64 ± 1.79 gms, respectively. A total of 312 patients had an event in the primary endpoint. For the primary and secondary endpoints apart from mortality and progression of atherosclerosis, we found a moderate but non-significant increased age and sex adjusted risk of about 20% among patients in the lowest quartile compared with the other quartiles, with no clear difference in risk between other quartiles. Multivariable adjustment did not change the result.

Conclusion:
In patients with usually stable coronary artery disease treated with cholesterol lowering statins, low intake of long chain n-3 fatty acids may be associated with a modest increased risk of subsequent CVD events with no apparent effect on atherosclerosis progression.

P341
Exclusive olive oil consumption is associated with lower likelihood of developing left ventricular systolic dysfunction in acute coronary syndrome patients: a case-control study
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Topic: Nutrition

Background:
The aim of the present work was to evaluate the association between exclusive olive oil consumption and the development of left ventricular systolic dysfunction (LVSD) in patients who had had an ACS.

Methods:
During 2006-2007, 144 male (65.1% 12 years) and 50 female (74.1% 12 years) post-ACS patients who developed LVSD (ejection fraction <0.50) after the acute event and 129 males (64.1% 12 years) and 51 females (67.1% 12 years) post-ACS patients without LVSD (ejection fraction ≥0.50), were included in the study. Participants were age and sex matched and consequently selected. Detailed information regarding their medical records, socio-demographic, anthropometric data, and various psychological, and lifestyle characteristics (physical activity, smoking habits etc) were recorded. Particularly, nutritional habits, including chronic olive oil use in daily cooking, as well as other added lipids, were evaluated using a semi-quantitative food-frequency questionnaire.

Results:
68% of the cases and 78% of the controls reported exclusive olive oil consumption (p=0.03). Exclusive olive oil consumption was associated with lower likelihood of developing LVSD (p=0.05). However, a significant interaction was observed between olive oil intake and physical activity status (p<0.05). Thus, multi-adjusted analysis revealed that exclusive olive oil consumption in physically active post-ACS patients was associated with 62% (95% CI 0.15-0.98) lower likelihood of developing LVSD, after adjusting for various confounders. No significant association was observed among sedentary participants.

Conclusion:
Exclusive, chronic olive oil consumption seems to offer significant protection against the development of LVSD in post-ACS patients, who were physically active.
Influence of short-term fish eating on lipid, fibrinolytic, and rheological parameters in healthy subjects

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Topic: Nutrition

Introduction: Fish intake has long been indicated as a protective dietary factor for cardiovascular diseases, due to the beneficial effects of its content of omega-3 polyunsaturated fatty acids (EPA and DHA). However, the mechanisms underlying this protection have not been fully elucidated. Aim of this study was to evaluate the influence of short-term dietary intake of fish on biomarkers related to atherothrombotic process.

Materials and methods: Period for a period of 10 weeks, 10 healthy subjects (6 males; 4 females) with a mean age of 48 years consumed during their main meals contents of about 300 g per week of tuna (Thunnus thynnus). Guidelines were given to cook both dorsal and ventral samples: 2h in microwave oven, then add salt and/or olive oil. Lipid (total cholesterol, HDL-cholesterol, LDL-cholesterol and triglycerides), fibrinolytic [t-PA (tissue plasminogen activator), PAI-1 (plasminogen activator inhibitor-1), t-PA/PAI-1], thrombolytic (circulating plasminogen activator inhibitor-2 (PAI-2), tissue factor pathway inhibitor (TAFI)), and haemato logical parameters (white blood cell count, plasma viscosity (PV), erythrocyte filtration rate (EFR)) were determined in samples obtained at the beginning (T0) and at the end of the experimental period (T1).

Results: Lipid profile showed a significant improvement at the end of the dietary intervention, as seen by lower levels of total cholesterol [T1: (202.2 ± 49.5 mg/dL; p < 0.01)]. LDL-cholesterol [T1: (125.8 ± 40.9 mg/dL; p < 0.01)]. HDL-cholesterol [T1: (40.2 ± 20.1 mg/dL; p < 0.01)]. and triglycerides [T1: (183.7 ± 40.2 mg/dL; T0: (312.1 ± 57.8 mg/dL); p < 0.001] and triglycerides [T1: (183.7 ± 40.2 mg/dL; T0: (312.1 ± 57.8 mg/dL); p < 0.001]. With regard to haemato logical parameters, a significant [p < 0.001] improvement of WBV in both highest and lowest shear rates was reported (WBV 94.5800 sec-1: 4.3 ± 0.2 vs. 4.5 ± 0.4; WBV 0.612 sec-1: 201.2 ± 22.8 vs. 218.4 ± 25.3, for T1 and T0, respectively). Moreover, interestingly, as regarding fibrinolytic parameters, dietary intervention with fish reported a significant increase of PLT: [T1: (57.7 ± 9.5 min.) vs. T0 (47.1 ± 14.7 min.); p < 0.05], possibly determined by the concomitant increase of PAI-1: [T0: (20.8 ± 20.5 mg/dL; T1: (56.1 ± 13.6 mg/dL); p < 0.01].

Conclusions: dietary short-term intake of fish seems to impose favourable biochemical changes in healthy subjects, as showed by lipid and haemato logical parameters. An impaired fibrinolysis has been otherwise reported at the end of the dietary intervention.
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Validation of a fat/sugar/fruit/vegetable nutrition screener in a cardiac rehabilitation setting

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Topic: Nutrition

Objectives: brief dietary questionnaires are needed to guide patient education and outcome evaluation in Cardiac Rehabilitation (CR); there is a lack of validated questionnaires appropriate for CR settings. A new 50-item brief Block Fat/Sugar/Fruit/Vegetable Screener (Screener) that generates estimates for saturated fat (SF), trans fat (TF), total sugar (TS), fruits (F) and vegetables (V), has been developed but not yet validated. The purpose of the present study was to evaluate the reliability and validity of the Screener when compared to the FFQ and to 24-hour dietary recalls.

Methods: participants recruited from a regional CR centre were asked to complete the Screener and a modified version of the FFQ at baseline (T1) and 2 weeks later (T2). A total of 53 participants (50%) were also randomly selected to complete 24-hour dietary recalls. Test-retest reliability was evaluated by computing Pearson correlation coefficients between nutrient scores from the Screener administered at T1 and T2. Statistically significant correlations were found for all nutrient categories. Pearson correlations ranged from .56 for vegetables and .74 for trans fat, with a mean of .66. Construct validity was evaluated by comparing the average of the 24-hour recalls to the average of the 2 Screener administrations. Statistically significant correlation coefficients were found for all nutrients. Deattenuated Pearson correlations ranged from .42 for trans fat to .92 for total sugar, with a mean of .62. Predictive validity was evaluated by comparing the scores obtained from the Screener at T1 and the FFQ at T2. Statistically significant correlations were found for all nutrient categories. Pearson correlations ranged from .44 for trans fat to .58 for saturated fat, with a mean of .54.

Conclusions: results of this study support both the reliability and validity of the Block Screener, showing it to be a quick and useful dietary assessment tool appropriate for clinical settings. Future validation studies of this instrument might consider administering the questionnaire before or after an intervention phase (e.g., CR) to minimise the chances of deliberate dietary modifications between questionnaire administrations. Moreover, validation of the Screener in other settings would be valuable.

P347

Fish consumption is associated with lower likelihood of developing left ventricular systolic dysfunction, in acute coronary syndrome patients: a case-control study

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Topic: Nutrition

Background: Acute coronary syndromes (ACS) represent the most common form of atherosclerotic disease, while in a remarkable percentage can lead to the development of heart failure. The aim of the present work was to evaluate the association between fish consumption and the development of left ventricular systolic dysfunction in patients who had had ACS.

Methods: During 2006-2007, 144 male (65 years) and 50 female (71±12 years) ACS patients who developed systolic dysfunction after the cardiac event and 129 males (64±12 years) and 51 females (67±10 years) with preserved systolic function, were included in the study. Participants were age and sex matched and consequently selected. Detailed information regarding their medical records, anthropometric data, physical activity and smoking habits were recorded.

Nutritional habits were evaluated using a semi-quantitative food-frequency questionnaire.

Results: Moderate consumption of fish (1.2-3 times/week) was reported by 58.8% of patients who preserved left ventricular ejection function and by 47.4% of patients who developed systolic dysfunction. Multivariate analysis revealed that moderate fish consumption was associated with 74% (95% CI 0.57-0.93) lower likelihood of developing left ventricular systolic dysfunction, compared to never consumption, after various adjustments. Furthermore, moderate fish consumption was associated with lower values of the endogenous nitric oxide synthase inhibitor asymmetric dimethylarginine (p=0.09) and oxidised LDL cholesterol (p=0.06), in patients who did not develop left ventricular systolic dysfunction.

Conclusion: Moderate fish consumption seems to offer significant protection against the development of systolic dysfunction in post ACS patients, merely attributed to its beneficial effect on oxidation process and endothelium function.

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Association of metabolic syndrome and plasma homocystein

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2Republic of

Topic: Metabolism

Early detection of asymptomatic cardiovascular disease in post ACS patients, merely attributed to its beneficial effect on oxidation process and endothelium function.

Methods: participants recruited from a regional CR centre were asked to complete the Screener and a modified version of the FFQ at baseline (T1) and 2 weeks later (T2). A total of 53 participants (50%) were also randomly selected to complete 24-hour dietary recalls. Test-retest reliability was evaluated by computing Pearson correlation coefficients between nutrient scores from the Screener administered at T1 and T2. Statistically significant correlations were found for all nutrient categories. Pearson correlations ranged from .56 for vegetables and .74 for trans fat, with a mean of .66. Construct validity was evaluated by comparing the average of the 24-hour recalls to the average of the 2 Screener administrations. Statistically significant correlation coefficients were found for all nutrients. Deattenuated Pearson correlations ranged from .42 for trans fat to .92 for total sugar, with a mean of .62. Predictive validity was evaluated by comparing the scores obtained from the Screener at T1 and the FFQ at T2. Statistically significant correlations were found for all nutrient categories. Pearson correlations ranged from .44 for trans fat to .58 for saturated fat, with a mean of .54.

Conclusions: results of this study support both the reliability and validity of the Block Screener, showing it to be a quick and useful dietary assessment tool appropriate for clinical settings. Future validation studies of this instrument might consider administering the questionnaire before or after an intervention phase (e.g., CR) to minimise the chances of deliberate dietary modifications between questionnaire administrations. Moreover, validation of the Screener in other settings would be valuable.

P347

Fish consumption is associated with lower likelihood of developing left ventricular systolic dysfunction, in acute coronary syndrome patients: a case-control study

D B Demetropoulos1, P Paapitakto1, M Kastoria2, C Chrysohoou1, P Aggelopoulou1, J Kechagia1, E Skoumas1, E Stefanadis1
1Harokopio University, Athens, Greece, 2Athens, Greece

Topic: Nutrition

Background: Acute coronary syndromes (ACS) represent the most common form of atherosclerotic disease, while in a remarkable percentage can lead to the development of heart failure. The aim of the present work was to evaluate the association between fish consumption and the develop-

Results:

The prevalence of metabolic syndrome was 18.7%: Total homocysteine was significantly higher in metabolic syndrome group than control group (P < 0.01). Total homocystein was significantly correlated with all components of metabolic syndrome. The prevalence of meta-

Conclusions:

Metabolic syndrome is associated with homocystein. Further studies with longi-

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Sudden unexpected cardiac death in a teenager due to arrhythmogenic right ventricular dysplasia

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Topic: Sports cardiology

Background: arrhythmogenic right ventricular dysplasia (ARVD) is a poorly understood and often undiagnosed disorder of the right ventricle, characterised by replacement of myoc-

Methods: a 13-year old boy collapsed suddenly on April 30, 2007 shortly after football training. Cardiopulmonary resuscitation was started with delay at a local hospital but did not gave any effect. He was a well-trained boy who participated in football training 3 times a week and in light athletics training 4 times a week. The medical history from health records since 1993 documented recurrent infections with a moderate frequency. Also, the boy had not experienced any vyncopes. Family history did not reveal any cases of sudden death in young age. In January 2007 he underwent complex screening of his heart status that included physical evaluation, anthropological measurements, spirometry and ECG - exercise test. The results of the studies were within normal limits, the level of his exercise capacity was very high (4.1 watts per kg) and no contra-indications were established to training and competitive participation. Inveresed T-waves were present in ECG leads V1-V4. Results: the autopsy revealed the following: heart size 10 x 8.5 x 5 cm, heart weight 250 g; elastic myocardium and myocardial cross-section reddish-brown, numerous diffusely located fibrotic foci present, largely subepicardial, 0.8 x 0.8 x 0.6 cm in size, observed in both ventricles, moderately enlarged right ventricle; wall thickness of left ventricle 1.4 cm and wall thickness of right ventricle 0.5 cm; myocardial wall slightly thinned. The coronary arteries arose normally, without atheroslerotic changes.

According to morphological changes in the myocardium it is possible to conclude that the cause of myocardial fibrosis corresponds to ARVD.

Conclusions: clinicians must become more familiar with ARVD, a potentially fatal cardiac disorder that can create vulnerability within a young adult population. It is mandatory to follow the generally acceptable preparticipation screening protocol in young athletes. Also, coaches, supplied with defibrillator, have to aquire relevant knowledge and skills of resuscitation.
Risk Factors for acute cardiac events in sport: a case control study

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Topic: Sports cardiology
Objective: In spite of the benefits of physical activity, exercise may provoke acute cardiac events in susceptible individuals. Understanding risk factors of exercise-related acute cardiac events may identify opportunities for prevention.

Methods: A case-control study was conducted to study determinants of acute cardiac events in athletes. The cases were athletes who suffered an acute cardiac event during or shortly after vigorous exercise. Athletes who visited a hospital because of a minor sports injury were selected as controls. Information on cardiovascular disease, family history of cardiovascular disease, cardiovascular symptoms and other potential risk factors was collected through questionnaires.

Results: 57 cases and 57 controls were included in the study. Athletes with a history of cardiovascular disease were at a markedly increased risk for cardiac events during exercise (OR=32, 95% CI 4.1-143). Smoking (OR=5.9, 95% CI 1.9-18), fatigue (OR=12, 95% CI 1.2-118) and influenza-like symptoms (OR=13, 95% CI 1.4-131) in the month preceding the event were related to acute cardiac events in athletes.

Conclusions: Known cardiovascular disease, smoking and a recent episode of fatigue or influenza are associated with an increased risk of acute cardiac events in athletes. Sports physicians and athletes should pay careful attention when these factors exist or occur.

Former elite athletes have a higher prevalence for atrial fibrillation at the age of over 50 years

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Topic: Sports cardiology
Purpose and objective: It is well documented that, due to an optimised arteriovenous oxygen difference and increases of left ventricular volume, stroke volume and diastolic filling, regular physical activity supports the ability to remain fit beyond the age of 50 years. A coexisting atrial fibrillation impairs these effects. The causes of lone atrial fibrillation often remain unknown. It may be relevant to the differential diagnosis of athlete’s heart and hypertrophic cardiomyopathy. In our case we have found that even a markedly asymmetric hypertrophy could revert with deconditioning guiding us to think that it could be an unusual adaptation to exercise.

Methods: We enclosed 21 former top level handball and soccer players (1st German league) in our screening programme for athletes (age 55.5 ± 3.1 years). All of them were supposed to be healthy. None of them complained about palpitations. Besides history taking and physical examination all individuals had 12-lead ECG. Conventional echocardiography was performed according to the ASE guidelines. Stress test was done by spiroergometry.

Results: In all former elite athletes atrial systolic function was normal and no structural heart disease was found. The mean left ventricular enddiastolic index was 27.3 ± 3.1 mm/m². Diameter of the left atrium was 37.3 ± 3.3 mm. Exercise testing showed a peak oxygen consumption of 33.2 ± 3.8 ml/kg/min representing an average predicted peak oxygen consumption of 114 % (min 71 %, max 134 %). Five athletes had persistent atrial fibrillation (23.8 %), 2 had documented intermittent atrial fibrillation (9.5 %).

Conclusion: Regular physical activity (soccer and handball) on a high level at young age might predispose to atrial fibrillation at higher age in otherwise healthy individuals. Regular physical activity supports the maintenance of a high maximum oxygen uptake and reduces cardiac discomfort like palpitations and shortness of breath during atrial fibrillation. Further trials should evaluate the presented data.
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The ventricular function response to a sporadic exercise in sedentary subjects

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Topic: Sports cardiology

Background: The exercise effects on cardiac function in athletes were been the aim of so many studies before, revealed significant changes in the left ventricular (LV) systolic and diastolic function. However, it remains unknown this response in non-athletic subjects.

Objectives: To determinate the effects of moderate sporadic exercise in sedentary adults we studied 16 subjects before and immediately following a seven-socer by an echocardiographic study as usual LV, mitral annulus systolic and diastolic function.

Methodology: Nineteen sedentary males (age range 25-56 years) were exercised in a play football match. Heart rate, arterial pressure, body mass, abdominal perimeter and biochemical parameters were recorded. ECG was performed. All subjects were performed a complete echocardiography study before and immediately after the soccer match, which include left ventricular end-diastolic and systolic diameters (LVEDD, LVEDS), end-diastolic volume (LVEDV), ejection fraction (EF) by biplane Simpson’s method and Tissue Doppler image for the lateral mitral annulus to obtain the diastolic filling trough the ratio E/e.

Results: Ventricular diameters (LVEDD 50.18 ± 4.8 cm vs 49.3 ± 3.9 cm, p=0.01, LVEDS 31.6 ± 4.5 cm vs 30.9 ± 2.2 cm, p=0.05) and EF (63 ± 9.5% vs 64 ± 7.6%, p=0.05) did not change pre and post match. E/e ratio were unchanged as well (46 ± 15.5 vs 42 ± 13.3, p=0.05). There was a significantly decrease in LVEDV (115 ± 28 vs 101 ± 24 mL, p=0.01), nevertheless without alterations in the other parameters, probably in relation with a decrease in the preload produced by the dehydration. No significant differences were found in regional or global systolic parameters.

Conclusions: Moderate sporadic exercise in non-active subjects is not associated with left ventricular systolic or diastolic changes.

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Response of specific cardiac markers after a soccer match in non-trained subjects

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Topic: Sports cardiology

Background: N-terminal pro brain natriuretic peptide (NT-proBNP) and cardiac troponin T are good markers of wall stress and myocardial injury. Their capacity to predict potential injury in subjects with cardiopathy is well known. The elevation of these biochemical parameters it has been related to strenuous exercise in competitive athletes, with an unclear meaning. The data of cardiac injury seem greater in less active subjects. The behaviour of these specific parameters of the heart in non-active subjects who make sporadic exercise has been less studied.

Objective: To evaluate the response of troponin T and NT-proBNP in non-active subjects after a soccer-soccer match.

Methods: Sixteen sedentary males (age range 25-56 years) were exercised in a play football match. Heart rate, arterial pressure, body mass, abdominal perimeter were recorded. ECG was performed. Blood samples were collected from each subject before and immediately after the soccer match. Levels of NT-proBNP, cardiac troponin T, creatinine kinase, lactacid, urea and creatinine were measured.

Results: Six of 16 participants (37.5%) showed NT-proBNP levels above upper reference limits (84 ng/L) after the match. NT-proBNP concentrations increased from 67 (SD 11.8) to 75.4 (SD 17.9) ng/L (p=0.01) after the exercise. Levels of cardiac troponin T were undetectable in all participants. Creatinine kinase and its MB fraction were increased post-match, 125.7±53.4 to 226.9±99 (p=0.01) and 14.2±3.9 to 21.6±4.8 (p=0.05) respectively. NT-proBNP was not related to exercise-induced increases in creatinine kinase or in MB fraction. Significant (p<0.05) increases in urea, creatinine and lactate were found.

Conclusions: Moderate sporadic exercise in non-active subjects is linked to a modest increment in levels of NT-proBNP, without an elevation of cardiac troponin, which can expose a physiological process.

Cardiovascular rehabilitation

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Gender differences after a myocardial infarction

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Topic: Cardiovascular rehabilitation

Purpose: It is well known that there is a lot of gender differences in patients with ischemic cardiomyopathy, in terms of its pathophysiology, its clinical evolution and also in the diagnostic and therapeutic approaches. We tried to determinate if there were also gender differences in the evolution and response to the cardiac rehabilitation programme (CRP) of our hospital.

Methods: For that purpose, we retrospectively studied all the patients included in our CRP diagnosed with ischemic cardiomyopathy from May 2006 to March 2008. We analysed the following variables: age, sex, presentation of the disease (ST elevation ACS, non-ST elevation ACS and stable angina), readmissions and fulfillment of the programme.

Results: We studied 349 patients (86.8% were men). Mean age was 55 years for men and 56 years for women. According to the presentation of the ACS, 50% of the women had a STEMI and 50% a non-Q-wave MI and 12% instable angina. 42% of the women had a readmission due to a cardiovascular event, while only 18.5% of the men did (p=0.01). 50% of the women needed a new percutaneous coronary intervention compared to 10% of the men (p=0.01) . When we evaluated the fulfillment of the CRP, we found that 94.5% of the men adhered to it while only 67% of the women did (p=0.01). At one-year follow-up, 70% of the men kept on exercising as they were taught in our CRP compared to only 40% of the women (p=0.01).

Conclusions: Moderate sporadic exercise in non-active subjects is associated with left ventricular systolic or diastolic changes.
**Results:** Twelve studies met the inclusion criteria. The majority of studies recruited a lower risk patient following an acute myocardial infarction (MI) and revascularisation. There was no difference in outcomes between centre-based and home-based rehabilitation in mortality (relative risk [RR] = 1.31; 95% CI: 0.65 to 2.63), cardiac events, exercise capacity (SMD = -0.01; 95% CI: 0.33 to 0.11), as well as in modifiable risk factors (systolic blood pressure; weighted mean difference [WMD] = -0.51 mmHg; 95% CI: -4.63 to 3.61), diastolic blood pressure: WMD = 1.86 mmHg; 95% CI: 0.74 to 2.97; total cholesterol: WMD = 0.23 mmol/L; 95% CI: 0.01 to 0.44; HDL- cholesterol: WMD = -0.06 mmol/L; 95% CI: -0.11 to -0.02; LDL-cholesterol: WMD = 0.15 mmol/L; 95% CI: -0.03 to 0.41) or proportion of smokers at follow-up (RR = 1.02; 95% CI: 0.76 to 1.37), or health-related quality of life. There was no consistent difference in the healthcare costs of the two forms of cardiac rehabilitation.

**Conclusions:** Home- and centre-based cardiac rehabilitation appear to be equally effective in improving the clinical and health-related quality of life outcomes in acute MI and revascularisation patients. This finding together with an absence of evidence of difference in patient adherence and healthcare costs between the two approaches supports the further provision of home-based cardiac rehabilitation programmes such as the Heart Manual. The choice of participating in a more traditional supervised centre-based or home-based programme should reflect the preference of the individual patient.

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**Effects of phase II cardiac rehabilitation programme on daily physical activity levels of coronary artery disease patients**

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**Topic:** Cardiovascular rehabilitation

**Objective:** To assess the effects of a phase II CRP on the daily PA levels of CAD patients.

**Methods:** Thirty-seven consecutive patients with recent history of first MI (70.7±12 yrs; 29 male; 92.1±7 yrs; BMI: 26.3±4.3 kg/m2; body fat: 30.0±7.6% at baseline and after the intervention period, there were no significant changes on BMI, body composition and Environment temperatures were 30 and 34°C, respectively. It was collected demographic data, type of cardiac disease, functional status and clinical evolution, cardiovascular risk factors, motivation/life style changes, complications and mortality.

**Conclusions:** Phase II cardiac rehabilitation programme enhances exercise capacity and circulatory power in coronary artery disease patients.

**P561**

**Aquatic cardiac rehabilitation: a reality with future**

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1Santa Maria Da Feira, Portugal

**Topic:** Cardiovascular rehabilitation

**Purpose:** Cardiac rehabilitation is the leading cause of death worldwide and also in Portugal. Cardiac rehabilitation is defined by the “American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR)” as: “coordinated, multifaceted interventions designed to optimise a cardiac patient’s physical, psychological, and social functioning, in addition to stabilising, slowing, or even reversing the progression of the underlying atherosclerotic processes, thereby reducing morbidity and mortality”.

**Objective:** The purpose of this study is to present an aquatic cardiac rehabilitation programme as a valid instrument to reach this purpose, because they offer a safe, individually adaptable exercise, with a single potential of changing life styles. With this work the authors intend to present their experience in aquatic cardiac rehabilitation.

**Methods:** Retrospective study of the group of all patients doing aquatic cardiac rehabilitation stages II and III in the Rehabilitation Department, between January 2003 and December 2007. Each session, with 7 to 10 patients, lasted for up to 60 minutes, two days a week, for periods of 12 to 16 weeks in stage II, and fortnightly, followed by monthly for 12 weeks in stage III. The water and environment temperatures were 30 and 34°C, respectively. It was collected demographic data, type of cardiac disease, functional status and clinical evolution, cardiovascular risk factors, motivation/life style changes, complications and mortality.

**Results:** Were included 66 patients, 84% men, with ages ranging from 35 to 65 years old. All patients had to moderate risk cardiac disease (AACVPR), a minimum functional capacity of 4 METS and had already fulfilled terrestrial cardiac rehabilitation stage II. The majority had multiple cardiovascular risk factors and coronary disease (with surgery percutaneous coronary revascularisation), some with heart failure, valvular heart disease and other comorbidities. All patients had functional capacity and cardiac efficiency increases and symptoms, signals, cardiovascular risk factors, depression reductions, with psychosocial well being and without major or minor complications.

**Conclusions:** Security and effectiveness of aquatic cardiac rehabilitation were evident in all patients. There were no complications.
P362
Exposure of increased venous return and enhanced preload during 8 weeks of hydrotherapy are well tolerated by patients with chronic heart failure
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Topic: Cardiovascular rehabilitation

Purpose: Exercise is a well-known cardiovascular protective factor in patients with heart failure. Consequently, it is of importance to offer suitable methods to achieve optimal individual physical performance. Exercise in a thermoneutral warm (34°C) water pool could be appropriate for elderly patients with heart failure who find it difficult to exercise on land. However, concerns have been raised about its safety because of increases in venous return and volume. The aim of this study was to investigate, with echocardiographic and cardiopulmonary exercise test, the consequence of hydrostatic induced hypervolemia after 8 weeks of hydrotherapy two times weekly.

Hypothesis: function, volumes, systemic vascular resistance and cardiopulmonary exercise test were studied.

Methods: Twelve patients, 5 women, (age 69±2 years, peak VO2 14.7±3.5 ml/kg/min, BNP 169±33 ng/L, LVEF 32±6%) participated in three observed sessions: baseline (A), after 8 weeks without exercise (B) and additionally after 8 weeks of hydrotherapy (C).

Results: The favorable effect of warm water immersion was observed in all three sessions; both SVR and HR decreased and CO increased. There were no signs of changes in volumes or peak VO2 after 8 weeks of repeated hydrotherapy (see table 1).

Conclusion: We can conclude that warm water immersion is a safe and beneficial method to be used during physical training and rehabilitation of stable heart failure patients.

Table 1.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR (bpm) land</td>
<td>70±13</td>
<td>73±11</td>
<td>67±14</td>
</tr>
<tr>
<td>HR (bpm) WWI</td>
<td>21±6**</td>
<td>20±4**</td>
<td>19±4**</td>
</tr>
<tr>
<td>SVR (mHg) land</td>
<td>212±40</td>
<td>114±40</td>
<td>110±40</td>
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<tr>
<td>SVR (mHg) WWI</td>
<td>131±20</td>
<td>145±26*</td>
<td>142±24*</td>
</tr>
<tr>
<td>SVR (mHg) WWI</td>
<td>30±7</td>
<td>30±7</td>
<td>30±7</td>
</tr>
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<td>SVR (mHg) WWI</td>
<td>21±5**</td>
<td>23±5**</td>
<td>22±5**</td>
</tr>
<tr>
<td>CO (L/min) land</td>
<td>3.4±0.9</td>
<td>3.1±0.6</td>
<td>3.0±0.7</td>
</tr>
<tr>
<td>CO (L/min) WWI</td>
<td>4.1±0.6**</td>
<td>3.9±0.7**</td>
<td>4.0±0.7**</td>
</tr>
<tr>
<td>Max power (watt)</td>
<td>83±31</td>
<td>85±36</td>
<td>92±37</td>
</tr>
<tr>
<td>Peak VO2 (ml/kg/min)</td>
<td>14±3.6</td>
<td>15±3.5</td>
<td>14±4.2</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.001, land vs WWI; CO, cardiac output; LVEDV, left ventricular end-diastolic volume; RU, resistant unit; SVR, systemic vascular resistance; WWI, warm water immersion.

P363
Evaluation of the impact of the long-term complex rehabilitation in patients with chronic heart failure
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1Institute of Medicine, Gothenburg, Sweden, 2Institute of Neuroscience, Physiology/Physiother., Gothenburg, Sweden

Topic: Cardiovascular rehabilitation

Introduction: Patients with chronic heart failure (CHF) are characterised by several respiratory, cardiac remodeling, neurohumoral abnormalities that are associated with their quality of life and post-prognosis. In the study we investigate the effects of long-term complex rehabilitation in CHF patients.

Methods: 103 stable with CHF BIV-NYHA patients (94 Male/9 Female; 49.6±18.3 yrs) participated in long-term rehabilitation programs for 6 months, 3 times/week. All participants performed 6 minutes walk test (6 MWT), two-dimensional Doppler echocardiography, spirometry. Neurohumoral parameters (blood cortisol concentration) was assessed before and after 6-month rehabilitation. They practiced 6-months-6-monthly lifestyle modification, cardiovascular risk factors correction and exercise programmes. 31 patients were included as controls and used only drug treatment without rehabilitation complex programmes.

Results: for 6 months exercise capacity and respiratory data were statistically significantly (p<0.05) improved in rehabilitation group: peak oxygen uptake (VO2peak) increased from 14.7±2.9 to 15.6±5.6 ml/kg/min, gas exchange ratio RQ from 0.99±0.07 to 1.0±0.56. The two-dimensional echocardiographic findings also revealed significant (p<0.05) improvement in rehabilitation group: increased left ventricular (LV) ejection fraction (21.4±7.3% to 28.7±5.7±6%), decreased left atrium diameter (57.3±9.55 to 53.5±13.2 cm), LV end-diastolic diameter (67.0±11.20 to 67.0±11.20) and LV end-systolic volume (196.0±83.33 to 181.2±41.33 ml).

We found no positive changes of these instrumental findings in controls, and the augmentation in left ventricular group appeared to be significant (p<0.05). Morning and afternoon blood cortisol concentration did not change in the both group (401±1.17±1.1 to 355±1.6±0.33 nm), proving long-term internal sympathetic activity in patients with CHF.

Conclusion: Long-term complex rehabilitation prevention is effective and workable method improving left ventricular systolic function, respiratory efficiency attenuating abnormal remodelling, adding a further beneficial effect of long-term complex rehabilitation in patients with CHF.

P364
Combined whole body endurance/inspiratory muscle training improves exercise capacity and pulmonary function in patients with ventricular assist devices
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Topic: Cardiovascular rehabilitation

Purpose: although patients with ventricular assist devices (VAD) are increasing and they tend to stay longer on mechanical support, only few studies on the effects of physical training have been performed. We prospectively investigated the effects of a combined whole body endurance/inspiratory muscle training programme in patients with VAD.

Methods: seven patients (n=7), mean age 36.4±17.5 yrs, with left ventricular assist device (LVAD, n=3) or biventricular assist device (BiVAD, n=4) were studied. Patients were implanted with VAD due to end-stage heart failure, as a bridge to heart transplantation. They entered the exercise training programme 7±4.5 months post-VAD implantation and after they had reached a steady condition. Patients exercised at home using a bike, at moderate intensity (12-14) according to Borg scale (6-20) for dyspnea, 3±5week for 10 weeks. Inspiratory muscle training was performed in parallel and involved training at 60% of sustained maximal inspiratory pressure (SPmaxa) to exhaustion, 2week for 10 weeks using designed-purpose software with an electronic pressure transducer, at the hospital, on a regular out-patient basis. Pre- and post-training, exercise capacity was evaluated using treadmill cardiopulmonary exercise testing and 6-min walk test (6MWT).

Results: SPmaxa was assessed by the Borg scale (6-20) at the end of the 6MWT, while pulmonary function was evaluated by spirometry.

Conclusion: both combined whole body endurance/inspiratory muscle training was safe and resulted in improvement of both pulmonary function and exercise capacity in patients implanted with a ventricular assist device. Further studies on the effects of physical training in this population are needed.

P365
Heart rate dynamics during a treadmill cardiopulmonary exercise test in heart transplantation patients.
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Topic: Cardiovascular rehabilitation

Background: Calculating the maximum heart rate for age is one method to characterise the maximum effort of an individual.

 Aim: The aim of this study was to evaluate heart rate dynamics (basal, peak and % predicted heart rate for age) in heart transplantation patients optimised beta-blockaded heart failure patients during a treadmill cardiopulmonary exercise test.

Methods: Twenty-one (91% male, 46±12 years) sedentary heart failure patients and 15 (47% male, 46±13 years) sedentary heart transplantation patients performed a treadmill cardiopulmonary exercise test between 10:00 a.m. and 3:00 p.m. Heart failure optimisation was considered 50% of age’s maximal effort or ≤11 months for heart transplantation patients.

Results: Basal heart rate was lower in heart failure patients (58±1 bpm) compared to heart transplantation (91±11 bpm; p<0.0001). Similarly, the peak heart rate (% maximum predicted for age) was lower in heart failure patients (80±13%) compared to heart transplantation (80±12; p<0.0001). Maximum respiratory exchange ratio (1.05±0.06 to heart failure and 1.1±0.3 to heart transplantation patients; p<0.008) was considered 50% of age’s maximal effort or ≤11 months for heart transplantation patients.

Conclusion: No patient reached the maximum heart rate predicted for age during a treadmill cardiopulmonary exercise test. Heart rate reserve was similar between groups. A heart rate increase in heart transplantation patients during cardiopulmonary exercise test over 80% of the maximum age-adjusted value should be considered an effort near the maximum.
P366

Info to the patients: an unresolved matter.
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Topic: Cardiovascular rehabilitation

Reduction in the average stay of the patient admitted to hospital suffering an ACS due, on the one hand, to early recanalization and on the other, to the assistance demand, has caused the patient not to be aware, in many cases, neither of the disease he is suffering, nor the procedures which have been performed on and not even of secondary prevention measures he would have to comply after being discharged.

Objective: studying the level of knowledge patient’s have about their condition after being discharged.

Method: patients attending first visit of our cardiac rehabilitation programme (CRP), after their admission due to ACS, were requested to answer 5 uncomplicated questions: 1) Do you know what has happened to you? 2) Have you read the discharge report? a) if you have, have you understood it? 3) The doctor who discharged you, how long did it take to him to explain you the treatment? 4) Were you explained about the diet you should follow? 5) Were you explained about the kind of physical activity you should carry out?

Results: from January to April 2008, 60 patients filled the questionnaire. Question number 1 received 35% of affirmative answers; 70% question number 2 and 8.3% question number 2.a.; 35% question number 4. 9% question number 5. The average time to explain the treatment was 15 minutes.

Conclusion: results points to the fact that actual information provided to the patients about their condition is insufficient. Taking into account that the main goal in the management of ischemic cardiopathy once established, is secondary prevention, it proves crucial to improve educational interventions on the patients and their families.

P367

Hostility, coping, social support and self-efficacy in adherence to cardiac rehabilitation programme
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Topic: Cardiovascular rehabilitation

Objective: to explore the predictive and discriminative ability of hostility, coping, perceived social support and self-efficacy, on different patterns of adherence to the cardiac rehabilitation programme (CRP).

Materials and Methods: using a cross-sectional and comparative design, we evaluated 112 myocardial infarction (MI) survivor patients, referred for CRP from January 2005 through December 2007. The patients were divided into three groups according to their pattern of adherence to CRP: “begin and finish” (Group I), “begin and no finish” (Group II) and “never begin” (Group III). Measurement instruments used were: Hostility sub-scale of Aggression Questionnaire (Buss and Perry, 1992), Coping Strategies Questionnaire (Rodolfo Guass-Mariñé, et al. 1992), Social Support Scale (Dunn, et al, 1978), all of them validated for Venezuelan population, and Programmed Physical Activity and Daily Physical Activity sub-scale of Self-efficacy for Weight Control Inventory (Romí, et al, 2007).

Results: Discriminative analysis revealed that problem-focused coping, perceived social support and self-efficacy, both programmed as daily, were significant for discriminating groups according to their pattern of adherence to the CRP, while the variables hostility and emotional coping, were not significant to explain the difference between the groups.

Conclusion: Hostility is a variable associated to cardiovascular disease but not relate to the adherence behavior; rather, different levels of problem-focused coping, perceived social support and self-efficacy, both programmed as daily, predicted belonging to the group.

P368

Effects of cardiac rehabilitation in Germany: metaanalysis of the effects from national and international trials
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1University Medical Centre Freiburg, Freiburg, Germany, 2University of Lubeck, Lubeck, Germany

Topic: Cardiovascular rehabilitation

In Germany, cardiac rehab is mostly provided on an in-patient basis over 3 weeks. Evidence for this kind of health care is poor, due to the focus on observational cohort studies only. Reliable evidence for the effectiveness of cardiac rehab is solely available from international randomised controlled trials, and applies to outpatient programmes lasting 6 to 12 weeks or longer. We conducted a systematic search for relevant German studies (1990-2004) using electronic data bases, hand search, and postal questionnaires. International studies were selected from recent metaanalyses. Effect sizes were computed for national studies and international treatments and controls separately. In the following, medium-term (12 months) results for lipids, blood pressure, psychological status, and cardiac mortality are presented. 77 national cohort studies were identified. Table 1 shows the effect sizes for selected endpoints. Except for HDL, cholesterol that showed stronger effect sizes in the national studies, no statistically significant differences as to lipids were found. For blood pressure the effect sizes differ significantly with lower effect sizes in the national studies. Effect sizes for depression and anxiety in the national studies are lower compared to international intervention groups. Post results as to blood pressure control in Germany are well known from other research. But lower effect sizes for changes in depression and anxiety as German cardiac rehab trials have not been reported so far. It seems likely that short-term programmes are less effective than interventions lasting for six weeks or longer. Further analyses will be conducted with special attention to modifying variables such as age, gender, and programme duration.

Table 1

<table>
<thead>
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<th>Endpoints</th>
<th>National intervention</th>
<th>International intervention</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol</td>
<td>0.29</td>
<td>0.57</td>
<td>0.19</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>0.59</td>
<td>0.13</td>
<td>0.12</td>
</tr>
<tr>
<td>LDL cholesterol</td>
<td>0.54</td>
<td>0.60</td>
<td>0.45</td>
</tr>
<tr>
<td>RR systolic</td>
<td>-0.36</td>
<td>0.14</td>
<td>-0.12</td>
</tr>
<tr>
<td>RR diastolic</td>
<td>-0.43</td>
<td>0.10</td>
<td>-0.20</td>
</tr>
<tr>
<td>Depression</td>
<td>0.11</td>
<td>0.32</td>
<td>0.26</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.05</td>
<td>0.48</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Effect sizes for selected endpoints

P369

Is a 3 week period of cardiac rehabilitation enough to improve endothelial function? C Cossutti1,2, F Guerrero2, C Gossaing1,2, C Cornilly3, J Munteanu2
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Topic: Cardiovascular rehabilitation

Endothelium is involved in different cardiovascular diseases as it has various regulating effects on vasomotion, tissue perfusion, haemostasis and thrombosis. Exercise training is known to have beneficial effects on endothelial function and consequently on heart failure, hypertension and atherosclerosis. Cardiac rehabilitation is therefore particularly recommended after cardiac surgery, myocardial infarction or in patients with heart failure. We sought to evaluate the effect of a 3 weeks rehabilitation period on endothelium-dependent vasomotion in cutaneous microcirculation.

Methods: we assessed endothelium-dependent vasodilation in cutaneous microcirculation in patients (pts) who underwent a programme of cardiac rehabilitation after coronary artery bypass grafting (CABG) and/or valvular surgery, or after a myocardial infarction. Reactive hyperemia was measured in the cutaneous microcirculation of the arm by Laser Doppler before and at the end of the programme. Peak VO2 was also determined before and after rehabilitation.

Results: the study population included 22 pts (18 men, mean age 60.6±12.7 years). Indication of rehabilitation was CABG in 6 pts, valvular surgery in 4 pts CABG and valvular surgery in 2 pts and myocardial infarction in 10 pts. Mean left ventricular ejection fraction was 57±12%. Mean body mass index was 27.5±7.4 kg/m2. LDL cholesterol was 0.9±0.3g/L. 30% of patients were smokers. Rehabilitation was not associated with a significant improvement of perfusion in reactive hyperemia: 40.5±23 perfusion units (PU) before to 44±27 PU after rehabilitation, p=0.6. However, time to return to baseline perfusion after hyperemia, improved significantly: from 40±19 to 32±18 sec, p=0.04. Peak VO2 improved from 29.4±1 to 21.6±1 ml/min/kg, p=0.05. However no correlation was found between Peak VO2 improvement and response to hyperemia.

Conclusion: a 3 week period of cardiac rehabilitation does not improve significantly reactive hyperemia measured in the cutaneous circulation by Laser Doppler in our study population. Other parameters seem however to improve. A longer period is probably needed for a significant improvement in endothelial function which should lead to encourage patients to continue exercise training after rehabilitation.
A short moderate intensity cardiac rehabilitation programme does not influence exercise capacity, diastolic function or NT-proBNP serum levels - preliminary results of a randomised clinical study

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Topic: Cardiovascular rehabilitation

Purpose: To investigate the impact of a short course (8 weeks), moderate intensity Cardiac Rehabilitation Programme (CRP) on exercise capacity, N-Terminal Pro-B-Type Natriuretic Peptide (NT-proBNP) serum levels and echocardiographic indices of diastolic function in patients discharged from hospital after an acute coronary syndrome (ACS).

Methods: Fifty-four patients discharged after an ACS were randomised to an 8-week CRP group (R; n=31; 67% males; mean age 57 years) or to a standard care group (N; n=23; 78% males; mean age 57 years) on an outpatient basis. Echocardiography and cardiopulmonary exercise test along with NT-proBNP measurements were performed before and after 8 weeks. Evolution of the different parameters of exercise capacity, ventricular function and NT-proBNP serum levels in the two groups was analysed.

Results: At randomisation, mean left ventricular ejection fraction (EF) was 54.2±8.9% in group R and 49.6±10.5% in group N. After the CRP, group R patients did not show any significant improvement in peak oxygen consumption (ΔVO2 peak ±1.62 ±0.45 ml/kg/min in group R vs. 0.31±1.40 ml/kg/min in group N; p=0.105) or exercise duration (ED) (ΔED±39.71 sec in group R vs. 29.85 sec in group N; p=0.200 when compared with group N patients. However, in overweight patients (BMI>25kg/m²) the differences became more pronounced, showing a strong tendency towards a better exercise capacity in group R (ΔVO2peak ±1.51±3.52 ml/kg/min in group R vs. ±1.11±4.51 ml/kg/min in group N; p=0.052). There were no significant differences between the two groups on left atrial volume index (LAVI (ΔLAVI±1.41±3.93 ml/m² in group R vs ±0.34±2 ml/kg/min in group N; p=0.542) and E/E' ratio (ΔE/E'; ratio ±0.59±2.14 in group R vs ±0.5±3.57 in group N; p=0.951). NT-proBNP significantly decreased in both groups but this reduction was not significantly different (ΔNT-proBNP±13.0±2.56 pg/ml in group R vs ±32.1±4.04 pg/ml in group N; p=0.13).

Conclusions: In our population, an 8 week CRP did not significantly affect exercise capacity, diastolic function or NT-proBNP. However, at 8-week, we can observe a slight trend towards a better exercise capacity in overweight patients submitted to CRP. The limited duration of the programme and the "low" exercise loads applied may have accounted for these results. More advanced and prolonged comprehensive CR programmes are probably needed to obtain an impact on atrial remodelling, parameters of diastolic function and NT-proBNP serum levels.

Effects of mixed aerobic and strength training programme on aerobic capacity in patients with stable coronary artery disease

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Topic: Cardiovascular rehabilitation

Exercise for patients with coronary artery disease (CAD) should include both aerobic and strength training to provide optimal improvements of overall physical fitness. The purpose of this pilot study was to test whether our progressive mixed aerobic and strength training programme (MST) for 21 weeks for stable CAD patients is safe, and whether it improves exercise capacity.

Methods: The patients participated in a pre-study clinical exercise test to exclude individuals with high-risk for cardiac complications. ECG was monitored using a new wireless monitoring system during training. Patients with CAD were randomised in exercise (EX: n=12, 79±19 yrs, BMI 27±1±3) and control (CONT; n=11, 63±18 yrs, BMI 27±1±4) groups. Coronary artery stenosis (30-90%) was diagnosed with coronary angiography. The EX group performed progress- ive MST training twice a week for 21 weeks. Every training session included indoor cycling with the intensity of 50-75% of heart rate reserve for 20 minutes and strengthening exercises for lower body muscle groups including leg press at the intensity of 50-70% of 1RM. Peak VO2 was measured using symptom limited exercise test. Isometric knee extension strength and chest press were measured. Statistical analyses were performed by the Intention-to-treat 'analysis and time by group interaction (IA) was analysed using repeated measures analysis of variance.

Results: At baseline the groups did not differ from each other. The EX group completed in average 36 of 42 training sessions (97%); range 60-100%). During the first 12 weeks, VO2peak increased by 7.3% (203±18 vs. 219±17 ml/kg/min; p<0.01). The duration of the maximal exercise test increased by 17.04% (11.1±5.9 vs. 13.3±1.3 min; p=0.001) and maximal workload by 10.4% (175±41 vs. 192±53 W) in EX group compared to the changes of -4.3±5% (p=0.025), 0.1±2% (IA p=0.033) and 3.4% (IA p=0.017) in CONT group, respectively. Isometric knee extension strength increased by 20.5% (545±179 vs. 645±189 N) in EX group compared to the increase by 10.3% in the controls (IA p=0.03) during the whole treatment period. At week 12 onwards serum glucose and lipid values improved significantly in EX group compared to CONT group.

Conclusions: This study showed that aerobic capacity improved significantly after 12 weeks of MST in EX group. The improvements in muscle strength and serum glucose and lipid values appeared during the latter half of the 21-week programme. Regular and progressive MST only twice a week is safe for cardiac patients and it improves their overall physical fitness.
HRV parameters between the groups of patients. A p value less than 0.05 is considered.

Methods: two to four weeks after ACS the patients started with 50-minute exercise therapy sessions three times a week with an overall length of 12 weeks. 58 patients were randomised into 2 subgroups: 31 patients received CoQ10 100/200 mg per day (1/7 weeks) and 27 patients received placebo according to the similar scheme. The patients underwent breath-by-breath bicycle cardiopulmonary testing before and after the rehabilitation program, while the functional indices of cardioregulatory system, the markers of cardiometabolic risk factors and oxidative stress were measured: peak oxygen consumption and maximal workload, total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, ura-sensitve C-reactive protein, conjugated dienes baseline conjugated dienes, oxidised LDL, and human autoanti-body against oxidised LDL.

Results: after administrating the CoQ10 in early rehabilitation after ACS most of the indices of cardioregulatory reserve and functional capacity revealed a significant increase. In the study group the improvement in aerobic capacity was more significant than in the control group. The markers of cardiometabolic risk and oxidative stress did not demonstrate statistically significant change neither in the study group nor in the control group.

Conclusions: favourable modifications in patients' cardioregulatory reserve and functional capacity may become more established in terms of dietary CoQ10 supplementation.

The improvement in the indices of cardioregulatory function and exercise capacity early rehabilitation after ACS. *p<0.001 vs 0.05.

Heart rate variability indices

<table>
<thead>
<tr>
<th>Control group</th>
<th>Training group</th>
</tr>
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<tbody>
<tr>
<td>Control group</td>
<td>Training group</td>
</tr>
<tr>
<td>Baseline</td>
<td>6 months</td>
</tr>
<tr>
<td>SDNN (ms)</td>
<td>119.7±26.2</td>
</tr>
<tr>
<td>SDANN (ms)</td>
<td>105.9±20.7</td>
</tr>
<tr>
<td>RMSSD (ms)</td>
<td>51.1±14.0</td>
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<tr>
<td>pNN50 (%)</td>
<td>30.3±9.8</td>
</tr>
<tr>
<td>VO2 (ml/min/kg)</td>
<td>4.7±3.6</td>
</tr>
</tbody>
</table>

Heart rate variability indices according to study group

Table 1

| Age (yrs) | 65.7±6.6 | 61.9±2.5 |
| LVEF (%) | 70.6±10.9 | 72.8±1.8 |
| PeakVO2 (ml/kg/min) | 45±2.6 | 45±2.6 |
| EPC migration pre-CPET (%) | 35.5±1.1 | 35.5±1.1 |
| EPC migration post-CPET (%) | 50±1±5 | 46±2±5 |

* p<0.001 pts vs cnl; † p<0.005 pre vs post CPET; ‡ p<0.041 pre vs post CPET, mean ± SEM
Influence of aerobic training on adiponectin and leptin levels in patients after coronary artery bypass-grafting

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1Institute of Cardiology, Warsaw, Poland

Topic: Cardiovascular rehabilitation

Background: Adipose tissue is now recognised as an active endocrine organ and releases proteins termed adipokines including such hormones as leptin and adiponectin. Adiponectin has drawn much attention because of its insulin-sensitising and antiatherogenic actions. Leptin is the main factor linking obesity, increased sympathetic nervous system activity and hypertension. Weight loss and some drug therapies have influenced significantly a simultaneous increase in adiponectin and decrease in leptin levels, but the effects of physical activity (aerobic training) on adiponectin and leptin levels in patients with coronary artery disease are unknown.

Aim: This study was designed to examine the influence of aerobic training on adiponectin and leptin levels in patients with coronary artery disease.

Methods: Sixty-four males, mean age 55.6 ± 6 yrs, at least 2 months after CABG, were randomised to either 6 weeks of aerobic training, three times a week, at 60-80% of maximal estimated heart rate (training group, TG, n=32) or to a control group (n=32). Exercise stress test was performed and body mass index (BMI), waist-to-hip ratio (WHR) and plasma levels of adiponectin and leptin were measured at the beginning and at the end of the study.

Results: Physical capacity increased significantly only in TG pts (max workload in METs from 7.7 ± 1.4 to 8.2 ± 1.4, p < 0.05). There were no differences between the beginning and the end of the study in either group in BMI (respectively, TG 27.3 ± 2.8 vs 27.4 ± 2.8 kg/m², NS, control group 26.0 ± 2.2 vs 26.1 ± 2.6 kg/m², NS), in WHR (respectively, TG 1.02 ± 0.05 vs 1.01 ± 0.05, NS, control group 1.03 ± 0.05 vs 1.03 ± 0.06, NS), and in levels of adiponectin (TG 6.7 ± 2.5 vs 6.9 ± 2.5 ng/ml, NS, control group 6.5 ± 2.6 vs 6.5 ± 1.8 ng/ml, NS). The level of leptin was similar at the beginning and the end of study in TG (6.7 ± 3.2 vs 6.9 ± 3.6, NS), but we observed a significantly increased level of leptin in the control group at the end of study in comparison to that observed at the beginning (respectively, 8.0 ± 4.0 vs 9.3 ± 5.2, p < 0.02).

In conclusion: (1) A short period of aerobic training improved the physical capacity, but it did not influence on BMI, WHR and the adiponectin level. (2) Aerobic training prevented an increase in leptin levels in patients who underwent such training. (3) These findings may support the hypothesis that exercise decreases leptin-resistance and improves signal transduction in the hypothalamus.
O379 Explaining the massive declines in coronary heart disease mortality rates in Iceland, 1981 - 2006

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Topic: Cardiovascular epidemiology

Background: coronary heart disease mortality rates have been decreasing in Iceland since the 1980s. We used the validated IMPACT model to examine how much of the decrease in Iceland between 1981 and 2006 could be attributed to medical and surgical treatments and how much to changes in cardiovascular risk factors.

Methods: the previously validated IMPACT mortality model was used to combine and analyse data on uptake and effectiveness of cardiovascular treatments and risk factor trends in the entire Icelandic population. The main data sources were official statistics, national quality registers, published trials and meta-analyses, clinical audits and a series of national population surveys. Sensitivity analyses were then conducted.

Results: between 1981 and 2006, coronary heart disease mortality rates in Iceland decreased by 80% in men and women aged 25 to 74 years. This fall resulted in 295 fewer deaths in 2006. Approximately one quarter of this decrease was attributable to treatments in individuals (including some 7% to secondary prevention, 6% to heart failure treatments, 5% to initial treatments of acute coronary syndrome, and 1% to hypertension treatments). Approximately three quarters of the mortality decrease was attributable to population risk factor reductions (principally cholesterol, 36%; smoking, 20%; systolic blood pressure, 25% and physical activity, 5%). Adverse trends were seen for diabetes (-5%), and obesity (+4%).

Conclusions: approximately three quarters of the large coronary heart disease mortality decrease in Iceland between 1981 and 2006 was attributable to reductions in major cardiovascular risk factors in population, mainly decreases in total serum cholesterol, smoking and blood pressure levels. These findings emphasise the value of a comprehensive strategy that promotes tobacco control and a healthier diet. It also highlights the potential importance of effective, evidence based medical treatments.

O380 Environmental tobacco smoke exposure assessed using serum cotinine: associations with MI, stroke and cardiovascular risk factors in adult men and women.

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Topic: Cardiovascular epidemiology

Objective: environmental tobacco smoke (ETS) exposure is associated with elevated CVD risks, but most studies have inspectre exposure measurements and the mechanism of action is unknown. We examine associations between cotinine, a circulating biomarker of ETS exposure, and a range of CVD risk factors, incident CHD and stroke in non-smokers.

Methods: population-based study of 4282 men and 4286 women aged 40-74 years in parallel prospective studies assessed in Primary Care centres in 24 British towns in 1998-2000, with 7 year follow-up for fatal and non-fatal MI (n=400) and stroke (n=359). Medical history, health behaviours and demographic data were reported in questionnaires and nurses recorded an ECG, took anthropometric measurements, seated blood pressure and fasting blood samples which were analysed for serum cotinine and CVD risk markers.

Results: associations were similar in males and females, so results are reported for genders combined. Among 4749 persistent non-smokers without pre-existing CVD or diabetes, geometric mean cotinine was 0.15μg/mL (95%CI 0.14, 0.16). In non-smokers a doubling in cotinine level was associated with higher BMI, 0.11 kg/m2 (95%CI 0.04, 0.19) and waist circumference 0.28cm (95%CI 0.19, 0.47) adjusted for age, gender, social and behavioural CVD risk factors. After further adjustment for BMI, cotinine was positively associated with CRP, triglycerides, sWRF and sP4A and lower albumin levels; a doubling in cotinine level was associated with 0.05mg/L (95%CI 0.01, 0.10) increase in log CRP level. Positive associations between cotinine and IL-6, and blood and plasma viscosity were abolished by adjustments. Cotinine was not associated with blood pressure or lipids. Compared to non-smokers with undetectable cotinine (<50μg/mL), smokers had lower blood pressure, HDL, BMI and waist circumference; higher triglycerides and consistently elevated inflammatory and haemostatic markers.

Compared to cotinine <0.05μg/mL, non-smokers with 0.05-0.19, 0.20-0.30 and 0.31-0.45μg/mL cotinine had HRs of MI of 1.09 (95%CI 0.67, 1.77), 1.06 (0.65, 1.73), 1.01 (0.55, 1.83) respectively, p trend=0.05. Adjustment for socio-demographic and CVD risk factors did not appreciably change estimates. HR of MI for smokers of 1-9 cigarettes/day compared to <50μg/mL cotinine was 2.57 (95%CI 1.67, 3.95). There was no evidence that ETS or smoking were associated with stroke.

Conclusions: non-smokers had more adverse inflammatory profile even at low ETS exposure than those with undetectable ETS exposure. In this elderly cohort with low ETS exposure, there was no evidence that it was associated with CHD or stroke.

O381 The effect of a multi-factorial lifestyle intervention on changes in alcohol intake. The Inter99 study

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Topic: Public health

Objective: to investigate the effect of smoking and five years of multi-factorial lifestyle intervention on changes in alcohol intake in a general population.

Methods: the study was a randomised controlled intervention study. A random sample of 11,708 individuals were drawn from a general population (n=63,301) and invited for a health screening and a multi-factorial lifestyle intervention programme. Participant rate was 52.5%. Participants received a personal lifestyle consultation including advice to reduce alcohol intake in those with an intake above the recommended maximum level (men: <21 drinks pr week; women: <14 drinks pr week). Those defined as at high-risk of ischemic heart disease were furthermore offered group-based lifestyle counselling. The intervention was repeated at one and three-year follow-up in high-risk individuals. From the remaining population, a control group were drawn (n=2,264) and followed by questionnaires. Participant rate was 64.5% in the control group. Changes in alcohol intake were analysed using linear mixed models.

Results: at three-year follow-up men in the intervention group had significantly decreased their intake of alcohol (drinks pr week) compared with the control group (net-change: -1.14; p<0.01) but at five-year follow-up this effect attenuated. In men with a high intake of alcohol (>21 drinks pr week) the effect on total alcohol intake was maintained at five-year follow-up (net-change: -3.7; p<0.01). No significant effects were found in women on total alcohol intake. Binge drinking (days per week with ≥5 drinks) decreased both in men and women at three and five-year follow-up (men: five-year net-change:-0.15; p=0.03; women: five-year net-change:-0.08; p=0.04). Furthermore, in the women the ratio between wine and total alcohol was increased compared with the control group at five-year follow-up (net-change: 0.04; P=0.01). In men the relative intake of wine was only increased in those a high intake of alcohol (net-change: 0.04; p=0.02).

Conclusion: multi-factorial lifestyle intervention, including low intensity alcohol intervention, improved alcohol habits in a general population.

O382 Prognostic value of 24-h blood pressure variability

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Topic: Hypertension

Purpose: previous studies reported contradictory results on the relation between cardiovascular outcome and blood pressure (BP) variability, but were often insufficiently powered or limited to selected patients or systolic BP. We studied mortality and morbidity in relation to the 24 h BP variability in subjects randomly recruited from the general population.

Methods: we performed 24-h BP monitoring in 7400 subjects (mean age 57.1 years, 45.3% women) enrolled in 6 prospective population studies in Denmark (2010), Belgium (1086), Japan (1430), Sweden (1049), Uruguay (1093), and China (344). We assessed systolic and diastolic variability from BP readings in individual ambulatory recordings from the standard deviation (SD) and average real variability (ARV). We computed standardised hazard ratios (HR), while adjusting for cohort, 24-h BP and other cardiovascular risk factors.

Results: over 10.7 years (median), total and cardiovascular mortality amounted to 1091 and 411 deaths, respectively. The incidence of fatal combined with nonfatal events was 954, 396, 527, and 396 for all cardiovascular events, stroke, cardiac and coronary events, respectively. After adjustment for cohort, age, sex, body mass index and smoking and drinking, total cholesterol levels, history of cardiovascular disease, diabetes mellitus, treatment with antihypertensive drugs, and 24-h BP a higher systolic ARV predicted (p<0.04) total (HR 1.10) and cardiovascular mortality (1.12) and mortalit, all fatal combined with nonfatal cardiovascular events (1.08), but not fatal combined with nonfatal stroke or cardiac and coronary events (1.03; p=0.08). Higher diastolic ARV predicted (p=0.01) total (1.12) and cardiovascular (1.21) mortality and all combined fatal and nonfatal events (1.10), with the exception of cardiac and coronary events (1.07; p=0.15). Findings for SD were similar to those for ARV. Sensitivity analyses, in which we stratified by ethnicity, sex, age, previous history of cardiovascular disease, antihypertensive treatment, numbers of BP readings in individual BP recordings, night-to-day BP ratio, or from which we excluded one cohort at a time showed consistent results.

Conclusions: short-term BP variability assessed from 24-h ambulatory recordings with inter-individual BP readings contributes to risk stratification over and beyond the BP level and other cardiovascular risk factors. Our study firmly established BP variability as an independent cardiovascular risk factor.
O383
Higher circulating IGF-1 levels are associated with middle time in-stent restenosis.

Preliminary results
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Topic: Stable angina pectoris

Background: restenosis after stent implantation remains to be a serious clinical problem. Several factors were shown to contribute, including early thrombus formation, vessel recoil and neointimal proliferation. Increased Insulin-like Growth Factor (IGF-1) expression by coronary vascular smooth muscle cells (VSMC) was observed in pts with restenotic plaques. IGF-1 is a strong mitogen for VSMC in vitro.

Aim: our goal was to measure circulating levels of IGF-1 and IGF Binding Protein 3 (IGFBP3) undergoing control coronaryography after stent implantation and compare the results in pts with and without in-stent restenosis.

Methods and studied group: we enrolled 140 consecutive patients (aged 60.1 ± 12.6 years, 82 males and 58 females, BMI 28.1 ± 4.1) scheduled for control angiography after stent implantation within 3 months or earlier if clinically required. Circulating IGF-1, IGFBP3 levels were measured in serum samples by RIA and IRMA techniques. Restenosis was defined as ≥20% lumen loss by QCA.

Results: in patients within-stent restenosis, the mean both IGF-1 (192.6 ± 59.5 vs 242.2 ± 101.8, p < 0.05) and IGFBP3 (2285.5 ± 773.9 vs 2622.6 ± 701.7, p < 0.05) serum levels were higher than in pts without restenosis. Similarly the IGF-1/BMI index was higher in patients with restenosis (7.01 ± 2.3 vs 10.0 ± 5.4, p < 0.05)

Conclusion: higher levels of both IGF-1 and IGF binding proteins are observed in patients with in-stent restenosis. This finding is independent on patients’ body mass index. Prospective studies aimed at evaluation of the possible role of IGF-1 in the development of in-stent restenosis are warranted.

O384
Associations between adulthood television viewing and cardiometabolic disease risk: longitudinal study with 21-year follow-up

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Topic: Physical activity

Purpose: Television viewing (TV) is a key indicator of sedentary behaviour and has been found to relate independently to metabolic and cardiovascular risk. However, very few studies have looked at these relationships using longitudinally designs with long follow-up. The aim of this study was to investigate the relationships between television viewing (TV) and cardiometabolic risk factors during early and middle adulthood and to examine whether these relationships are independent of adult physical activity (PA) levels.

Methods: The 1958 British Birth cohort includes all births in one week in March 1958. TV and sports participation frequency were recorded by self-reports at 23 y (year 1981). Daily TV times and weekly recreational PA times were recorded by self-reports at 44 y (year 2002). We derived TV and PA variables that took into account both age points and were dichotomised into low and high (high TV: ≥5 times/wk at 23 y and ≥21 h/week at 44 y; high PA: doing sports ≥3 times/wk at 23 and doing of moderate-to vigorous recreational PA ≥150 minutes/wk at 44 yrs). Risk factors (measured at 44 y) were systolic blood pressure, body mass index (BMI), waist circumference, LDL, HDL, triglycerides and HbA1C. Multiple linear regression models were adjusted for social class, smoking, recreational PA and occupational sitting and PA where appropriate.

Results: A total of 5,073 participants (2,535 men) had valid data on all variables and were included in the analysis. Men’s TV showed important multivariable relationships with BMI (beta=0.71, p < 0.001), waist (1.82, < 0.001), blood pressure (1.69, 0.004), HLD (-0.03, 0.020), triglycerides (0.06, 0.002). Women’s TV showed important associations with BMI (1.50, < 0.001), waist (2.72, < 0.001), blood pressure (1.23, 0.056), LDL (0.06, 0.078) HLD (-0.08, < 0.001), triglycerides (0.06, 0.002). Relationships with HbA1C were weak. These associations were adjusted for adulthood physical activity levels and other covariables.

Conclusions: Regardless of participation in physical activity, adulthood television viewing is related with raised cardiometabolic risk in early middle age. Physical activity recommendations should address sedentary behaviour, as well as physical activity.
O385 Randomised comparison of the effects of interval aerobic plus strength training versus interval aerobic training alone on endothelium function in chronic heart failure (CHF). However the optimal form of training remains debated. This randomised study compared the effects of interval aerobic combined with strength training versus the aerobic training alone on endothelial function in CHF patients.

Methods: We studied 28 consecutive patients in optimally treated, stable CHF who were randomly assigned to 3 times weekly training sessions for 3 months, consisting of a) 40 min of aerobic interval training (30 sec effort - 60 sec rest at intensity ≥ 100% VO2peak) (n=14); versus b) 20 min of similar aerobic, interval training plus 20 min of strength training of various muscle groups (quadriceps, hamstrings, muscles of the shoulder zone, biceps) (n=14). All patients underwent maximal, symptom-limited cardiopulmonary exercise testing and ultrasound evaluation of endothelial function by flow-mediated vasodilation (FMD) before and after the programme.

Results: Peak oxygen uptake increased significantly and similarly in both groups, from 17.5±4.0 to 17.2±3.7 ml/kg/min in the aerobic training alone group (p=0.05), and from 17.5±6.0 to 18.3±3.6 ml/kg/min in the combined training group (p=0.006). A significant improvement in FMD (p=0.002) was observed in the combined training group, in contrast to the aerobic training alone group (p=ns); the improvement was significantly greater in the combined training than in the aerobic training alone group (p=0.05).

Conclusions: A 3-month exercise-training programme improved endothelial function and physical performance in CHF patients. Combining high-intensity, interval aerobic exercise with strength training had a greater beneficial effect on endothelial function than interval, aerobic exercise alone.

O386 Influence of aerobic training on haemodynamic and neurohumoral response to static exercise, physical capacity and markers of inflammation in post CABG patients.

Methods: Sixty optimally treated male patients (pts), mean age 55±6 yrs, mean 2 months after CABG, were randomised to either 6 weeks of aerobic training on cycloergometer, three times a week, 30 min of moderate intensity exercise (65% of VO2 peak) in the upright position at a water height of 1.40 m at temperature of 31°C versus 10 pts to a control group (n=30). At baseline and at the end of the study, all pts underwent: (1) exercise stress test; (2) haemodynamic study in isometric type of exercise known to provoke sympathetic activation, increasing the release of catecholamines.

The aim of the study was to evaluate the influence of aerobic training on the haemodynamic and neurohumoral response to handgrip and on physical capacity, lipids and inflammatory markers in patients with chronic heart failure and age above 70 yrs.

Results: Exercise duration (759 vs 827 sec, p<0.01) and max workload in METs (7.6 vs 8.1, p=0.05) increased only in TG. At the end of the study, the SV values at peak H increased significantly in 95% (p<0.05) in TG whereas decreased in controls by 9%. E' indexed comparable increases in HR in TG (62±7 vs 71) and in controls (63±7 vs 71), and significantly lower increases in systolic BP (42±17 vs 0.05) in TG at peak H. At peak H, there were lower, however not significant, increases in plasma levels of norepinephrine and epinephrine in TG (by 17% and 73%, respectively), comparing with controls (by 20% and 84%, respectively). Plasma levels of NO increased significantly only in TG comparing with controls by 40% and 14% (p<0.05), respectively. Moreover, at the end of the study, the TG pts significant improvements were found in levels of LDL cholesterol (2.4±1.2 vs 2.4±1.0 mmol/l, p=0.05) as well as in markers of inflammation: fibrinogen (4.0 vs 3.3 g/l, p<0.05), leucocyte count (7.2±6.3 vs 10.3±9.0, p<0.05) and erythrocyte sedimentation rate (13.3±3.4 vs 9.9±5.4, p<0.05). C-Reactive protein and IL-6 level (2.6±2.2, p=0.07) tended to be lower in the TG (0.36 vs 0.17 mg/l, p=0.05).

Conclusion: Aerobic training on cycloergometer improved physical capacity, haemodynamic and neurohumoral response to static exercise and reduced the levels of both lipids and markers of inflammation in post-CABG patients.

O387 Aquatic therapy added to aerobic training vs aerobic training alone in the rehabilitation of elderly patients with chronic heart failure: effects on exercise tolerance and haemodynamic profile.

Methods: Twenty-one patients with stable CHF, median age 68±4 years, ejection fraction 32±9 NYHA functional class II-III were enrolled. Eleven pts were randomised to group A performing a combined training (AT+APT) and 10 patients to group B (APT only), both on top of maximal medical therapy. At baseline and after 12 weeks all patients underwent 6-minute walking test (6MWT), assessment of quadriceps maximal isometric voluntary contraction (MVC) and peak torque (PT) blood pressure and heart rate (HR) and non-invasive haemodynamic evaluation (Impmsor, Innovation DK) with assessment of cardiac output (CO), stroke volume (SV) and peripheral vascular resistances (PVR). AT was performed 3 times/week in upright position at a water height of 1.40 m at temperature of 31°C consisted of slow walking and exercises involving muscle groups of the lower and the upper limbs and torsos with progressive increase in intensity. APT was performed 3 times/week and consisted on cycling or walking 60% of VO2peak.

Conclusion: Exercise therapy was well tolerated. No patients had adverse events during water immersion. No patients withdrawn during the study period. Distance walked at 6MWT improved in both groups (Gr A 1350±235 m; Gr B 1080±216 m) with significant intergroups differences (p=0.02). Diastolic BP and rest HR significantly decreased in the A group while remained unchanged in the B group (–14 mmHg±7, p<0.04; 12 bpm, p=0.03 respectively) and CO and SV had a relative despite no significant increase in Gr A, APT significantly decreased in A group (38±22 mmHg±10 ml, p=0.05) while remained unchanged in B group. Patients of A-group had a significantly higher increase of both MVC and MV and B group.

Conclusions: We demonstrated that AT added to APT, significantly increases exercise tolerance and haemodynamic profile of patients with CHF.

O388 Short-term effect of a 4-week training programme on clinical parameters and quality of life in patients with chronic heart failure aged 70 and older.

Methods: 284 patients with CHF, divided according to age into Group 1 (N=140 < 70 yrs, mean age = 76±5 years, 83 male, 57 female) and Group 2 (N=144 ≥ 70 yrs, mean age = 81.6±6 years, 99 male, 45 female), took part in a 4-week training programme consisting of special muscle strength training, a 6-minute walk test and biocell ergometer training. Quality of life was measured using the German version of the Short Forms-36 questionnaire (SF-36). Patients were examined before the programme (T1) and immediately after the programme (T2).

Results: Comparing the older (Group 1) and the younger (Group 2) patients, statistically significant differences were found in the clinical and training-related data. At the beginning of the exercise training programme (T1), the left-ventricular ejection fraction (LVEF) in Group 1 was 32.5±7 and had increased significantly to 38.5±9% by the end (T2) of the programme. In the younger patients, the LVEF rose from T1 32±8% to T2 37±9% (p<0.01). The peak oxygen uptake (VO2max) increased significantly in Group 1 from T1 11.2±2.9 to T2 12.4±3.8 ml/kg/ KG. In Group 2 VO2max showed a sharper increase from T1 13.3±8.8 to T2 15.2±4.7 ml/kg/KG (p<0.01). Regarding the 6-minute walk test, the distance in Group 1 increased from 293±274 to 379±85 meters (p<0.001) and in Group 2 from 353±183 to 462±186 meters (p<0.001). At the end of the exercise programme, both groups reported improvements in their quality of life. Despite these improvements, the comparison between the two groups showed significantly poorer results for the patients aged 70 and above.

Conclusion: A 4-week training programme for elderly heart failure patients was effective in improving clinical parameters and quality of life. These results underline the necessity of physical training, especially in very elderly patients.
Cardiovascular responses to daily school exercise lessons in children
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Topic: Physical activity

Background: The prevalent life-style of children in developed countries is associated with a multitude of harmful trends resulting in overweight, early diabetes, and hypertension. A major contributing factor is the decline of physical activity which can be observed in school children of every age. Aim of this prospective study was to improve physical fitness and activity by means of additional school exercise lessons and to investigate its effect on cardiovascular function and risk markers.

Methods: 188 students (age 11.1 ±0.8 years, 53% female) from seven classes of three different high schools in Leipzig were randomised to an intervention group (IG) with daily school exercise lessons for 1 year (1Y) and a control group (CG) with regular school sports (2 hours per week). 29 children of a high school with special focus on competitive sports and physical education served as reference group (RG). Measurements were performed at baseline and after 1 year.

Results: Baseline levels of body mass index (BMI), blood pressure, and lipid profile were comparable in all groups. After 1 year of daily school exercise lessons BMI-standard deviation score (SDS) decreased significantly in children of IG (from 0.014 ±0.01 to -0.25 ±0.01, p<0.01). After 1 year the percentage of overweight and obese children decreased in IG (from 13% to 9%, p=0.14) whereas it increased in children of CG (from 11% to 13%). At 1 year maximal oxygen consumption (VO2max) improved significantly by 29% (IG: from 37.9 ±0.5 ml/min*kg to 48.8 ±6.7 ml/min*kg, p<0.001) and by 17% (CG), but did not reach RG-levels (60.2 ±12.0 ml/min*kg, p<0.001 vs. IG and CG). At 1 year of daily exercise lessons, there was a significant increase of HDL-cholesterol (from 1.38 ±0.03 mmol/L to 1.42 ±0.03 mmol/L, p<0.05), and a significant decrease of triglycerides (from 1.10 ±0.04 mmol/L to 1.04 ±0.05 mmol/L, p<0.05) and systolic blood pressure (from 103 ±1 mmHg to 98 ±1 mmHg, p<0.05). There was a mean percentage increase of 74% of circulating progenitor cells (CPCs, CD34+/KDR+ cells) in children of IG at one year in comparison to no change in CG.

Conclusion: Regular physical activity has a significant positive influence on body composition, exercise capacity, and cardiovascular risk markers. Thus increased physical activity has to be recommended for primary prevention of cardiovascular diseases in school children.

Five year follow-up of the PCI vs. Exercise in stable coronary artery disease- pilot trial (PET-PILOT)
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Topic: Stable angina pectoris

Coronary revascularisation by percutaneous techniques is widely used in the treatment of patients (pts) with coronary artery disease (CAD). Among non-pharmacological therapeutic options for pts with stable CAD, regular physical exercise training (ET) is known to improve functional work capacity, myocardial perfusion and the 1 year event free survival rate. Aim of this study was to compare stent angioplasty (SA) with a conservative strategy including daily ET with regard to event-free survival after a 5 year follow-up and clinical status.

Methods: 101 pts with stable CAD were randomly assigned either to SA or to the ET-group. Pts in both groups received optimised medical standard therapy. Initially and at follow-up visits, clinical status was assessed using the Canadian Cardiovascular Society classification (CCS). The primary endpoint was the composite of death from any cause, non-fatal myocardial infarction, cerebrovascular accident, need for any revascularisation procedure due to unstable angina pectoris (UA) and hospitalisation due to worsening of angina pectoris.

Results: The event free survival rate for the combined primary endpoint was 63 % (32 patients out of 51) in the exercise training group and 40% (20 patients out of 50) in the stent group (p=0.037). Within the five years of follow-up, 36 cardiovascular events occurred in 19 patients of the training group as compared to 55 cardiovascular events in 30 patients of the stent group.

Conclusion: At long-term follow-up of 5 years, daily exercise training additionally to a optimal medical treatment in stable CAD patients leads to a better event free survival rate compared with stent angioplasty.
**O381**

**Evaluation of the implementation of a region-wide preparticipation screening for athletes**

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**Topic:** Sports cardiology

**Purpose:** Preparticipation screening is recommended by the European society of cardiology and were published two years ago. The intention was to reduce sudden cardiac death in athletes and to evaluate athletes for severe heart conditions for their own protection. The objective of this study was to evaluate athletes at risk and the benefits from a region-wide network in preparticipation screening.

**Methods:** According to the ESC and EAPCPR guidelines, preparticipation screening (history, auscultation, ECG, blood pressure measurements) was done in a regional network where 38 physicians (general family medicine, internal medicine or cardiology) with a sports medicine diploma who lived in the 6 counties of northrhine westphalia took part. The physicians were supplied by our centre with a specialised ECG-Box that checks all ECGs for abnormalities with a special software according to the guidelines and ECGs were digitally stored in the Box and digitally sent with the results of history and auscultation to our centre for second evaluation. Starting April 2007 until November 2008.

**Results:** We received 556 screened athlete files. 12 % of whom reported to have elevated blood pressure, where 59 % of them had documented elevated blood pressure after 15 minutes of rest. 65 % of the measured elevated blood pressures were not under a medication therapy. 8 % had a pathologic auscultation and needed further evaluation. 13 % of the screened athletes needed further evaluation either due to history/symptoms, auscultation or ECG. Disqualification from competitive sports was recommended in two cases (auricentric and hypotrophic cardiomypathy).

**Conclusion:** A regional network for preparticipation screening is a beneficial method to filter athletes at risk from healthy athletes. As 13 % of the screened athletes needed further evaluation, more pathologic findings will be expected in higher screening numbers. As two athletes had to be disqualified due to severe heart conditions, it is efficient in primary prevention. As many patients had elevated blood pressure at rest, more screening and therapy towards hypertension control seems to be helpful and important and should be done in further studies.

**O391**

**Is now the time for universal preparticipation screening?**

Friday, 8 May 2009, 11:00–12:30 Location: Room C6

**O385**

**Children athlete’s heart: effect of age and gender on echocardiographic parameters**

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**Topic:** Sports cardiology

The limits of athlete’s heart patterns have been largely described in athletes over 16 yrs old. However, to our knowledge, few data have been reported from younger highly trained athletes. The limits of athlete’s heart normal values, in accordance with age and gender, in this population seem important to precise.

**Purpose:** This prospective study aimed to describe echocardiographic (echo) patterns recorded in a large population of French highly trained (≥8 houres/week) children according to their age and gender.

**Methods:** 1211 French athletes, aged 7 to 16 yrs, have been included in this study. All have benefited from a clinical exam and a resting echocardiography according to the ASE recommendations. Both surface area (BSA) indexed usual echo data have been calculated. Four groups according to their age: Young girls aged 10 to 12 yrs (n = 58, BSA = 1.3 ± 0.2 m2), older girls aged 13 to 16 yrs (n = 495, BSA = 1.6 ± 0.2 m2), young boys aged 7 to 13 yrs (n = 107, BSA = 1.3 ± 0.2 m2), older boys aged 14 to 16 yrs (n = 561, BSA = 1.8 ± 0.2 m2) have been compared.

**Results:** Mean overall population echo data were as follow: aortic diameter (Ao) 27.1 ± 3.5 mm; left atrial diameter (LAD) 31 ± 4.6 mm; left ventricular end-diastolic diameter (LVEDD) 49.8 ± 4.7 mm; interventricular septum wall thickness (IVSWT) 8.6 ± 1.4 mm; posterior WT 8.1 ± 1.4 mm; LV mass 141.4 ± 41.4 g; left ventricular ejection fraction (LVEF) 67.1 ± 6.2 %; minimal waves: R 95.6 ± 16.9 mmHg; A 46.9 ± 12.0 mmHg, E/A ratio: 2.1 ± 0.6. In both gender groups, older children obtained higher absolute values than younger ones (p<0.05), except for LVEF and E/A ratio. However, when indexed by BSA, higher values have been observed in the youngest children (p<0.01), except for LV mass/BSA, which remained superior in the older group (p<0.05). In both similar age groups, boys have higher absolute values compared to girls (p<0.05), except for LVEF and E/A ratio. Indexed by BSA, higher values have been observed for LVEDD in boys (p<0.001). Only in the youngest group, Ao/BSA and LVID/BSA were higher in boys (p<0.001). No difference between boys and girls was observed for IVSWT and posterior WT indexed by BSA in both groups, and for Ao/BSA and LVID/BSA only in the oldest group.

**Conclusions:** Resting echocardiographic patterns in highly trained children are influenced by both age and gender. Thus, these two parameters must be taken into account in the interpretation of absolute and relative echocardiographic parameters. Our results propose limits of athlete’s echocardiographic patterns in highly trained children.

**O384**

**Electrocardiographic patterns in Georgian high level male athletes with increased left ventricular mass**

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**Topic:** Sports cardiology

**Objective:** unrecognized hypertrophic cardiomyopathy (HCM) is a leading cause of exercise-related sudden cardiac death (SCD) in young athletes. Therefore, substantial increase in left ventricular mass in athletes is a common finding. The research has included a cardiovascular evaluation with medical history, physical examination, 12-lead resting an exercise ECG, and M, two-dimensional and Doppler echocardiography. Electrocardiographic patterns were evaluated according to commonly adopted criteria.

**Methods:** The research has included a cardiovascular evaluation with medical history, physical examination, 12-lead resting an exercise ECG, and M, two-dimensional and Doppler echocardiography. Electrocardiographic patterns were evaluated according to commonly adopted criteria.

**Results:** 324 Georgian highly trained normometaile male football players (age ranged from 18 to 35 years, mean age 22,92±2,4 years) on the basis of echocardiographic investigation were divided into 2 groups: 1 - 263 athletes with normal LVMI, and 2 - 61 athletes with increased LVMI (>125g/m2). None of the athletes had a family history of HCM, all denied use of the illicit drugs.

**Conclusions:**

- the purpose of the study was determination of the clinical significance of the electrocardiographic (ECG) patterns in highly trained athletes with increased left ventricular mass index LVM (>125g/m2).
- The study population included participants consecutively referred (December 2005-June 2008) for cardiology evaluation after preparticipation screening by sports physicians, identified with hypertension at rest or during exertion. Hypertension was defined according to ESC criteria.
- Management with drugs preferably not interfering with sports participation.
- Adequate control of blood pressure allows eligibility for sports participation. Long-term follow-up for cardiac events in this group is mandatory.
Pre-participation cardiovascular screening in older (>35y) athletes: data from the Netherlands

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Topic: Sports cardiology

Purpose: Pre-participation cardiovascular screening (PCS) in young athletes (<35y) is an evidence-based method to identify athletes at risk for life threatening cardiac events, and to reduce the incidence of sudden cardiac death. The strategy of PCS remains a highly debated issue, and data concerning PCS in older athletes (>35y) are limited. It was the purpose of our study to describe the results of PCS in older athletes.

Methods: study population included participants consecutively referred (December 2005-June 2008) for cardiologic evaluation after PCS by sports physicians. Complete cardiac evaluation and management were according to the ESC recommendations.

Results: 465 athletes, age 6-73 years were referred. There were 302 older athletes, age 50-74 years. There were 239 males and 63 females; 126 males and 20 females still in competitive sports; 113 males and 44 females performing leisure time physical activity.

Reason for referral: arrhythmia 120 (36%), coronary syndrome 82 (25%), hypertension 36 (11%), extrascreening 27 (8%), cardiac murmur 23 (7%), abnormal ECG 16 (5%), suspected cardiomyopathy 13 (4%), (near)syncpe 12 (4%). In all exercise testing was performed, and in 287 echocardiography. Other non-invasive and invasive diagnostic tools if necessary to establish the diagnosis.

Diagnosis: arrhythmia 55 (19%; 29 pt with atrial fibrillation, 3 ventricular tachycardia), coronary syndrome 25 (9%), hypertension 77 (27%) valvular disease 15 (5%), cardiomypathy 13 (4%), (near)syncpe 12 (4%). In all exercise testing was performed, and in 287 echocardiography. Other non-invasive and invasive diagnostic tools if necessary to establish the diagnosis.

Management: invasive treatment was performed in 16 pt (4.9%). Rhythm surgery, catheter ablation or ICD implantation in 9, and coronary revascularisation and/or valve surgery in 7 pt.

Conclusion: PCS in older athletes in the Netherlands revealed cardiovascular abnormalities in 196 out of 302 pt (66%). Atrial fibrillation (9.6%) and hypertension (27%) were seen frequently. Few needed invasive treatment (4.9%).

Cardiovascular findings from the pre-participation screening of 20,197 athletes: a Northern Greece experience

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Topic: Sports cardiology

Pre-participation cardiovascular screening plays a significant role in the identification of athletes at risk for sudden death. Moreover it uncovers findings that would be considered abnormal in non-athletes. Therefore, the aim of the study was to present the cardiovascular findings of the pre-participation screening of 20,197 athletes aged 5 to 39 yrs old from the region of Northern Greece who were examined since 1991. In particular, 12,744 males and 7,453 females, participating in 39 sport disciplines. Screening consisted of complete personal and medical history, physical examination and 12-lead ECG. Furthermore, in 12,353 athletes (7,563 males) an echocardiographic study was performed. In the presence of positive findings more specific non-invasive and invasive tests were applied.

The results showed that overall 48.2% of the athletes presented "abnormal" cardiovascular findings. Mild systolic murmur was found in 13.4% and arterial hypertension in 0.7%. "Abnormal" resting ECG patterns were observed in 45.7% of the athletes as right bundle branch block (16.8%), sinus bradycardia (13.2%), 1st degree atrioventricular block (12.1%) and inverted T-waves in precordial leads (0.9%). Wolf Parkinson White syndrome was identified in six cases. The echocardiographic study showed that mitral valve prolapse was noted in the 3.9% of the sample, more often in females (5.2%). Hypertrophic cardiomyopathy was diagnosed in 3 athletes. In 48 athletes, the left interventricular septal thickness was found lying in the "grey zone" of 13 to 16 mm. Sixty-one subjects had left ventricular end-diastolic diameter > 60 mm while 11 subjects presented atrial and 7 ventricular septal defects. Only nine athletes were disqualified from any competitive sport activity while there were no sudden cardiac death cases. It is concluded, that a significant prevalence of "abnormal" findings is identified by the athletes' regular cardiovascular pre-participation screening. However, the vast majority of these findings are proved to be indicative of long-term exercise-induced physiological cardiac remodelling and of limited clinical significance.
**ORAL SESSION IV**

Translational cardiovascular science

Friday, 8 May 2009, 11:00–12:30 Location: Room C6

**O397**

Balance between circulating endothelial progenitor cells (EPCs) and mature circulating endothelial cells (CECs) in relation to the severity of peripheral arterial disease


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**Topic: Peripheral vascular disease**

**Introduction:** The maintenance of endothelial health depends, not only on the local milieu, but also on circulating endothelial progenitor cells (EPCs) derived from the bone marrow. Indeed, EPCs support the integrity of vascular endothelium and promote revascularisation of ischaemic areas. On the other hand, circulating endothelial progenitor cells (CECs) are considered a marker of endothelial dysfunction. Previous studies demonstrated reduced number of EPCs in peripheral arterial disease (PAD) patients, but few data are available on CECs. Aim of our study was to compare the presence of EPCs and CECs in PAD patients in relation to the severity of the disease.

**Methods:** In 30 PAD patients (22 M/8 F; median age: 69 (49-86) years) we measured circulating EPCs and CECs by using flow cytometry. EPCs were defined as CD133+/KDR+ and CD34+CD133+/KDR+, while CECs were defined as CD146+/CD31+/CD34+/KDR−. Results: The extent of decrease (p<0.05) in relation to the clinical severity of the disease, as seen by Fontaine’s stages, was observed for CD34+/KDR+ EPCs (stage II: 0.90 (0.68-0.25); stage III: 0.09 (0.02-0.05); stage IV: 0.03 (0.02-0.08) cells/μL). On the contrary, a significant (p<0.05) increase was noted by CECs (stage II: 0.077 (0.02-0.13); stage III: 0.084 (0.02-0.19); stage IV: 0.15 (0.05-0.19); stage V: 0.22 (0.08-0.33) cells/μL). In order to evaluate the balance between EPCs and CECs in relation to the clinical progression of the disease, we calculated the CECs/EPCs ratio. By increasing Fontaine’s stage, a progressive and significant (p<0.05) increase in ratio value was observed, indicating a prominent role of CECs with respect to EPCs number. [stage II: 0.42 (0.2-2.30); stage III: 1.22 (0.25-7.67); stage IV: 6.39 (1.43-7.71); stage V: 6.14 (1.61)].

**Conclusions:** Our results demonstrate an imbalance between EPCs and CECs in PAD patients in relation to the progression of the disease, possibly indicating that the endothelial damage observed in these patients is not sufficiently repaired by a concomitant increase of the regenerative capacity of EPCs.

**O398**

Effects of vascular oxidative stress induced by Endothelin-Specific overexpression of uncoupled eNOS in mice


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**Topic: Stable angina pectoris**

**Purpose:** Numerous pathological conditions are associated with increased vascular oxidative stress. Whether elevated vascular levels of reactive oxygen species promote cardiovascular pathology or are the consequences of the disease state is an important but unanswered question.

**Methods:** We have generated a mutant of bovine eNOS in which cysteine 101 was replaced by alanine (C101A) resulting in uncoupling of eNOS. The effects of C101A mutation have been characterised in cultured human embryonic kidney cells (HEK) transfected with either mutant eNOS or wild-type (WT-eNOS). Transgenic mice carrying eNOS+/- mice have been generated on a C57BL/6 background using the endothelium-specific Tie-2 promoter. By breeding these mice with EPC knockouts (eNOS−/-), mice that only express eNOS−/- (eNOS−/-/eNOS+) or no eNOS at all (eNOS−/-/eNOS−/-) were obtained.

**Results:** Studies in HEK cells transfected with eNOS+/- revealed increased eNOS activity, increased superoxide generation inhibited by L-NAME treatment, less NO production (45.9±6.1 %) and 82 % respectively in the CsA+VEGF group, P<0.01 respectively. There were no statistic differences of bax gene expression in each group.

**Conclusions:** Endothelial specific overexpression of uncoupled eNOS and increased vascular oxidative stress decrease the number of circulating stem cells with endothelial progenitor capacity.

**O399**

5-Nitrosylation of the nitric oxide receptor soluble guanylyl cyclase in-vivo

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**Topic: Stable angina pectoris**

**Purpose:** Vascular soluble guanylyl cyclase (sGC) activity has been shown to be regulated in-vivo by nitric oxide (NO) via its downregulation of the expression and b) a post-translationally S-nitrosylation mechanism. However, we were previously able to show that sGC activity was not affected in-vivo in nitrate-treated animals. In this study, we investigated the expression, activity, and S-nitrosylation of sGC in mice with an endothelial-specific overexpression of eNOS.

**Methods:** eNOS+ mice with a 2:8-fold higher aorta sGC-expression and a decreased systolic blood pressure were generated using the endothelium-specific Tie-2 promoter. Transgenic negative littersmates served as controls (eNOS−/−). Westernblots for both α1- and β1-subunits of sGC were performed in mouse lungs using polyclonal rabbit antibodies. Phosphorylation of vasodilator-stimulated phosphoprotein (VASP) was determined with westernblots with a P-vas289-VASP monoclonal antibody. Conversion of [6-33P]-GTP to [32P]-GMP was used to measure activity of sGC activity stimulated with S-nitroso-N-acetyl-penicillamine (SNAP). S-Nitrosylation of β1-GC was semiquantitatively evaluated by labeling S-nitrosylated residues with biotin and performing westernblot after separation on neutravidin-agarose (biotin switch assay). Aortic vasoconstriction by acetylcholine and SNAP was analysed in organ bath experiments.

**Results:** Westernblots of mouse lung cytosols showed similar protein levels of sGCα1 (104±10.35 %) and sGCβ1 (109±7.28 %, P>0.05 each in eNOS+ vs. eNOS−). The activities of sGCα1 in response to SNAP (1 mmol/L) were decreased in lungs of eNOS+ (80±25.3 %) vs. eNOS− (162±52 mol/min/mg, n=5, P<0.05). Phosphorylation of VASP was increased by approximately 2-fold (P<0.05). There was an increase of nitrosylated/membrane sGCα1 subunit of 150±18.9 % in eNOS+ (100 % in eNOS−, n=3). Concentration-dependent vasoconstriction to endogenous and exogenous NO was similar.

**Conclusions:** While expression of sGC does not seem to be affected by an increased bioavailability of nitric oxide, activity of isolated sGC is decreased by 2-fold. The increased ratio of nitrosylated sGC vs. total sGC suggests an endogenous regulation mechanism as was described in-vitro. However, the signaling function of the pathway is unaffected as indicated in vasoconstriction experiments and by increased VASP-phosphorylation in eNOS+.

**O400**

Vascular endothelial growth factor promotes the proliferative capacity of endothelial progenitor cells by increasing calcineurin enzymatic activity

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**Topic: Heart disease**

**Background:** Endothelial progenitor cells (EPCs) contribute to postnatal neovascularisation. The function of EPCs is regulated by numerous cytokines. The most important family of cytokines implicated in the neovascularisation processes is the vascular endothelial growth factor (VEGF) family. It has been shown that VEGF plays an important role on regulating EPCs’ functions, VEGF cross-talks with numerous signals on regulating the biological function of EPCs. But little is known about the role of VEGF in regulating the activation of calcineurin signal in EPCs.

**Objective:** To investigate whether VEGF regulates the proliferative capacity of EPCs by the way of activating calcineurin signal.

**Methods:** EPCs were obtained from cultured mononuclear cells isolated from peripheral blood of healthy adults, and they were divided into 6 groups depending on the treatment administered: Control (without agent), VEGF (50ng/ml), cyclosporin A (CsA, 10 μg/ml), and CsA+VEGF incubation with CsA for 1 h before VEGF was added into groups. Calcineurin enzymatic activity and cell proliferation were assayed using colorimetric method. Cell apoptosis was determined using the terminal deoxynucleotidyl transferase-mediated dUTP nick-end labeling staining. The expression of bcl2 and bax genes was assayed by the reverse transcriptase-polymerase chain reaction analysis.

**Results:** Compared with the control group, treatment with VEGF (50ng/ml) potently increased CaN enzymatic activity (increased 735 %, P<0.01), cell proliferation (increased 40 %, P<0.01). Pre-treated with CsA (10 μg/ml) markedly abrogated the aforementioned effects of VEGF-treatment [compared with the VEGF group, the CaN enzymatic activity, cell proliferation and bcl2 gene expression were decreased 60 %, 78 %, and 82 % respectively in the CaN+VEGF group, P<0.01 respectively and increased the apoptosis rate of EPCs [apoptotic rate: Control group (3.1 %) was lower than CsA group (25.7 %) and CsA+VEGF group (24.6 %), P<0.01 respectively]. There were no statistic significant different of bax gene expression in each group.

**Conclusions:** VEGF-treatment promotes the proliferative capacity of human EPCs by activating CaN signal.
Effect of endogenous NO and pentaerythritol tetranitrate on myocardial AT-2 receptor expression in-vivo.

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Topic: Stable angina pectoris

Purpose: We hypothesised that pentaerythritol tetranitrate (PETN) and endothelial nitric oxide (NO) might impact on the expression of angiotensin (AT) type 1 (AT-1) and type 2 (AT-2) receptors.

Methods: We generated mice with an endothelial-specific overexpression of endothelial NO synthase (eNOS) using the Tie-2 promoter and backcrossed these mice to the C57BL/6 background. Two of these lines were characterised by eNOS-western blot analyses and blood pressure measurements in comparison to transgene negative littermates. In addition, C57Bl/6 mice were fed with either 6 or 60 mg PETN/kg body weight/day for 4 weeks.

Results: Analysis of line 1 of transgenic eNOS mice (1-eNOS++) showed a 2.3±0.15 fold higher aortic expression of eNOS and a reduction of blood pressure to 109.6±2.0 mmHg (P<0.01, n=4-6). Analysis of line 2 of transgenic eNOS mice (2-eNOS++) showed a 3.3±0.3 fold higher aortic expression of eNOS and a reduction of blood pressure to 105±1.0 mmHg (n=6, P<0.01). Treatment of 2-eNOS++ with the NOS-inhibitor L-nitroarginine (L-NAME) for 30 days was significantly increased in both lines vs. control (P<0.05, n=6 respectively). In lung tissue the AT-2 receptor expression of L-NAME-fed mice was decreased in heart tissue of eNOS transgenic mice (P<0.05, n=4). Furthermore, in-vitro studies with the NO-Donor S-Nitroso-N-Acetyl-D,L-Penicillamin incubated porcine aortic endothelial cells resulted in significant higher expression levels of the AT-2 receptor (P<0.05, n=6). Preliminary experiments with PETN-fed mice showed a significant increase in AT-2 receptor expression in myocardial tissue (P<0.05) whereas the expression of the AT-1 receptors did not change (P>0.05) neither in myocardial nor in aortic tissue.

Conclusion: These results show that endogenous NO and NO-Donors can upregulate vascular AT-2 receptor in-vivo. This newly discovered regulation might contribute to vasoprotective effects of NO.

Expression of adiponectin and adiponectin receptors in the skeletal muscle of CHF patients and effect of exercise training.

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Antwerp University Hospital, Edegem, Belgium, University of Paris, INSERM U769, Paris, France

Topic: Exercise physiology, testing and training

Background: Adiponectin is an anti-inflammatory, insulin-sensitising and anti-atherogenic adipokine that plays a fundamental role in energy homeostasis. In chronic heart failure (CHF) patients (pts), high circulating adiponectin levels are associated with improved outcome. Recently, adiponectin expression has been identified in human skeletal muscle fibres. We investigated the expression of adiponectin, the adiponectin receptors and genes involved in the downstream lipid- and glucose metabolism in the skeletal muscle of CHF pts prior to and after exercise training.

Methods: Thirteen CHF pts and 11 healthy age, gender and BMI-matched subjects underwent clinical assessment, echo-cardiography and cardio-pulmonary exercise testing. Plasma samples were collected to determine circulating adiponectin levels, NT-pro-BNP, lipoproteins and inflammatory parameters. Muscle biopsies (m. vastus lateralis) were taken to measure the mRNA expression of adiponectin, adiponectin receptors (AdipoR1 and AdipoR2) and downstream adiponectin-related enzymes. The effect of exercise training in CHF pts was assessed after 4 months.

Results: Adiponectin expression in the skeletal muscle of CHF pts significantly increased compared to healthy subjects (P=0.006), whereas AdipoR1 was downregulated (P=0.06). In addition, the expression of several genes involved in lipid (PPAR alpha, ACADM) and glucose metabolism (Hexokinase 2) was significantly reduced in CHF versus healthy subjects (resp. P<0.001, P=0.047 and P<0.001). Combining all measurements, strong positive correlations (all P<0.01) were found between the AdipoR1 and genes downstream the receptor (PPAR alpha, ACADM, CPT1B, HK2 and G6P/T4), as well as with exercise capacity (maximal workload and VO2 peak). Adiponectin mRNA levels were positively associated with circulating adiponectin levels (P=0.007) and correlated negatively with exercise capacity (P=0.01) and AdipoR1 mRNA levels (P=0.042). Physical training for 4 months decreased mRNA expression of adiponectin (P<0.055) and increased expression of AdipoR1 in skeletal muscle (P=0.01) to levels comparable to the healthy subjects. Additionally, several genes involved in the lipid metabolism tended to be normalised.

Conclusion: Adiponectin expression in the skeletal muscle of CHF pts is significantly higher compared to healthy subjects. CHF pts are characterised by a downregulation of AdipoR1 and an associated downregulation in genes involved in lipid- and glucose metabolism. Exercise training normalises the expression of adiponectin and AdipoR1 and tends to reverse the disorders in lipid and glucose metabolism.
M418
Age related alterations of endothelial function in patients with chronic heart failure and healthy subjects - Effects of exercise training
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2Topic: Exercise physiology, testing and training
Background: Impairment of endothelial function may occur in both physiologic aging and chronic heart failure (CHF). It has, however, never been assessed, whether the degree of endothelial dysfunction in CHF patients is influenced by age and if the well established beneficial effects of endurance exercise training on endothelial function are diminished in old age.
Methods: In this study we randomized 50 pts, with stable CHF (age 61.4±2.7 years, EF 59.6±3.1%, VO2max 13.8±2.3mlkg⁻¹min⁻¹) and 50 healthy subjects (HS) (age 59.8±3.1 years, EF 60±1%, VO2max 21.1±3.1 mlkg⁻¹min⁻¹) to a training (T) or a control group (C). To detect possible age effects we included subjects below 55 (young) and above 65 years (old). Subjects in the T-group exercised 4 times daily at 60% to 70% of VO2max for 4 weeks under supervision. At baseline and after the intervention, flow-mediated dilatation (FMD) was assessed by a high-resolution radial ultrasound (NDUS).
Results: As compared to young HS, old HS showed at baseline a reduced FMD (young: 16.7±1.1%; old: 12.1±1.6%; p<0.05). In CHF patients, endothelial function was impaired (young: 9.3±0.6%; old: 5.1±2.0%; p<0.05). No difference of these baseline parameters between the age groups was observed (p=0.72) in this subgroup. As a result of ET, FMD improved from 12.2±0.9% to 15.9±1.2% in old HS (p<0.05), while it remained unchanged in young training HS and C respectively. In young and old patients with CHF four weeks of ET resulted in a significant change in FMD (young: from 9.2±1.2; p<0.05; old: from 9.0±0.3 to 12.4±1.3; p<0.05). In C no effect was detectable.
Conclusions: The present trial provides new insight into the age-dependency of cardiovascular training effects: Among HS aging is associated with the development of endothelial dysfunction. The training effect was not significantly diminished among older patients with CHF patients. The training effect was not significantly diminished among older patients with CHF isofunction.
Purpose: Physical training has important peripheral vascular effects. Endothelial progenitor cells (EPC) play an regenerative role at the level of the endothelium. We determined a time-course of circulating EPC before/after a maximal exercise test (ET) in healthy subjects (HS) and in patients (pts) with chronic heart failure (CHF).
Methods: Eight groups (4 HS, 20 ± 0.9 yrs, Watt max 265 ± 10; 4 CHF pts, 70 ± 5 yrs, left ventricular ejection fraction 20 ± 5 %, Watt max 53 ± 10) underwent ET. Venous blood was taken before, within 10 min, after cessation of ET, after 30’, 60’, 2 - 4 - 8 - 12 - 24hrs, 2 - 4 days. Circulating CD34+/KDR+ EPC were quantified in whole blood by flow cytometry.
Results: Results are shown in the figures (mean ± SEM). ET acutely increased total leucocyte count in both groups (HS p= 0.1; CHF: p< 0.01). A second, delayed leucocytosis was documented in HS, but not in CHF pts. EPC increased acutely following ET in HS, stayed elevated for 4 hrs, whereas in CHF pts this increase was absent after the ET. EPC remained elevated the next morning in both groups, although still lower in CHF pts. Normal diurnal variation was suppressed post-ET in both groups.
Conclusion: Acute exercise induces an increase in leucocytes and EPC numbers, which is smaller and less prolonged in CHF, suggesting a general enhancement of progenitor cells in the bone marrow. Moreover, the present results might have consequences for the standardisation of blood sampling in future EPC studies. In order to avoid intra-individual variability, recent physical exercise at the time of blood sampling should be taken into account.

M420
Plasma serotonin levels and endothelial function in patients after early myocardial infarction in comparison with patients with depression.
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2Topic: Biomarkers
Objective: The serotoninergic system is known to modulate mood, emotion, sleep and appetite and thus is implicated in the control of numerous behavioral and physiological functions. Decreased serotonergic neurotransmission has been proposed to play a key role in the etiology of depression. On the other hand, serotonin release from its stores in platelets can contribute to manifestation of CHF. The present study has the objective to compare plasma serotonin levels and endothelial function measured with flow mediated dilatation method between patients after early myocardial infarction (until 45th year of age) and patient with manifest depression.
Methods: We examined 75 patients, 40 after early myocardial infarction (mean age 45.7±8.29 yrs, 15 age matched patients (46.28±6.75 years) with clinical manifest depression which was confirmed with Beck Depression Inventory and Zung selfrating depression scale and 20 controls (46.48±6.62 yrs). Plasma serotonin levels were assessed with RIA (DBR Instruments GmbH) early in the morning, fasting. We also compared mean systolic and diastolic blood pressure and heart rate from ambulatory blood pressure monitoring. Endothelial function was measured with flow mediated dilatation method as postischemic dilatation of brachial artery with endothelial dysfunction characterized as postischemic dilatation under 7% from the baseline.
Results: We found significantly higher serotonin concentrations in patient after myocardial infarction as in the control group (533.71 ± 122.85 vs. 385.87 ± 85.22 ng/ml; p< 0.05). On the other side, patients with depression had significantly lower serotonin concentrations as control (155.39 ± 62.85 vs. 385.87 ± 85.21 ng/ml; p<0.01). Endothelial function was significantly lower in patients after myocardial infarction in comparison with controls (0.25 ± 2.78 vs. 11.85 ± 4.87%; p< 0.01). We found no significant difference in endothelial function between patients with depression and control group. Correlation between serotonin concentrations and systolic blood pressure (r = -0.2817; p<0.01), heart rate (r = -0.2758; p<0.01) and endothelial function (r = -0.752; p = 0.01) was also found.
Conclusions: These data suggest that changes in the serotonin plasma concentration could be a novel risk factor for early development of atherosclerotic lesions and endothelial dysfunction. Patients with early atherosclerosis presents higher serotonin levels, probably due to predisposition to local activation of thrombosis.

M421
Association between endothelial related genotypes and aerobic power and the response to physical training in patients with coronary artery disease
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2Topic: Exercise physiology, testing and training
Purpose: the heritability of aerobic power and of the response to physical training has been shown in healthy subjects. Because there is a link between endothelial function and aerobic power, we evaluated the association of 36 polymorphisms of 9 important genes which influence endothelial function, with aerobic power or the response to physical training in patients with coronary artery disease (CAD).
Methods: 935 biologically unrelated Caucasian patients with CAD who performed an incremental exercise test until exhaustion during graded bicycle testing at baseline and after completion of 3 months of training were included in this study. Polymorphisms of the Enos gene (-195TT>C,-294GA>G, -813TT>C, -786G>A, G298A and T273>C); the Ec-sod gene (A, T), the Cat gene (C, G), the P22phox gene using PHASE software. Analyses of variance were performed using ANOVA and the results of massARRAY technology. Genetic associations can possibly explained by the large distance between genotype and the measured phenotype.
Results: Results are shown in the figures (mean ± SEM). ET acutely increased total leucocyte count in both groups (HS p= 0.1; CHF: p< 0.01). A second, delayed leucocytosis was documented in HS, but not in CHF pts. EPC increased acutely following ET in HS, stayed elevated for 4 hrs, whereas in CHF pts this increase was absent after the ET. EPC remained elevated the next morning in both groups, although still lower in CHF pts. Normal diurnal variation was suppressed post-ET in both groups.
Conclusion: Acute exercise induces an increase in leucocytes and EPC numbers, which is smaller and less prolonged in CHF, suggesting a general enhancement of progenitor cells in the bone marrow. Moreover, the present results might have consequences for the standardisation of blood sampling in future EPC studies. In order to avoid intra-individual variability, recent physical exercise at the time of blood sampling should be taken into account.

Aerobic power and genotypes

<table>
<thead>
<tr>
<th>Gene</th>
<th>Allele-carrier</th>
<th>VO2max (%)</th>
<th>VO2 (post%)</th>
<th>VO2 (pre%)</th>
</tr>
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<tr>
<td>Enos</td>
<td>273C&gt;T</td>
<td>98% ± 1.6%</td>
<td>95% ± 1.9%</td>
<td>20% ± 1.4%</td>
</tr>
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<td>97% ± 1.7%</td>
<td>21% ± 1.8%</td>
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<td></td>
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<tr>
<td>Cat</td>
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<tr>
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<tr>
<td></td>
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<td>95% ± 1.0%</td>
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</tbody>
</table>

Significant different in IVOS2: p< 0.015, p< 0.046, p< 0.005
**M422**

Exercise training induces left ventricle hypertrophy in MLP-/- mice

M Ericsson1, S H Torpy1, DP Cataldo3, G Cordeschi5, O Ellingsen1

1SThU, Tromso, Norway, 3Medical Faculty / STthU, Tromso, Norway, 5University of California, San Diego, United States of America

**Topic:** Exercise physiology, testing and training

**Objectives:**

- Regular physical activity is known to be beneficial for the heart and exercise training improves cardiac function by increased contractility and stroke volume. Mice with a congenital knockout for muscle LIM protein (MLP-/-) is a well-known model of cardiac dysfunction and reduced contractility.
- Maximal oxygen uptake (VO2max) is closely linked to cardiomyocyte contractile function and stroke volume. Our working hypothesis was that the response to exercise training is altered in MLP-/- mice.

**Methods:**

- 30 male mice were included in the study. Wildtype (WT) mice served as controls. An eight-week high-intensity exercise training programme with weekly VO2max tests was set up to follow cardiac response. Animals were either subjected to exercise training or remained sedentary.
- Treadmill running was performed in intervals, 8 min at 85-90% of VO2max, interspersed with 2 min at moderated intensity, 1 hour, 5 days a week for 8 weeks. High-frequency echocardiography was performed before and after the training programme. VO2max and maximum running speed (RS) were measured. Postanalyses were included histology.

**Results:**

- VO2max in MLP-/- and WT mice during the training period. Trained WT increased VO2max by 33%, and RS by 35%. MLP-/- improved VO2max by 8% and RS by 32%

- Hearts were increased in MLP-/- (P=0.025), and heartweight / tibialength measurements were 11% larger for MLP-/- (P<0.05), independent of training. Left ventricle mass increased by training in both MLP-/- and WT (P<0.05). Soleus muscle mass increased by 28% (P<0.05) in trained WT mice, the increase for MLP-/- was not significant. Echocardiography showed increased anterior and posterior wall thicknesses in both systolic and diastolic in trained MLP-/- (P<0.05), compared to sedentary mice. No changes in LV dimensions were recorded in the control groups, independent on training.

**Conclusions:**

- MLP-/- mice shows reduced increase in VO2maxcompared to WT controls after eight weeks of training. Anterior and posterior wall thicknesses increased by training in MLP-/- mice. However, cardiac dysfunction might not be clearly demonstrated.

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**M423**

A polymorphism in the CNTF gene, but not in CNTFR or IL-6 genes, is associated with changes in aerobic capacity after training in CAD patients

T Thomaes1, M Thomis1, S Onkelinx1, L Vanhees1

1KULeuven, Leuven, Belgium

**Topic:** Exercise physiology, testing and training

**Background and objectives:**

- There is a large heterogeneity in exercise capacity and response to training in CAD patients, of which genetic variability might be one major factor. Previous studies have described a relation between ciliary neurotrophic factor gene (CNTF) and its receptor (CNTFR and the interleukin-6 gene (IL-6) with muscular strength and fat-free mass, which are correlated with aerobic capacity. In this study we investigated the influence of polymorphisms of these genes on the aerobic capacity at baseline and after 3 months of physical training.

**Methods:**

- 93 CAD patients who performed an incremental exercise test until exhaustion were included in this study. Polymorphisms of the CNTF-gene (C710T and C1747T), the CNTF-gene (G-6A) and the IL-6-gene (G-174C) were detected using the invader assay. Genotype-phenotype analyses were performed using ANCOVA with age, sex, height and weight as covariates. Haplotype analysis was performed for the CNTFR gene polymorphisms

**Results of the G-6A polymorphism**

- of CNTFR haplotypes and none of the tested gene x gene interactions were significant.

**Conclusion:**

- The 3 most common CNTFR haplotypes and none of the tested gene x gene interactions were significant.

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**M424**

In chronic heart failure the expression of myostatin is increased in the skeletal muscle K Lenk1, V Adams1, A Links1, K Engelmann1, S Eisbr2, GC Schuler2

1University of Leipzig, Heart Centre, Leipzig, Germany

**Topic:** Heart disease

**Background:**

- In chronic heart failure (CHF) elevated pro-inflammatory cytokines and muscle wasting are associated with the terminal stage of this syndrome. It has been shown that the expression of myostatin, a key regulator of skeletal muscle mass, is increased in a variety of cachectic states.

**Aims:**

- Aim of the present study was to investigate the expression of myostatin in an animal model of CHF as well as in CHF-patients. Furthermore the role of pro-inflammatory cytokines was analysed in cell culture.

**Methods and Results:**

- In an animal model of CHF (LAD ligation model), the content of myostatin protein was elevated 2.4-fold in the skeletal muscle (CHF 2.89±0.35 vs control 0.87±0.1, P=0.01). This increase was also observed in CHF patients (CHF 0.99±0.07 vs control 0.99±0.18, P<0.05). To elucidate the impact of pro-inflammatory cytokines on myostatin expression, C2C12 myocytes were incubated with IL-1β, IL-6 and TNF-α. Only TNF-α induced the expression of myostatin through a p38MAPK-dependent pathway under participa-

**Conclusion:**

- These alterations of myostatin expression in the skeletal muscle might be one reason for the devastating process of muscle wasting in chronic heart failure.

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**M425**

Differential effects on catabolic activation in quadriceps muscle and diaphragm of rats after induction of chronic heart failure (chf)

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1University Leipzig, Heart Centre, Leipzig, Germany, 2Klinikum der Tierärzte, Bremen, Germany

**Topic:** Exercise physiology, testing and training

**Aims:**

- Muscle wasting is increasingly recognized as a cause of exercise intolerance in CHF. The catabolic process is in part mediated by the E3-Ligase Murf-1 via activation of the ubiquitin proteasome system. It is, however, unclear if respiratory muscles are equally affected by muscle catabolism as compared to peripheral skeletal muscles. Aim of this study was to examine the effects of CHF on expression of Murf-1 and the activity of manganese superoxide dismutase (Mn-SOD) in quadriceps muscle (Qua) and diaphragm (Dia) in LAD-ligated rats (MI).

**Methods:**

- Left-ventricular function was assessed in MI (n=12) and sham operated (C, n=9) rats using echocardiography and Millar catheter 12 weeks after operation. Murf-1 protein expression and multi-ubiquitin content were quantified using Western Blot and Mn-SOD activity was measured in Qua and Dia.

**Results:**

- Compared to C, MI resulted in left ventricular dysfunction (EF: 33.4±3.3 vs. 64.6±2.6 %, p<0.01; LVEDD: 9.6±0.3 vs. 6.8±0.2 mm, p<0.01, dP/dmax: 4.4±0.5 vs. 5.8±0.5, p=0.02). MI resulted in a 4.5-fold increase in Murf-1 expression in Qua (3.7±0.2 vs. 3.6±0.3 arb. units, p<0.001). A negative correlation was observed with EF (r=-0.66, p=0.01), a positive one with LVEDD (r=0.59, p=0.03). MI also resulted in an increase in the ubiquitin content in Qua (514±47.1 vs. 295±47.1 arb. units, p=0.05). Mn-SOD activity decreased in MI (0.18±0.1 vs. 1.4±0.4, p<0.01). This was negatively correlated with Murf-1 expression (r=-0.53, p=0.04). MI also resulted in an increase of Murf-1 protein expression in Dia (2.2 fold, 2.6±0.4 vs. 1.3±0.3 arb. units, p<0.05) but no difference in ubiquitin content was detectable (46.3±1.7 vs. 46.3±5.9 arb. units, p=0.99). In contrast to Qua Mn-SOD activity increased with CHF in Dia (2.4±0.5 vs. 0.7±0.4, p<0.01). All observed correlations in Qua could not be detected in Dia.

**Conclusion:**

- MI resulted in CHF accompanied by an increase of E3-Ligase Murf-1 and ubiquitinated proteins in peripheral muscle. This increase was significantly correlated with left ventricular dysfunction and decreased antioxidative capacity in quadriceps muscle. One reason for the attenuation of catabolism in the quadriceps muscle compared to the diaphragm is the different activation of the E3-Ligase Murf-1 via activation of the ubiquitin proteasome system.
Effects of mild and intensive exercise on insulin muscular intracellular signaling of old rats

AD Assanelli1, FV Flati2, CF Carre3, SS Speca4, PE Pasini5, RF Rannou6, LDS Le Douairon6, CS Caracciolo7
1Chair of Sport Medicine University of Brescia, Brescia, Italy, 2Chair of Experim. Medicine Univ. L’Aquila, L’Aquila, Italy, 3Inserm U642, F-35000, Rennes, Rennes, France, 4Chair of Experim. Medicine Univ. L’Aquila, L’Aquila, Italy, 5Mauggeri Foundation Lumezzane Brescia, Lumezzane Brescia, Italy, 6UFR STAPS Universite Rennes 2, Rennes, France, 7Chair of Microbiology University of Brescia, Brescia, Italy

Topic: Physical activity

Elderly is characterised by insulin resistance. Recently it has been demonstrated that aerobic exercise overcomes the age-related, insulin resistance by improving mTOR signaling in elderly humans. However we do not know the intracellular molecular effects of different levels of physical training on aged skeletal muscle.

Aim: The aim of this study was to analyse the effects of mild and high exercise activity on skeletal muscle cytoplasmatic insulin signalling. We studied rats trained as previously described by Barbier and co-workers. We used 3 groups of 6 animals each : 1) old (18 months) sedentary controls, 2) old with mild physical activity ( treadmill 2 h./day for 2 days/ week for 3 months ) and 3) old with high physical activity. ( treadmill 2 h./day for 5 days/ week for 3 months ) -6 hours after the end of the last exercise rats have been scarified. Quadriceps and left ventricle were isolated and frozen in liquid nitrogen and then stored at -80 C. We measured, in the tissues collected, intracellular insulin signalling (insulin-Receptor, IRS1, mTOR and Glut 4 , by molecular biology).

Results: in the skeletal muscle mild exercise significantly decreased insulin receptors (IR) (from 7200 to 3150 absorbance) and Glut 4 (from 7550+-250 to 3200+- 98 absorbance) while high exercise did not modify IR and Glut 4. On the contrary, mild activities significantly increased IRS 1 (from 10+-2 to 6187+- 250 absorbance) and high activity influenced mTOR (2998+-79 to 12800+- 300 absorbance).

In the heart high activities significantly increased both IR (from 7020+- 145 to 5650+- - 65 absorbance) and Glut 4 (from 7800– 300 to 4030– 45 absorbance). While mild activities did not modify IR but increased IRS 1 (from 50–10 to 3800–130 absorbance) and mTOR (from 1550– 150 to 5580– 280 absorbance).

Conclusion: insulin skeletal muscle signaling is dramatically impaired in old animals. Mild physical activity reactivated the expression of crucial proteins involved in muscle insulin signaling. However insulin signaling of cardiac and skeletal muscle had different behaviour, suggesting different metabolism and function of the two organs.

The alpha-adducin Gly460Trp variant increases the risk of stroke in hypertensive Dutch women

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1University Medical Centre Utrecht, Utrecht, Netherlands, 2University Hospital Maastricht, Maastricht, Netherlands

Topic: Genetic-environmental interactions

Objectives: The Gly460Trp variant of the α-adducin gene has been associated with renal sodium retention and salt-sensitive hypertension. Independent of blood pressure, salt sensitivity has been related to cerebrovascular events. We studied the risk of stroke, coronary heart disease (CHD), and myocardial infarction (MI), associated with the α-adducin variant and examined the extent to which this risk is modified by the presence of hypertension.

Methods: We performed a case-cohort study in a prospective cohort of 15,236 initially healthy Dutch women. We applied a Cox proportional hazards model with an estimation procedure adapted for case-cohort designs to study the relation of the polymorphism and CHD (n=210), MI (n=71), any stroke (n=74), and ischemic stroke (n=49).

Results: Subjects with the Gly460Trp variant had a 2.8 times higher risk of stroke (95% confidence intervals [CI] 1.3-5.8) under the dominant genetic model, which did not attenuate after adjustment. The same pattern was found under per-allele comparison. Risk of ischemic stroke in the variant allele carriers was 3.9 times higher than in subjects with the common genotype (95% CI 1.7-8.6) using dominant inheritance model. The same patterns were found under per-allele comparison. CHD and MI were not related to the variant. The risk of ischemic stroke was more pronounced among women with systolic hypertension (10.9; 95% CI 3.6-33.5).

Conclusions: The findings in this prospective study in a population based cohort of Dutch women strongly suggest that presence of the α-adducin Gly460Trp polymorphism increases the risk of stroke. This risk is particularly elevated in the presence of systolic hypertension.
M428

**The effects of regular aerobic exercise on vascular function in the diabetic population.**

**SMM Hospital of Udine, Udine, Italy, 2Milan, Italy**

**Abstract:**

**Objectives:**

To evaluate the effects of regular aerobic exercise on endothelial function in middle-aged diabetics.

**Methods:**

A cohort of 1904 healthy, middle-aged (50-70 years) individuals were included. All participants underwent an exercise test and a vascular function test. The exercise test was performed on a treadmill at a submaximal intensity to achieve a heart rate of 75-85% of the maximum heart rate. The vascular function test was performed before and after the exercise test. The main outcomes were the maximal flow-mediated dilation (FMD) value (FMD%) and the FMD time-course (time to the maximal endothelium-dependent dilation).

**Results:**

The maximal FMD value (FMD%) and the FMD time-course (time to the maximal endothelium-dependent dilation) were significantly higher in the group that performed regular aerobic exercise compared to the group that did not perform regular aerobic exercise. The median FMD% was 6.6 (IQR: 3.8-11.8) vs 3.8 (IQR: 2.6-7.5), and the median time to the maximal endothelium-dependent dilation was 11.2 seconds versus 12.07 seconds.

**Conclusions:**

Regular aerobic exercise improves endothelial function in middle-aged diabetics.

**M429**

**Cardiac structure and function in twins discordant for leisure time physical activity for 32 years.**

**1University of Jyvaskyla, Jyvaskyla, Finland, 2University of Helsinki, Helsinki, Finland**

**Topic:** Physical activity

**Abstract:**

**Purpose:**

To investigate the effects of long-term leisure time physical activity on cardiac structure and function in twin pairs who have been discordant for their leisure time physical activity habits for 32 years.

**Methods:**

Twelve middle-aged and elderly (50-67 years) same-sex twin pairs [five monozygotic (MZ) and seven dizygotic (DZ)] were studied as a part of the TWINACTIVE study. The discordance in leisure time physical activity habits was initially determined in 1975 and it remained significant during the follow-up until 2007. At the end of the follow-up, standard cardiovascular magnetic resonance imaging was performed.

**Results:**

At the end of the follow-up, resting heart rate was lower in the active than inactive co-twins (59 ± 11.2 vs 64.8 ± 11.6, p = 0.001), and their maximal FMD value was higher (Subgroup 1: 7.3 ± 2.9% versus Subgroup 2: 5.7 ± 2.3%, p = 0.001). In the multivariate analysis of the whole group, after adjustments for age, sex, brachial artery diameter, body mass index, total serum cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, triglycerides, serum creatinine, glucose, high-sensitivity C-reactive protein, systolic and diastolic blood pressure, heart rate, and smoking, physical activity emerged as a multivariate determinant of both FMD time-course (b = -12.6, p = 0.001) and FMD% (b = -9.96, p = 0.023).

**Conclusions:**

Habitual physical activity is associated with faster endothelium-dependent dilation, and augmented FMD response, independent of other factors. Regular leisure-time physical activity has beneficial effects on endothelial function in healthy adults.
Late Luminal Loss

**Maximal exercise capacity in adults with congenital heart disease**

R Buys1, W Buiks2, I Deteleux3, A Stevens4, I Vanschepdael5, A Kalboutsu6, A Deligiannl7

**Topic:** Exercise physiology, testing and training

**Purpose:** investigations on exercise capacity in adult patients with congenital heart disease (GUCH) mostly report on small groups without comparison to matched control subjects. Our aim is to evaluate whether GUCH can perform an exercise test as maximal as healthy subjects, and to investigate submaximal substrates of exercise capacity.

**Methods:** adult patients with Tetralogy of Fallot (TF, age 25.7±7.6 y), Transposition of the Great Arteries (TGA, age 22.4±6.3 y) and Coarctation of the Aorta (COA, age 27.4±8.9 y) and 138 healthy adults (Controls, age 32.4±11.4 y) performed a cardiopulmonary exercise test until exhaustion. VO2 and VC20 were determined during the exercise test. The Oxygen Uptake Efficiency Slope (OUES) and VE/VO2-slope were calculated and the ventilatory anaerobic threshold (VAT) was defined. Comparisons of means were performed by ANOVA. Correlations between peak VO2 and the OUES, VE/VO2slope and VAT were calculated.

**Results:** GUCH showed a significantly lower exercise tolerance than controls, ranging from 80% in COA to 64% in TGA. Peak RER reached values indicating a near maximal exercise, but was significantly lower than controls. Therefore the lower values of maximal exercise capacity may be partly explained by a lower degree of exercise intensity. The same information on exercise capacity can be withheld by using submaximal exercise parameters. Of all submaximal parameters, VT (0.845, p<0.0001) correlated best with peak VO2, followed by VE/VO2slope (r=0.453, p<0.0001). Conclusion: although near maximal exercise testing can be performed in GUCH, OUES and determination of VAT may be used to accurately interpret the exercise tolerance. **Exercise parameters**

<table>
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<th>Control (N=18)</th>
<th>COA (N=45)</th>
<th>TF (N=91)</th>
<th>TGA (N=85) (N=88)</th>
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<tr>
<td>peak VO2 (mL/min/kg)</td>
<td>37.4 ± 8.6</td>
<td>31.8 ± 8.2</td>
<td>29.5 ± 8.04</td>
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<tr>
<td>% predicted peak VO2</td>
<td>101 ± 17.5</td>
<td>79.6 ± 14.8</td>
<td>74.4 ± 16.2</td>
</tr>
<tr>
<td>peak RER</td>
<td>1.22 ± 0.12</td>
<td>1.16 ± 0.09</td>
<td>1.12 ± 0.12</td>
</tr>
<tr>
<td>VAT (W)</td>
<td>129 ± 48.6</td>
<td>115 ± 36.4</td>
<td>109 ± 33.3</td>
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<tr>
<td>OUES</td>
<td>3020 ± 796</td>
<td>2646 ± 778</td>
<td>2481 ± 735</td>
</tr>
</tbody>
</table>

Data are presented as means ± SD. **Significant difference with control group p<0.0001.** [Significant difference between COA and TF p<0.05, **Significant difference between TF and TGA p<0.05, **Significant difference between COA and TGA p<0.05.**

**Cardiac autonomic function and cardiopulmonary efficiency in power-trained athletes using anabolic steroids**

E Kouidi1, N Koutlianos1, A Kalboutsu2, A Deligiannl3

**Topic:** Exercise physiology, testing and training

The effect of anabolic androgenic steroids (AAS) use on athletes’ cardiac autonomic activity in terms of heart rate variability (HRV) is not yet studied. Furthermore, cardiorespiratory data exist regarding the cardiopulmonary performance in athletes abusing AAS. Therefore, the purpose of the study was to inquire the effect of long-term systemic AAS use on cardiac autonomic and cardiopulmonary efficiency in power-trained athletes. Finally, 49 subjects participating in power-type sport disciplines were examined. Particularly, 19 athletes (age 25.8±8.3 y) using AAS according to their state, formed group A and 19 non-users comprising group B (age 22.6±3.1 y) and the other 7 non-users in group C. AAS users had significantly higher HRV parameters and experienced at least 3 years of continuous AAS intake. All subjects underwent clinical examination and head-up tilt test of four-board support type using the 30-min protocol in order to evaluate the baroreflex sensitivity and HRV modulation. Furthermore, all athletes underwent a maximal spiroergometric test on a treadmill for the measurement of maximal aerobic capacity. The tilt test results showed that Group A presented significantly lower total event counts and baroreflex effectiveness index compared to group B by 24.4% and 10.5%, respectively (p<0.05). Regarding HRV analysis no significant differences were observed in all HRV indices between the two groups. However, cardiopulmonary test analysis showed that AAS users had significantly higher time to exhaustion than controls by 17.7% (p<0.05) as well as maximal oxygen uptake and anaerobic threshold (35.56±9.9 vs 39.92±7.0 mL/kg/min and 28.9±10.1 vs 20.6±4.9 mL/kg/min, respectively, p<0.05). No significant correlations were established between cardiopulmonary testing and baroreflex sensitivity or HRV parameters in both groups. However, the years of training experience were found to be significantly negatively correlated with the total mean reflective responses (slope) of the detected events in the tilt test in group A (r = -0.61, p<0.05). On the contrary, this correlation was found to be significantly positive in group B (r = -0.73, p<0.05). Furthermore, the total mean slope was found to be significantly negatively correlated with the low to high frequency HRV spectral band ratio by -0.56 and -0.80 in groups A and B, respectively (p<0.05). It is concluded, that systemic use of AAS in athletes alters the haemodynamic responses according to the baroreflex sensitivity changes. Additionally, it is supported that AAS increase the aeroergic capacity of the athletes from the known increase of their muscle strength.
**Beneficial effect of Aerobic Training in Multiple Sclerosis**


1. G. Da Saliceto Hospital, Piacenza, Italy, 2. University Hospital, Parma, Italy, 3. Piacenza, Italy

**Topic: Physical activity**

**Background and Purpose:** Physical deconditioning is involved in the impaired exercise tolerance of patients with multiple sclerosis (MS), but data on the effects of aerobic training (AT) in this population are scant. The purpose of this study was to compare the effects of an 8-week AT programme on exercise capacity, in terms of walking capacity and maximum exercise tolerance, as well as its effects on fatigue and health-related quality of life, as compared with neurological rehabilitation (NR) in subjects with MS.

**Subjects and Methods:** Nineteen subjects (14 female, 5 male; mean age 41.8 ± 8 years) with mild to moderate disability secondary to MS participated in a randomised crossover controlled study. Eleven subjects (8 female, 3 male; mean age 44.6 ± 6 years) completed the study.

**Results:** After AT, but not NR, the subjects’ walking distances and speeds during a self-paced walk were significantly improved, as were their maximum work rate, peak oxygen uptake, and oxygen pulse during cardiopulmonary exercise tests. The increases in peak oxygen uptake and maximum work rate, but not in walking capacity, were significantly higher after AT, as compared with after NR. Additionally, the subjects who were most disabled tended to benefit more from AT. There were no differences between AT and NR in effects on fatigue, and the results showed that AT may have partially affected health-related quality of life.

**Discussion and Conclusion:** The results suggest that AT is more effective than NR in improving maximum exercise tolerance and walking capacity in people with mild to moderate disability secondary to MS.

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**Efficacy of home-based exercise programmes for patients with chronic heart failure: a meta-analysis**

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1. Princess Alexandra Hospital, Brisbane, Australia, 2. The University of Queensland, Brisbane, Australia

**Topic: Physical activity**

**Objective:** traditionally, exercise training for patients with heart failure has concentrated on supervised centre-based programmes. However, home-based programmes may offer an alternative to conventional programmes or as a means of maintaining physical fitness after graduating from centre-based programmes. This review was undertaken to examine the effectiveness of home-based exercise programmes on exercise capacity in patients with heart failure, compared with usual medical care.

**Method:** Literature searches were performed using electronic databases to identify randomised controlled trials of home-based exercise programmes. Protocols included an initial period of centre-based exercise training followed by exercise in the individual home environment, home-based exercise training only, and concurrent centre and home-based exercise training. Outcome measures included peak oxygen consumption, exercise duration and the 6-minute walk test.

**Results:** a total of 18 relevant papers were identified for review. The mean improvement in peak oxygen consumption was 3.05 ml/kg/min (95% confidence interval [CI], 1.56 to 4.54). Exercise duration increased by 1.94 minutes (95% CI, 0.89 to 2.98) and distance on the 6-minute walk test was increased by 38.02 meters (95% CI, 5.36 to 70.67). Other reported benefits of home-based programmes include increased quality of life, improved self-efficacy and lowered hospital admission rates.

**Conclusions:** home-based exercise programmes have been shown to benefit people with heart failure in the short-term. Further research is required to investigate the long-term effects of home exercise and to determine the optimal strategies for improving exercise adherence in patients with heart failure.
Conclusion: Our results suggest that the difference between central and brachial systolic blood pressure is affected by age and cardiovascular risk factors. This is probably due to large vessel stiffening by atherosclerosis.

P439

White coat hypertension in children

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Introduction: Identification and treatment of hypertension should be an important focus of physicians caring for children. Recognition of systemic hypertension in children requires careful blood pressure measurement using proper technique to compare with appropriate normative data. The aim of our study was to select out of ambulatory blood pressure monitoring for identified children with white coat hypertension, thus avoiding unnecessary diagnostic testing and treatment these children.

Methods: 454 children (aged 12 to 19 years) participated in the study. Based on office systolic and diastolic blood pressure measurements and 24-hour ambulatory blood pressure monitoring, subjects were placed into one of three groups: normotensive, white coat hypertensive and hypertensive. Results: Forty-five percent (206 children) of 454 subjects with systolic or diastolic blood pressures greater than or equal to 95 percentile were classified as white coat hypertension, 55% remained hypertensive. The ambulatory blood pressure monitoring patterns of white coat hypertensive patients were significantly different from those of hypertensive patients.

Conclusions: This study documented the existence of white coat hypertension in children and showed that white coat hypertensive children were significantly different from hypertensive children on most comparison of 24-hour ambulatory blood pressure monitoring data. Also, when age and sex were controlled, heavier children had a more significant chance of having elevated systolic blood pressure than normal weight children.

P440

Effects of exercise training on haemodynamic, hormonal and metabolic profile in normotensive young women at high familial risk of hypertension

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1University of São Paulo - Medical School, São Paulo, Brazil

Purpose: offspring of essential hypertensive parents (OHT) are at high-risk of future hypertension and subsequent cardiovascular diseases. Although several metabolic and haemodynamic abnormalities has been associated with family history of hypertension, there is limited information regarding whether increased arterial stiffness and endothelin levels precede the onset of hypertension in young OHT women. Moreover, there is little information about the effects of exercise training in this population.

Methods: healthy sedentary women with two parents (OHT2: n=15; 25.4±6.6 years; BMI = 23.8±4.5 kg/m²), one parent (OHT1: n=17; 24.9±4.1 years; BMI = 23.9±4.5 kg/m²), or no parents with hypertension (ONT: n=12; 24.4±2.7 years; BMI = 23.8±2.2 kg/m²) were studied. 24-hour ambulatory blood pressure monitoring (24-h ABPM), cardio-femoral pulse wave velocity (PWV), and biochemical analysis (total cholesterol and fractions, triglycerides, glucose, endothelin and catecholamines) were evaluated. The OHT women were further randomly assigned to a three times-a-week exercise training (OHTex) or control (OHTcon) group, and had the haemodynamic and biochemical parameters evaluated after 16 weeks.

Results: 24-h ABPM was not different between groups at baseline. However, PMV was 7.2% and 11.7% higher in OHT2 than OHT1 and ONT, respectively (p<0.01), and tended to be higher in OHT3 than ONT (p=0.06). Catecholamines and endothelin were higher in OHT2 and OHT1 than ONT (p<0.01), but were not significantly different between OHT groups. There were no significant differences in comparison between glucose, triglycerides, and total and HDL cholesterol; however LDL cholesterol tended to be higher in OHT2 than ONT (p=0.06). On the other hand, exercise training, reduced PMV (7.54±0.57 vs. 7.21±0.55 m/s; p=0.03), norotephrine (237±9.93 vs. 144±2±56 µg/ml; p=0.001), endothelin (4.0±1.1 vs. 3.8±0.1 µg/ml; p=0.04) and LDL cholesterol (108±6.281 vs. 98±1±99 mg/dl; p=0.04) in OHTex to levels similar to those of ONT. Systolic, diastolic and mean BP during the nighttime, and systolic and mean 24-h BP were also reduced in the OHTex after follow-up. There were no significant differences in any parameter between OHTcon or ONT after the follow-up.

Conclusion: normotensive young women offspring of hypertensive parents showed early haemodynamic, hormonal and metabolic alterations typical of hypertension, which were reduced by exercise training to levels similar to those of young women without history of hypertension. These results suggest that exercise training may have a potential role in the management of an inherited hypertension disorder.

P441

Independent relationship of serum uric acid level and impaired autonomic function with night blood pressure in untreated dipper and non-dipper hypertensive patients

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Topic: Hypertension

Background: The lack of nocturnal decline in blood pressure (BP) is associated with an increase in cardiovascular events. In this study, we aimed to evaluate the association of night blood pressure, serum uric acid, the low-grade inflammation and cardiac autonomic function in untreated dippers and non-dipper hypertensive patients.

Methods: Ninety-two eligible consecutive patients attending for initial evaluation of hypertension were enrolled in this study. The association of hsCRP with HRV (SDNN) was investigated. Ambulatory BP measurements, heart rate variability (HRV) indices were obtained over 24 Holter ECG recordings, high sensitive C-reactive protein (hsCRP) and serum uric acid levels (SUA) were measured in all patients. The univariate analyses and then multivariate linear regression analyses were performed.

Results: The HRV indices (SDNN, SDANN and Triangular index) were inversely correlated with hsCRP (r=-0.425, p<0.001; r=-0.431, p<0.001; r=-0.363, p<0.001) and night BP measurements (for night mean BP: r=-0.286, p=0.008; r=-0.215, p=0.016; r=-0.254, p=0.025; respectively). SUA levels were positively correlated with night BP measurements (for night mean BP: r=0.260, p=0.012; night systolic BP: r=0.249, p=0.016; night diastolic BP: r=0.249, p=0.016). In multivariate linear regression analyses, hsCRP and age were independent predictors of cardiac autonomic dysfunction (for SDNN: β=-0.380, p=0.002; and β=-0.256, p=0.006; respectively) and, SUA and HRV indices were independent predictors of night BP measurements (for night mean BP: SUA: β=0.276, p=0.006; SDNN, β=0.233, p=0.012).

Conclusion: Our study findings suggest that the lack of nocturnal decline in BP is independently associated with SUA levels and the autonomic dysfunction. These independent relationships may play an important role in the pathogenesis of hypertension.
Heart rate variability changes in children with systemic hypertension

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Topic: Hypertension

Aim: Find out changes in parameters of time domain analysis of heart rate variability (HRV) in children with systemic hypertension and compare them with healthy controls.

Methods: 80 subjects in age from 14 to 16 were examined in this study. - 40 subjects with essential hypertension and 40 healthy subjects (control group). Four parameters of HRV from 24-hour Holter monitoring have been analysed (SD, pNN50, rMSSD, triangular index). GiOtto ECG Holter monitor (Medatron) was used in each child. Time domain analysis parameters have been compared by using Mann-Whitney test (p<0.05).

Results: Parameters (MSSD and pNN50) was significantly decreased in children with systemic hypertension (p<0.05).

Conclusions: Parameters reflecting mainly parasympathetic activity (pNN50 and rMSSD) were significantly decreased in children with systemic hypertension.

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Conclusions: Parameters reflecting mainly parasympathetic activity (pNN50 and rMSSD) were significantly decreased in children with systemic hypertension.
**Biomarkers**

**Objective:** The risk of arterial hypertension onset in adults with risk factors over three-year period.

**Methods:** Data were obtained from ‘Blood Pressure Screening and Survey in Yerevan Adult Population’ study conducted in April-May 2004 and re-screening performed in April-May 2007. In 2004 survey 543 adults with OBp, NBP and HNBp were revealed. From them 167 (29%) male, aged 40.4±14.6 years were randomly selected and underwent to re-screening in 2007. During both studies subjects' BP was measured and body mass index (BMI) was calculated. AH was defined as ≥140/90 mm Hg for those who was receiving antihypertensive medications. BMI ≥25 kg/m² was considered as overweight; and BMI ≥30 kg/m² as obesity. Smoking status was ranked in 5 categories: nonsmokers and current smokers (<5 cig/day, 6-9 cig/day, 10-20 cig/day and >20 cig/day). Alcohol consumption was graded by current drinking frequency in 3 categories: nondrinkers, mild drinkers (1-2 times per week), and frequent drinkers (>2 times per week).

**Results:** During a 3-year follow-up, in 14 (8.4%) subjects, AH was developed (male/female ratio 2.5:1). As compared with risk in subjects with OBp or NBP, the relative risk of AH in subjects with HNBp was 3.3 (SEM 10.5; 95% CI: 2.0-40.8). Mean BMI was significantly increased (SEM 0.27; 95% CI: 1.030.01; p=0.043). A smoking and alcohol consumption status were also significantly changed over 3-year period. Positive correlations between BP and male sex, BMI, age in 2007, and heavy drinking (2004) and smoking in 2004 were revealed (table).

**Conclusion:** This prospective study demonstrates an 8.4% onset of arterial hypertension in Yerevan adults with optimal (OBp), normal (NBP) and high normal blood pressure (HNBp) over a 5-year period, which was significantly associated with age, gender (male sex), excessive weight, heavy drinking and smoking.

**Table 1:**

<table>
<thead>
<tr>
<th>r between BP and Male sex</th>
<th>2004</th>
<th>2007</th>
</tr>
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<tbody>
<tr>
<td>0.186*</td>
<td>0.171</td>
<td>0.175*</td>
</tr>
<tr>
<td>0.071</td>
<td>0.241*</td>
<td>0.292*</td>
</tr>
<tr>
<td>0.166*</td>
<td>0.316*</td>
<td>0.280*</td>
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</tbody>
</table>

*p<0.05; **p<0.01

**Heart-type fatty acid-binding protein in the early diagnosis of acute coronary syndrome: systematic review of a novel biomarker**

**Methods:** Systematic literature search was performed to identify studies estimating the diagnostic value of H-FABP in ruling in or ruling out ACS in patients suspected of ACS, that were published before August 2008. We included studies that provided 2-by-2 tables in which patients were assigned to one of four categories: true positive (TP), true negative (TN), false positive (FP), and false negative (FN). We did not use a valid reference standard (according to, then, current international guidelines on acute coronary syndrome) were excluded. For each article the diagnostic 2 by 2 table was reconstructed and prevalence, negative predictive value (NPV), positive predictive value (PPV), sensitivity, and specificity were calculated.

**Results:** Of the 1346 original articles we retrieved, 16 studies (2035 patients) satisfied the selection criteria for quality assessment (mean age 54.6±16.9 years, prevalence of ACS ranged from 16% to 74%). Results were not pooled, because of large heterogeneity between the studies, especially in the methods used to assess H-FABP levels and in the cut-off value chosen; four different ELISA laboratory tests and 4 different point of care tests were applied with cut-off values ranging from 5.1 to 16.8 ng/ml. Also the time since symptom onset differed considerably: range <30 minutes to ≥24 hours. Using linear regression analyses we did find an association of the prevalence of disease with both the PPV (beta 0.5, 95%CI 0.1 - 1.0) and NPV (beta 0.3, 95%CI 0.2 - 0.4). Conclusions: In a setting with a low prior probability of ACS (in primary care) the NPV of H-FABP has the highest diagnostic value and H-FABP seems useful to rule out ACS, whereas in a setting with a higher prevalence of ACS (emergency room/ coronary care unit) the PPV provides most diagnostic information and could be useful to rule in ACS. In two large ongoing diagnostic studies we will further assess the added value of H-FABP in suspected patients in both the primary and secondary care setting.
P450
Perioperative predictors of myocardial troponin I release in patients undergoing mitral valve surgery
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Topic: Biomarkers
Purpose: Troponin I release is a well-known indicator of myocardial injury in patients undergoing heart surgery, but few studies have investigated the perioperative, intra-operative and postoperative predictors of troponin I release in patients undergoing mitral valve surgery. The aim of this study was to determine the association of these 3 variables with the increase of troponin I above a threshold value significantly related to an adverse cardiac event in this type of patients. This effect occurred when one or more of these conditions were fulfilled: [1] need of inotropes or intracardiac balloon pump for at least 24 hours; [2] occurrence of low cardiac output syndrome intra-operatively or postoperatively; [3] length of the stay in intensive care unit above 3 days; [4] organ failure; [5] death of patient; [6] acute myocardial infarction during or after the surgery.
Methods: A multivariate analysis of 72 predictors in 185 consecutive patients (60% male) undergoing mitral valve repair or replacement. Data were collected prospectively and 3 sets of database (preoperative, intra-operative, postoperative) were created. For all analyses, the troponin I variable was dichotomized (less or equal/14 ng/ml of troponin I) after the Radio Operator Curve was generated. We performed a multiple, forward, stepwise logistic regression to determine if any variable remained significantly associated with troponin I after controlling the others in each database.
Results: When the 72 putative predictors were entered into a stepwise logistic regression analysis, the first variable to enter the model was the length of the continuous extracorporeal circulation (CEC) (OR: 1.042; 95% CI: 1.019-1.064; p<0.05) followed by the start or not of norepinephrine or epinephrine infusion in operating theatre (OR: 0.25; 95% CI: 0.077-0.808; p<0.05). None of the other variables were significant predictors of a troponin I peak release above 14 ng/ml. The final model was highly significant ( Hosmer and Lemeshow’s test, p<0.05).
Conclusions: The multivariate analysis showed that: [1] every minute of CEC is associated with elevated levels of a “third factor” are found in end-stage renal disease patients. One of the most prominent is endogenous ouabain (EO). Ouabain causes hypotension, impairs renal function and promotes cardiac hypertrophy. The aim of this study is to investigate the relationship between circulating EO and GFR using two groups of patients: 1) mild hypertensives and 2 patients undergoing cardiovascular surgery where acute renal failure is a common and threatening complication.
Methods: 277 unselected patients with hypertension (female 48, male 229, age 45 ± 0.58 years) and preliminary data among 23 consecutive cardiac surgery patients were analysed.
Results: Among hypertensive patients plasma levels of EO were positively correlated with diastolic blood pressure (r=0.279, p=0.0001) and GFR (r=0.174, p=0.06). In cardiac surgery patients, haemodynamic support to obtain a mean arterial pressure >70 mmHg, fluid administration to increase central venous pressure >10 mmHg, and loop diuretics to maintain a urine output >0.5 mL/kg/h were applied. On the first day after surgery plasma EO levels increased from 150.3 ± 20.8 to 207.6 ± 27.6 pmol/L (p=0.009, ANOVA repeated measure). Plasma creatinine was strongly related to circulating EO either before (r=0.479, p=0.021) or after (r=0.456, p=0.044) surgery.
Conclusions: When taken with prior observations, the positive correlation of EO with GFR in both patient groups shows that elevated plasma levels of EO precede glomerular disease and raise the possibility of a casual link between the endogenous glycosides and glomerular damage.

P451
Can glucose metabolism replace classical outcome predictors in postcardiac infarction patients?
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Topic: Biomarkers
Introduction: several markers of metabolic imbalance have been identified in acute myocardial infarction (AMI) patients, but the question still remains of which markers have a superior predictive value to the classical predictors. The aim of this study was to determine if any metabolic parameter remained significantly associated with troponin I after controlling the others in each database.
Methods: The primary outcome measurement was postoperative NT-proBNP release. Median (interquartile range) plasma concentrations of NT-proBNP before surgery were 402 (115-887 pg/ml) and the TEA group (p=0.016) after 24 hours after surgery it increased to 1846 (1135-3687 pg/ml) vs. 5005 (2220-11377 pg/ml), p=0.01. There were more patients (p=0.043 in the control group (946±19.5 mg/L) than in the TEA group (496±8.85 mg/L) with an intensive care unit (ICU) stay longer than 4 days. A multivariate analysis that included all pre- and intra-operative factors showed that the absence of perioperative β-blocker therapy (OR 0.394; 95% CI: 1.123-13.833; p=0.03) and the absence of epidural catheter (OR 3.91; 95% CI: 1.06-14.619; p=0.04) were the only variable independently associated to a prolonged ICU stay.
Conclusions: epidural, added to a standard general anaesthesia for CARG, significantly attenuates NT-proBNP release in elderly patients and could be associated to a reduced incidence of prolonged ICU stay.
P454 Serum oxidisability potential of ischemic heart disease patients predicts exercise test results and severity of disease
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1Tilburg University, Tilburg, Netherlands
2Bnei-Zion Medical Centre, Haifa, Israel
Topic: Biomarkers
Aim: To find out whether serum oxidisability potential correlates with exercise test parameters and predicts its results.
Background: Oxidative stress leading to modification of low-density lipoprotein is a central paradigm of atherogenesis and plaque destabilisation. The thermochemoluminiscence (TCL) assay measurement is based on heat-induced oxidation of biological fluids leading to the formation electronically excited species in the form of unstable carbonyls. Photons emission is measured for 300 sec and the obtained curve is described as the amplitude of the kinetic curve and its slope (r > r > TCL). TCL ratio correlations with exercise duration (ED), metabolic equivalents (METs), maximal heart rate (maxHR), maximal systolic BP (MBP), >1mm S-T depression, Diabetes, Hypertension, Smoking, LV ejection fraction (LVEF) were calculated and compared to the TCL ratio of normal controls.
Results: High TCL ratio (r) correlated well with METs, r = 0.84, with maxHR, r = 0.79, and with exercise-induced T-S segment shift, r = 0.87. A lower serum oxidisability potential expressed as low TCL ratio, thus, a previous high oxidative stress, was found in IHD patients compared to normal controls, and in patients with low LVEF in particular. The TCL ratio (% difference CHF) among IHD patients was 193±24 compared to 215±13 in control group. p<0.05 in patients with <40% LVEF, 186±14 vs 200±11 in 50 patients with >40% LVEF, p<0.01. A trend for lower TCL ratio (%) was found in diabetic, hypertensive, and post-CABG patients. A paradoxically low TCL ratio (low oxidisability potential) observed in patients without S-T depression compared to patients with S-T depression (189±22 vs 20±15, p<0.05) is due to the fact these patients had a much lower exercise capacity as well as a much lower LVEF.
Conclusions: Serum oxidisability potential is associated with exercise test parameters, results and CAD severity.
TCL ratio, an "easy to measure marker" might be incorporated into risk assessment and prediction in chronic ischemic heart disease patients.

P455 Cognitive but not somatic symptoms of depression are associated with increased pro-inflammatory cytokine levels in congestive heart failure
S Schmidt Pedersen1, ORF Smith1, HM Kupper1
1Zew Medical Centre, Haifa, Israel
2Bnei-Zion Medical Centre, Haifa, Israel
Topic: Biomarkers
Aim: To find out whether serum oxidisability potential correlates with exercise test parameters and predicts its results.
Background: Oxidative stress leading to modification of low-density lipoprotein is a central paradigm of atherogenesis and plaque destabilisation. The thermochemoluminiscence (TCL) assay measurement is based on heat-induced oxidation of biological fluids leading to the formation electronically excited species in the form of unstable carbonyls. Photons emission is measured for 300 sec and the obtained curve is described as the amplitude of the kinetic curve and its slope (r > r > TCL). TCL ratio correlations with exercise duration (ED), metabolic equivalents (METs), maximal heart rate (maxHR), maximal systolic BP (MBP), >1mm S-T depression, Diabetes, Hypertension, Smoking, LV ejection fraction (LVEF) were calculated and compared to the TCL ratio of normal controls.
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Conclusions: Serum oxidisability potential is associated with exercise test parameters, results and CAD severity.
TCL ratio, an "easy to measure marker" might be incorporated into risk assessment and prediction in chronic ischemic heart disease patients.

P456 N-terminal pro-B-type natriuretic peptide for in-hospital prognosis after coronary artery bypass grafting.
M Gonfraldi1, G Landoni1, E Bignami1, C Gardini1, S Turi1, G Cozotto1, G Bruno1, A Zangrillo1
1IRCCS H San Raffaele, Milan, Italy
Topic: Biomarkers
Aim: To investigate release of N-terminal amino-acid sequence of the pro-B-type natriuretic peptide (NT-proBNP) after coronary artery bypass grafting and its prognostic characteristics.
Methods: observational study of 184 patients in which we determined plasma concentrations of NT-proBNP just before anaesthesia induction and 24 hours after the end of the surgery.
Results: NT-proBNP concentrations increased from a median of 270 (interquartile range 75-786) pg/ml preoperatively to 1664 (928-3393) pg/ml on postoperative day 1 (p<0.001). all postoperative values were higher than preoperative ones. NT-proBNP concentrations at day 1 were correlated to those at day 0 (r=0.34, p<0.001). Patients showing elevated concentration of cardiac troponin I (cTn I) at day 1 (cTn I)>14 ng/ml had significantly (p=0.04) higher plasma NT-proBNP levels than patients with low cTn I concentration. At day 1 patients with prolonged ICU stay (>24 days) showed significantly (p=0.03) higher plasma NT-proBNP levels than patients with ICU stay <4 days. Elevated NT-proBNP level at day 1 was significantly (p=0.001) associated with in-hospital mortality. 18584 (11889-29538) pg/ml versus 1597 (965-3034) pg/ml in survivors.
Conclusions: our results show for the first time that postoperative NT-proBNP levels are associated with in-hospital mortality and prolonged ICU stay. These findings support the interesting prognostic value of postoperative plasma levels of NT-proBNP.

P457 Admission glycaemia and glycaemia variation: two very different ways to predict the future in non-diabetics post myocardial infarction
S Monteiro1, N Antonio1, R Texeira1, C Loureiro1, E Jorge1, R Batista1, P Monteiro1, L Providencia1
1Coimbra University Hospital, Coimbra, Portugal
Topic: Biomarkers
Introduction: hyperglycaemia during acute myocardial infarction (AMI) is associated with bad prognosis. There are several parameters to access glucose metabolic control, but is there one which is clearly better?
Aim: to evaluate the impact of admission glycaemia (AG) and magnitude of glycaemia variation (MGV) on the prognosis of diabetic and non-diabetic AMI patients and to identify independent predictors of mortality post-AMI.
Population and methods: 1053 consecutive AMI patients, diabetes (n=348) and non-diabetics (n=705). Both groups were then divided, according to the quartiles of AG (Q1 <5.93, Q2 5.93-7.44, Q3 7.44-10.33, Q4 ≥10.33 mmol/l) and MGV (<15896-3034) pg/ml in survivors.
Results: after multivariate regression analysis, AG:Q1 <5.93 (OR 3,91; IC 1,95-7,88), Q2 5.93-7.44 (OR 3,72; IC 1,67-8,33), Q3 7.44-10.33 (OR 5,83; IC 2,33-14,47) and Q4 ≥10.33 mmol/l (OR 8,91; IC 1,20-66,30), age ≥72 years (OR 3,58; IC 1,79-7,20), Killip class ≥1 (OR 3,49; IC 1,87-6,32) and Troponin I ≥6.0 ng/ml (OR 2,26; IC 1,28-3,98) were independent predictors of in-hospital mortality and Q4 versus Q1 of MGV (OR 2,30; IC 1,22-5,12) was an independent predictor of 1-year mortality. In diabetics there were no differences in mortality among AG and MGV quartiles. In non-diabetics, higher AG was associated with higher in-hospital mortality, while higher MGV was only significantly related to 1-year mortality (table 1).
Conclusions: in our AMI population, AG was a short- and long-term bad prognosis marker, while MGV impacted only in long-term prognosis, especially in non-diabetics. These data suggest that AG is a more complete mortality predictor than MGV.
Heart disease/PAD/Stroke

P458 Cardiac rehabilitation therapy in the elderly with congestive heart failure
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1Spatial Municipal Ascar, Timisoara, Romania, 2University of Medicine and Pharmacy V. Babes, Timisoara, Romania

Topic: Heart disease

Background: Heart failure syndrome has a high incidence and prevalence among the elderly (age ≥ 65 years), leading to increased morbidity, mortality and health-related costs. A significant proportion of the re-hospital-admissions can be avoided by active chronic disease management.

Aims: To report on the 2 year status of surviving patients, comparing cardiac rehabilitation to standard medical care in elderly patients with heart failure.

Methods: An intensive HF-rehabilitation programme was set up started in hospital and continued outpatient. The patient education team consisted of cardiologists, general practitioners, nurses and physiotherapists. 80 patients (65-85 years, 32 male) with NYHA III/II confirmed by echocardiography were randomised in two treatment groups: group I (CRT) consisted of 35 patients standard medical care and cardiac rehabilitation therapy (CRT), group II (non-CRT) included 45 patients with standard medical care of heart failure. The trial measures consisted in 6-minute walk test, Minnesota Living with Heart Failure (MLHF), EuroQol quality of life scores and routine biochemistry. Data on deaths and admissions were obtained from the medical records department.

Results: At 2 years evaluation, 60% of patients were alive. NYHA class and walking distance had deteriorated compared to baseline measurements, although MLHF scores were better. Deaths increased with age and LV dysfunction. In comparison to deceased patients, survivors showed more improvement in NYHA class at 6 months and significant differences in mean values of renal function, QOL at baseline and 6 months The CRT group showed better trends for survival, reduced re-hospital-admissions and time in hospital, QOL and walking distance.

Conclusion: At 2 years, elderly patients with congestive heart failure who received cardiac rehabilitation therapy associated to standard medical care, had a better survival, reduced time in hospital, and a better quality of life. The experience of this rehabilitation programme is encouraging and suggests that there is a considerable potential for community efforts to improve the accessibility and efficiency of cardiac rehabilitation therapy.

P459 Angiotensin converting enzyme inhibitors in heart failure. Do the beneficial effects observed in Caucasian patients apply to Afro-Caribbean patients with heart failure? C Edwards1, N Chandra1, J Rawlins1, M Papadakis1, S Sharma1
1King’s College Hospital, London, United Kingdom, 2Lewisham University Hospital, London, United Kingdom

Topic: Heart disease

Objectives: To study heart failure (HF) in a leading cause of morbidity and carries a poor prognosis. Several studies indicate that Afro-Caribbeans (AC) with heart failure have a worse prognosis than their Caucasian counterparts. The aim of this study was to investigate whether outcome varied with ethnicity in patients treated with ACEI or AIIRB.

Methods: The hospital records of 322 consecutive patients (AC 166, C 156) with HF were reviewed and treatment (including doses) with an ACEI or AIIRB as well as NYHA class at first clinic, most recent clinic, and mortality were recorded. The mean follow-up was 2.96 years.

Results: The number of patients on either ACEI or AIIRB therapy did not differ between the groups (AC 94.0% vs. C 94.2%, p=0.99), therapy with ACEI was similar (72.1% vs. 82.7%, p=0.42) though more AC patients were on AIIRB (38.1% vs. 17.2%, p=0.05). Patients on the maximum tolerated doses were similar in both groups. NYHA class in both groups were similar at first clinic (p=0.84) and at most recent follow-up (p=0.67). NYHA class improved significantly (p<0.05) and Caucasians (p<0.01). Mortality rate was similar between both groups (AC 79.9 vs 77.3%, p=0.51).

Conclusion: Afro-Caribbean patients with heart failure present at a younger age than Caucasians and are more likely to have a non-obstructive aetiology. Whilst there was no significant difference in mortality or age at death a trend towards increased mortality at a younger age was observed in AC. The difference in age at presentation and suggestion of worse outcome may be explained by AC developing hypertensive heart disease at a young age. The variation in heart failure aetiology suggests that aggressive preventive and therapeutic strategies for hypertension should be adopted in Afro-Caribbean patients.

P460 Comparison of differences in the demographics, aetiology and prognosis of heart failure in Caucasian and Afro-Caribbean patients with heart failure. CP Edwards1, N Chandra1, J Rawlins1, M Papadakis1, S Sharma1
1King’s College Hospital, London, United Kingdom, 2Lewisham University Hospital, London, United Kingdom

Topic: Heart disease

Objectives: To study heart failure (HF) in a leading cause of morbidity and carries a poor prognosis. Several studies indicate that Afro-Caribbeans (AC) with heart failure have a worse prognosis than their Caucasian counterparts. The aim of this study was to investigate whether outcome varied with ethnicity in patients treated with ACEI or AIIRB.

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P462
Depressed heart rate variability correlates with anaemia and impaired quality of life in patients with chronic compensated heart failure
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Topic: Heart disease

Purpose:
Anaemia occurs commonly in patients with chronic heart failure (CHF) and has been proposed as a novel therapeutic target in this patient population, as it is also related with poor prognosis and impaired quality of life. Depression is also common among those patients and has been independently associated with a poorer prognosis. Furthermore, impaired heart rate variability (HRV) is also associated with depression and poor prognosis. The purpose of this study was to reveal any existence of association between heart rate variability, anaemia, depression and quality of life in patients with chronic compensated heart failure.

Methods:
We enrolled 146 consecutive patients (mean age 64±13.12 years old) with chronic compensated heart failure and 35 healthy controls (mean age 61±17 years old). The study was approved by the local ethic committee. The main outcomes were HRV parameters, anaemia, depression, and quality of life measured by the SF-36 health survey scale. Students T-test or Mann-Whitney-U test for continuous variables and chi-square test for categorical variables were used for data analysis. receiver operating characteristics curve (ROC) was used to determine the area under the curve (AUC) for significant cut-off points of HRV parameters for anaemia, depression, and quality of life.

Results:
Patients with anaemia (n=30, 20.3%) showed lower heart rate variability (p<0.001) and higher prevalence of depression (p=0.001) compared to controls. Furthermore, worse quality of life was seen in anaemic patients (p<0.001). The AUC for HRV parameters to discriminate anaemia was 0.76±0.13, 0.65±0.14 and 0.65±0.15 for RMSSD, SDNN and pNN50, respectively. The AUC for anaemia to discriminate depression was 0.62±0.15 and for quality of life was 0.66±0.11. Further analysis revealed that heart rate variability and depression were strongly associated (p<0.001, r=0.46). Furthermore, HRV parameters had a positive correlation with quality of life (r=0.34-0.46, p<0.001).

Conclusions:
Anaemia seems to create a vicious circle in depression and quality of life. HRV and depression are associated and both affect quality of life significantly. Consequently, improvement of anaemia might enhance HRV and vice versa.

P463
Residual ventriculo-aortic functional disturbances after stenting of native coarctation:
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Topic: Heart disease

Purpose:
Although aortic stenting resulted in partial mid-term improvement in cardiac function, residual ventriculo-aortic disturbances and their known complications.

Methods:
We enroled 146 consecutive patients (mean age 64±13.12 years old) with chronic compensated heart failure and 35 healthy controls (mean age 61±17 years old). The study was approved by the local ethic committee. The main outcomes were HRV parameters, anaemia, depression, and quality of life measured by the SF-36 health survey scale.

Results:
Patients remained having thicker LV, larger LA and worse long axis function than controls after stenting. Furthermore, depression and quality of life were worse in patients with aortic stenting, compared to controls. Residual LV hypertrophy was correlated with residual LV diastolic dysfunction.

Conclusions:
Echocardiographic improvement after stenting may be insufficient in patients with residual ventriculo-aortic disturbances.
**Arterial mechanics in ischemic versus non-ischemic cardiomyopathy: a diagnostic impact**

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**Topic:** Heart disease

Identification of the aetiology of dilated cardiomyopathy represents a challenge in daily medical practice. Despite of deterioration of cardiac arteries and aortic elastic properties in patients with ischemic heart disease, their predictive role has not been established in differentiating ischemic from non-ischemic cardiomyopathy.

Aim: the aim of this study was to differentiate between ischemic and non-ischemic cardiomyopathy by examining the mechanical properties of the carotid and aortic arteries by DTI and conventional echocardiography.

**Patients and methods:** the patients recruited for this study included 70 patients with cardiomyopathy. According to angiography results, the patients were grouped as group I that included 36 patients with ischemic cardiomyopathy (IDCM) (mean age of 57.38 + 11.94 years) and group II that included 34 patients with non ischemic cardiomyopathy (NIDCM) (mean age of 57.19 + 11.7 years).

Thirty healthy subjects served as a control group. The investigations done included carotid duplex to measure (imina media thickness IMT, carotid peak systolic velocity CPSV and carotid systolic and diastolic diameters) and M-mode of the aortic root to assess aortic systolic and diastolic diameter, pulsatile change/aortic systolic diameter-diastolic aortic strain (pulsatile change/10 diastolic diameter), aortic distensibility (Gaussian strain systolic pressure-diastolic pressure). DTI was used to assess aortic wall systolic velocity (SV), E and A waves, time to SV and time to R.

**Results:** the patients in both group I and II had a decreased aortic pulsatile change, aortic strain and aortic distensibility compared to the control group, while the previous parameters were lower in IDCM group than in NIDCM group (1.7 ± 1 vs. 4.4 ± 2 vs. 5.6 ± 1.2 pm, 0.001, 5.93 ± 6 vs. 15.9 ± 5.7 vs. 21.34 ± 8.9 pm, 0.001, 2.4 ± 1 vs. 20.2 ± 3.5 vs. 12.3 ± 3.1 pm, 0.001 respectively). The ischemic group had significantly lower SV, E, A values than non ischemic group p < 0.001. The carotid IMT was significantly increased in IDCM vs. NIDCM (1.36 ± 0.1 vs. 0.66 ± 0.5 p < 0.001, however, CPSV was significantly reduced in IDCM vs. NIDCM (31.8 vs. 94.4% sensitivity and 88.2% specificity. Value < P467 non-invasive method for differentiating IDCM from NIDCM. A value < 5.7 vs. 21.3 pm, 0.001. The previous parameters were associated with less MACE events, with significant reduction of all cause mortality, irrespective of patient’s age.

**Conclusion:** ultrasonic examination of both carotid and aortic mechanical function is a useful non-invasive method for differentiating IDCM from NIDCM.

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**Ankle-brachial index as a predictor of all-cause and cardiovascular disease mortality in Chinese patients with high cardiovascular risk**

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1 First Hospital of Xinjiang Medical University, Urumqi, China, People’s Republic of, 2 Renmin Hospital of Beijing University, Beijing, China, People’s Republic of

**Topic:** Peripheral vascular disease

Peripheral arterial disease (PAD) is an important manifestation of systemic atherosclerosis and is associated with elevated cardiovascular morbidity and mortality. The aims of our study is to assess the 1-year risk of all-cause and cardiovascular disease (CVD) mortality associated with ankle-brachial index (ABI) in Chinese patients at high CV risk.

**Methods and Results:** 3733 patients with high CV risk had bilateral ABI measurements at baseline and were followed up for 1-1.5 years. Low ABI was defined as < 0.9. Patients were divided to four groups: 1) coronary heart disease (CHD), 2) ischemic stroke (IS), 3) diabetes mellitus (DM), 4) very high-risk group (VHR). A total of 3179 patients were analysed (52.9% male, mean age 69.3 yrs.). The prevalence of low ABI was 28.1%. At 1 year, all cause mortality was 8.7% and 27.6% was attributable to CVD mortality due to CV events was 4.8% vs 1.5%. After adjusting other risk factors the hazard ratio of low ABI was 1.623 for all-cause mortality and 2.304 for CVD mortality. Similar results were found in four groups.

**Conclusion:** ABI is a strong and independent predictor of mortality. Patients with a low ABI have a substantially increased risk of all-cause mortality and CVD mortality.
P470
Requirement for increasing awareness in diagnosis and treatment of peripheral arterial disease in Romania
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Topic: Peripheral vascular disease

Purpose: the aim of our study was to evaluate the prevalence and treatment of peripheral arterial disease (PAD) in patients with cardiovascular risk factors (CVRF) or atherosclerotic disease (AD).

Method: we enrolled 1981 outpatients in 16 centers in Romania. We included patients older than 45 with AD or at least 3 CVRF. It has been used a questionnaire regarding RF and treatment of PAD and former medical records to document AD. For diagnosing PAD we based on medical history and ABI determination.

Results: the diagnosis of PAD was established in 247 patients (12.22%). The prevalence of RF and their correlation with the presence of PAD are summarised in the next table. We found no correlation between PAD and dyslipidemia. A large proportion of patients with RF and PAD had poor control of their condition (29.06%, respectively 42.5%).

Regardig the association between PAD and other RF we found PAD alone in 11.33%, PAD and coronary artery disease (CAD) in 31.57%, PAD and cerebral vascular disease (CVD) in 25.91% and the association PAD-CAD-CVD in 11.17% of cases.

Revascularisation therapy was encountered in 24.8% and amputation in 17.4%. Therapy with an antipatlelet drug was prescribed in 75.30% of cases and only 63.1% patients received statins. Cludisation relever therapy consisted of perfusional therapy in 46.9% and no other specific drug was used for this purpose.

Conclusions: PAD prevalence in patients with CVRF in Romania is similar with those reported in other European countries. Modifiable RF are frequently encountered (smoking, high BMI) and poor controlled (arterial hypertension, DM). In the vast majority of cases PAD is correlated with the presence of other AD (CAD, CVD). It must be mentioned that medical and revascularisation treatment are underused in this patient's situation, which conducts to the high proportion of amputation.

* Results were compared using chi-squared test; BMI, body mass index; DM, diabetes mellitus.

P471
Comparison of the ankle-brachial index measurement using an automated oscillographic Doppler technique, the Czech post-MONICA study
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Topic: Peripheral vascular disease

Background: peripheral arterial disease is a well-established cardiovascular risk factor, but it remains underestimated by primary care and cardiovascular physicians. Automatic ankle brachial index measurement might be easier and faster alternative to standard Doppler technique. The aim of the present study was to assess the accuracy of automated ocudiametric device (BOSO ABI) in measuring ankle brachial index (ABI) in general population compared to the Doppler technique of measurement.

Methods: in 289 consecutive patients from the Czech post-MONICA study (randomly selected representative population sample aged 25-64 years), mean age 45±11.46 (46% of men), ankle brachial index measurement was carried out using the BOSO ABI machine and hand held Doppler in the same session. In 79 consecutive patients repeated ABI measurement was performed using BOSO ABI to compute the coefficient of repeatability. The two techniques were carried out by different investigators who were blind to the findings of the other analyses. The analyses were done as proposed by Bland and Altman.

Results: the mean ABI difference between BOSO ABI and Doppler method was 0.09 with limits of agreement ranging from -0.24 to 0.06, intraclass correlation coefficient 0.63 (95% confidence interval 0.56-0.72). The mean difference between duplicate ABI measurements for BOSO ABI was not significantly different from zero. The coefficient of repeatability was 0.13, intraclass correlation coefficient of repeated measure 0.76 (95% confidence interval 0.66-0.83).

Conclusions: there was no significant agreement between the ABI readings obtained by BOSO ABI and those obtained by the standard Doppler technique. BOSO ABI does not seem to provide sufficient accuracy for clinical ABI measurement in general population.

P472
Lipid control in patients with peripheral vascular disease without other manifestations of atherosclerosis
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Topic: Peripheral vascular disease

The peripheral vascular disease (PVD) is a manifestation of atherosclerosis that occur significantly the risk of ischemic heart disease. This fact forces us to a more restricted reduction of serum cholesterol according to a secondary prevention for achieving LDL-cholesterol <100 mg/dL.

Objectives: we reviewed the control lipid levels in patients with PVD without other manifestations of atherosclerosis in our area, in 2005 and 2006.

Methods: we reviewed cardiovascular risk factors of patients registered as PVD without other manifestations of atherosclerosis on the electronic clinical station of our Healthcare System. We checked total cholesterol, HDL, LDL, and triglycerides.

Results: a total of 1241 patients were included, which represents 0.59% of the population older than 34 years. The medium age was 65.6 + 15.8 years and most of them were males (61.2%). The distribution of risk factors was as follows: 24.6% had diabetes mellitus, 18.5% were active smokers, 50.9% had hypertension, 32.1% had hypercholesterolemia and 16.8% were obese. The average of total cholesterol and LDL-cholesterol was 209.06 mg/dL and 116.5 mg/dL, respectively. LDL-cholesterol was under 100 mg/dL in only 31.8% of the patients. The treatment analysis revealed that more than 23.4% of the patients were taking statins and 37.6% were on antihypertension. When these patients were compared with those that also have ischemic heart disease (IHD), it is remarkable that LDL-cholesterol was lower in patients with IHD (100.28 versus 119.14 mg/dL).

Conclusions: in our area, patients with PVD without other manifestations of atherosclerosis, have a poor control of LDL-cholesterol, which is far from the goals outlined in the internationally accepted guidelines. Few patients are treated with statins, which seems to show little sensitivity on the part of most healthcare professionals in our area in identifying this disease as an atherosclerosis manifestation. We concluded that a better awareness should be achieved by the healthcare professionals to improve the secondary prevention of these patients.

P473
Epidemiological aspects in a cohort of patients with lower extremity arterial disease Y Auresele1, J Ferresanu1, D Biesla2, MD Datra2
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Topic: Peripheral vascular disease

Purpose: to identify the vulnerable patient with peripheral (lower extremity) arterial disease-PAD according to the clinical, aneglogographic status and cardio-metabolic risk factors.

Material: we analysed retrospectively a cohort including 1521 consecutive patients, hospitalised between 2002-2008, with certain diagnosis of PAD. The clinical characteristics are: clinical arterial status (20% stage II, 46% stage III, 26% stage IV Leriche), conventional risk factors profile (mean aged 57±13.1 years; 83.7% males; 89.2% active smokers, 47.1% diabetes, 3.8% obese; 32.3% dyslipidemia, 29% arterial hypertension, 21.7% genetic factor, 25.8% NCEP-ATP criteria for metabolic syndrome, 27% prior revascularisation-samputation, 25.7% prior cardiovascular morbidity, 67% ≥ 2 risk factors). All patients were evaluated by anagography (86% thoracic), 43.5% superficial femoral artery-SFA, 1.4% profunda femoral artery-PFA, 1.1% iliac arteries, 7.3% popliteal arteries, 32.7% calf arteries, 11.3% occlusion of lower limb arteries, 14% stenosis - unique/multiple, 69% of SFA, 32.7%-mixed arterial lesions). Ankle-brachial index (ABI) was evaluated in 1364 patients (98.7%). Arterial disease in other territories was evaluated by clinical exam, vascular ultrasound (atheroma plaques, intima-media thickness-IMT in 1167 patients-76.7%), ECG and echocardiography; 13.4% of patients have a prior coronarography.

Results: There are some clinical subgroups: 41.7% PAD without other manifest cardiovascular disease; 25.5% PAD-coronary disease; 11.7% PAD- cerebrovascular disease; 18.2% multiple arterial disease. 2. Glycemic values, venous blood pressure, active smoking are independent predictors of severe clinical PAD (ANOVA); in diabetic patients it is a significant correlation with associated risk factors/biomarkers clinical arterial disease in other territories (p<0.05). 3. ABI<0.5 is related with extensive thrombosis lesions/multiple stenosis, ABI + IMT<0.9 mm is related with clinical subgroups (t-test). 4. Angiographic extensive thrombotic lesions are associated with stages IV-III, diabetes, smoking + arterial hypertension (t-test), unique stenosis with stage II, dyslipemia + IMT>0.9 mm.

Conclusions: 1. PAD in the studied cohort is a systemic disease using ABI and IMT the accuracy of clinical evaluation is higher. 2. There is a radiologic diagnosis for PAD, related with advanced clinical status and extensive angiographic lesions. 3. Cardio-metabolic profile has a poor control at the moment of diagnosis. 4. It is strongly necessary to create an integrated system for prevention, active detection and aggressive therapy for PAD.
**P474**

**Motivational aspects and participation rate in rehabilitation of patients with peripheral arterial disease**

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**Topic:** Peripheral vascular disease

**Purpose:** Participation rate of patients with peripheral arterial disease (PAD) in hospital based cardiovascular rehabilitation programs is low. The aim of this study is to confirm a lower participation rate compared to patients with coronary arterial disease (CAD) and to search for possible sociodemographic and motivational reasons.

**Methods:** 342 consecutive PAD-patients and 98 CAD-patients filled out a questionnaire either during their hospital stay or during the appointment with their angiologist. Outcome measures were sociodemographic and motivational factors, whether there was a recommendation from the physician to attend the programme or not and the participation rate.

**Results:** The results show clearly that PAD-patients participate less than CAD-patients and cardiologists recommend the programme more than the angiologists. The differences between the two patient groups are shown in table below.

**Sociodemographic and motivational factor**

<table>
<thead>
<tr>
<th>Factor</th>
<th>PAD-patients</th>
<th>CAD-patients</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>69</td>
<td>66</td>
<td>0.019</td>
</tr>
<tr>
<td>Level of education (1-5)</td>
<td>1.95</td>
<td>2.12</td>
<td>0.040</td>
</tr>
<tr>
<td>Participation rate</td>
<td>15.5%</td>
<td>14.8%</td>
<td>0.000</td>
</tr>
<tr>
<td>Recommendation by physician</td>
<td>3.14</td>
<td>3.81</td>
<td>0.0001</td>
</tr>
<tr>
<td>Disease specific vulnerability feelings (1-7)</td>
<td>2.44</td>
<td>4.05</td>
<td>0.0008</td>
</tr>
<tr>
<td>Pressure to change (1-4)</td>
<td>2.40</td>
<td>2.67</td>
<td>0.032</td>
</tr>
</tbody>
</table>

**Conclusion:** With this study we can confirm that the recommendation and information about rehabilitation from the cardiologists and cardiologists play a key role for the participation rate. In addition, our results indicate different sociodemographic and motivational situations in the two patient groups. Therefore, the angiologists have to provide specific information about the disease, its progress and the training in the rehabilitation programme to increase the motivation and the participation rate.

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**P476**

**Ankle Blood Pressure as a Predictor of Cerebrovascular Morbidity and Mortality in a Prospective Follow-up Study**

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**Topic:** Stroke

**Purpose:** The value of the ankle blood pressure (ABP) in atherosclerotic vascular damage has not been characterized and few studies have attempted to use the ABP as a risk marker without indexing it to the brachial blood pressure (BP). We examined the association of ABP, together with exercise brachial blood pressure, with cerebrovascular (CV) mortality and morbidity during the follow-up of 15 years.

**Methods:** A prospective follow-up study of 4,038 consecutive ambulatory patients aged 15 to 84 years, mean 50 years, and 5% made an occurrence test between August 1989 and December 1995. The ABP was measured with a Doppler probe. The brachial blood pressure was measured with a standard mercury sphygmomanometer. The patients were followed up until December 31st, 2006. The occurrence of follow-up was 100% for stroke events leading to hospitalisation or death.

**Results:** A total of 170 subjects had a CV event (30 TIA, 109 non-fatal strokes and 31 fatal strokes) during the follow-up. Multivariate adjusted HRs for CV event were 2.45 (95% CI 1.61-3.74, p<0.0001), 2.40 (1.47-3.90, p=0.004) and 2.48 (1.31-4.69, p=0.035) in groups II, III and IV, respectively.

**Conclusion:** The value of the ankle blood pressure (ABP) in atherosclerotic vascular damage has not been characterized and few studies have attempted to use the ABP as a risk marker without indexing it to the brachial blood pressure (BP). We examined the association of ABP, together with exercise brachial blood pressure, with cerebrovascular (CV) mortality and morbidity during the follow-up of 15 years.
S104 EuroPrevent Congress Abstracts May 2009

P478 Esmolol reduces perioperative ischaemia in cardiac surgery. A meta-analysis of randomised controlled studies.
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Topic: Pharmacoeconomics
Purpose: Esmolol is an ultra-short-acting beta-blocker, its half-life is approximately 8 minutes, its time to peak effect is about 6-10 minutes after administration while its wash-out time is considered to be 20 minutes after infusion stop. All these properties make this beta-blocker the first choice drug in critical patients, in which possible side effects such as cardiac failure are possible. These clinically useful pharmacological characteristics have led to the widespread use of esmolol in the prevention of sympathetic response in cardiac surgery, but its beneficial effects on clinically relevant outcomes have never been confirmed in cardiac surgery.

Methods: We conducted a systematic review and meta-analysis of all existing trials to determine the impact of esmolol on patients undergoing cardiac surgery. Scientific sessions were searched. Authors and external experts were contacted. A reviewer independently abstracted patient data, treatment characteristics and outcomes. Computations were performed with RevMan 4.2 (a freeware available from The Cochrane Collaboration).

Results: The 21 included trials randomised 869 patients and most of them were performed on patients undergoing CABG surgery. Patients receiving esmolol had a significant reduction in the rate of perioperative myocardial ischaemia (15/32 vs esmolol group vs. 36/140 in the control arm, p=0.009) and the use of inotropic drugs (83/32 esmolol vs 29/53 control group, p=0.004). Beta-blocked patients developed more episodes of hypotension (27/113 esmolol vs. 14/19 control group, p=0.02) and bradycardia (8/129 esmolol vs. 3/133 control group, p=0.002).

Conclusions: Our meta-analysis confirms the trends of numerous underpowered studies suggesting that esmolol can be useful to treat perioperative arrhythmias, as an adjuvant to traditional cardioprotective agents or to reduce hemodynamic responses to laryngoscopy, intubation and extubation.

P479 Relation of baseline plant sterol levels to aortic valve and ischemic cardio vascular events and the incidence and mortality of cancer in the patients with aortic valve stenosis. (The THAS trial)
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Topic: Controlled clinical trials
Background: The Simvastatin plus Ezetimibe in Aortic Stenosis (SEAS) study was a randomised placebo-controlled clinical trial in 1873 patients with asymptomatic aortic stenosis, aimed at evaluating the effect of intensive lipid-lowering therapy on disease progression. Unexpectedly, cancer and cancer-related deaths occurred more frequently in the actively treated group than in the placebo group. The cholesterol absorption inhibitor, ezetimibe, also inhibits the absorption of plant sterols that are specific phytochemicals that resemble cholesterol in structure but are found exclusively in plants. The plant sterols have been suggested to be risk factors for both cardiovascular disease and cancer. These findings prompted us to investigate the relation of plant sterol levels to the aortic valve and ischemic cardiovascular events and the incidence and mortality of cancer in the patients with aortic valve stenosis treated with simvastatin plus ezetimibe or placebo for a median time of 32.2 months.

Methods: Serum levels of plant sterols, sitosterol (sit) and campesterol (cam) were determined in 1619 patients in the SEAS trial. The relationship between baseline levels of these plant sterols and the development of aortic and ischemic cardiovascular events and the incidence and mortality of cancer in the patients with aortic valve stenosis treated with simvastatin plus ezetimibe or placebo was assessed by Cox regression analysis.

Results: The median baseline levels of serum sit and cam were 284.6 (118.0, 564.2) and 444.7 (240.1) μg/mL and the sit/cholesterol (cho) ratio and campesterol/cholesterol ratio were 1.29 (0.50) and 2.01 (0.35) μg/g cholesterol, respectively. Baseline levels of sit and cam and of sit/cholesterol and campesterol/cholesterol ratios were not related to the development of aortic valve (sit p=0.962, campesterol=0.643, sit/cholesterol p=0.668, campesterol/cholesterol p=0.440) or ischemic cardiovascular events (sit p=0.063, campesterol p=0.518, campesterol/cholesterol p=0.622) not to the incidence (sit p=0.229, campesterol p=0.236, sit/cholesterol p=0.390, campesterol/cholesterol p=0.561) or mortality rate of cancer (sit p=0.438, campesterol p=0.989, sit/cholesterol p=0.651, campesterol/cholesterol p=0.243). The reduction of plasma cholesterol levels with ezetimibe is known to be closer correlated to the reduction of plant sterols levels. There was no significant relationship between cholesterol levels reached during the trial and the risk of cancer-related deaths.

Conclusion: Our findings show that the baseline plant sterol levels were not related to aortic valve and ischemic cardiovascular events nor to the incidence and mortality rate of cancer among these patients with aortic valve stenosis.

P480 Coenzyme Q10 and selenium in statin-associated myopathy treatment. Results of randomised double-blind clinical study
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Topic: Controlled clinical trials
Background: Inhibition of HMG-CoA reductase by statins leads not only to decreased synthesis of cholesterol but also to decreased coenzyme Q10 (CoQ10) and several selenoproteins. Aim of our double-blind randomised, single centre 3-month study using 2X2 factorial design - CoQ10 200mg/daily vs. selenium 200mcg/daily vs. their combination vs. placebo administered to statin treated patients with statin-associated myopathy not leading to treatment withdrawal was to evaluate possible beneficial effects of coenzyme Q10 and selenium supplementation.

Methods: We screened 1,142 patients treated with statins and found 60 eligible patients to be enrolled to the study. All patients underwent physical, laboratory (including plasma level of CoQ10 and selenium) and echocardiographic examinations at the beginning and at the end of the study. Physical and laboratory examinations were performed after 1 month of the study treatment also.

Results: Muscle pain was present in 40 of studied patients, muscle weakness in 21 of them, 22 patients described tiredness since statin use and cramps were present in 18 patients. All these symptoms of statin-associated myopathy significantly improved in the group of patients treated by CoQ10 active form (p=0.0001). Plasma level of CoQ10 in the active group increased from baseline 0.81 ± 0.39 mmol/L to 3.31 ± 1.72 mmol/L compared to placebo group at month 3 visit (p=0.001). Selenium supplementation (active or placebo) was not associated with a decrease of statin-associated myopathy. Our study confirmed that blood concentration of selenium in patients with statin-associated myopathy is suboptimal and increase of coenzyme Q10 plasma level is higher when supplemented along with selenium in comparison with isolated coenzyme Q10 supplementation, even though it does not reach statistical significance (p=0.1059).

Conclusion: our results showed that supplementation of statin-treated patients with coenzyme Q10 resulted in a decrease of symptoms of statin-associated myopathy which could be associated not only with improvement of quality of life, but compliance to statin therapy as well. Selenium supplementation was associated with statistically significant increase of its plasma level but did not lead to significant improvement of statin side effects.

P481 Cardiovascular Disease Event Risk among Patients with Prior Cardiovascular Disease Initiating Statin Monotherapy or Simvastatin Plus Niacin Extended-Release Combination Therapy
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Topic: Quality of care and outcomes research
Objectives: To compare annual cardiovascular disease (CVD) event risk between patients initiating statin (rosuvastatin) monotherapy and niacin extended-release [NER] + simvastatin (NERS) combination therapy among patients with prior CVD.

Methods: A retrospective analysis of patients aged ≥ 18 years newly initiating rosuvastatin monotherapy or NERS therapy (initial therapy of NER added to existing statin therapy) between 01JAN2001 and 30JUN2006 (index date) was performed using a large integrated managed care research database. Inclusion criteria were patients with a minimum of 12 months pre- and post-index date follow-up and had a diagnosis of CVD at some time during 12 months prior to index date. Unadjusted and adjusted annualised CVD event risk was compared in the post-index date period. Annual CVD-event risk was modelled through a multivariate Cox proportional hazards model. Model covariates included treatment group, age, gender, Deyo-Charlson co-morbidity index (DCI), and prior type 2 diabetes and hypertension.

Results: A total of 4,711 study patients were identified initiating rosuvastatin monotherapy (n=3,452) or NERS (n=1,259). NERS patients were significantly younger (38.5±9.2 years vs. 60.6±11.9 years; p<0.0001), more likely to be male (85.1% vs. 57.6%; p<0.0001), and had a significantly lower pre-index date DCI score (1.3±1.3 vs. 1.4±1.5; p=0.004) as compared to rosuvastatin statin monotherapy patients. NERS patients were also more likely to be hypertensive at baseline than rosuvastatin statin monotherapy patients (88.6% vs. 74.6%; p<0.0001). Unadjusted bivariate analyses demonstrated that patients initiating NERS therapy were 35% less likely to experience a CVD event as compared to rosuvastatin statin monotherapy patients. After adjusting for confounders, multivariate Cox proportional hazards model showed that patients initiating NER/ S therapy were 26% less likely to experience a CVD event as compared to rosuvastatin monotherapy patients [Hazard Ratio: 0.735; 95% CI: 0.544 - 0.994; p=0.05].

Conclusion: Patients with prior CVD treated with NERS were associated with lower annualised CVD event risk compared to patients treated with rosuvastatin monotherapy. Further studies examining the clinical impact of a comprehensive lipid treatment approach targeting multiple lipid fractions rather than low density lipoprotein cholesterol-only treatment strategy are warranted.
Translational vascular biology

P482
The reduction of total cardiovascular risk. Results of the strong duet study
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2Heart Centre Leipzig, Leipzig, Germany
3European University of Britany, Brest, France, 4University Hospital of Brest, Brest Cedex, France

Topic: Exercise physiology, testing and training
Background: aortic sclerosis (AS) is the most common adult heart disease seen in the Western world and its incidence continues to rise. When the severity of AS becomes severe, AS confers significant mortality and morbidity. Thus, adverse events can be avoided or delayed if it is possible to prevent the progression of AS at an early stage of disease. However, no effective therapy to prevent AS is currently established.

The pathology of AS is similar to atherosclerosis such as endothelial dysfunction and inflammation. Importantly, exercise training (ET) inhibits atherosclerotic vascular events through improving endothelial dysfunction and inflammation. In addition, physical inactivity is one of the independent predictor of death in patients with AS. Taken together, ET particularly at an early stage of disease may lead to prevent progression of AS. This study was designed to investigate whether ET prevents aortic valve (AV) disease using well-established hypercholesterolemic animal model developing AS.

Methods and results: primary aim of this study was to evaluate the effect of ET on the AV thickness. Four-week-old LDL receptor deficient (LDLr-/-) mice were divided into three groups: Group 1 (N), normal diet; group 2 (AS), cholesterol diet developing AS; group 3 (ET), amlodipine 5 or 10 mg respectively, and atorvastatin 10 mg daily ) on total cardiovascular risk reduction, level of blood pressure and plasma lipids in the second phase. Using SCORE system we have found that the risk of fatal cardiovascular event in the following 10 years in the group of 1, 406 patients was 9.21 ± 6.52. This cardiovascular risk was reduced at the end of the second phase with combined amlodipine and atorvastatin treatment to 4.70 ± 3.51 (by 49%) (p<0.0001). Systolic blood pressure decreased from 159.99 ± 14.10 mmHg to 132.01 ± 9.36 mmHg (p<0.0001), diastolic blood pressure from 96.05 ± 8.66 mmHg to 80.83 ± 5.46 mmHg (p<0.0001), total cholesterol from 6.48 ± 0.93 mmol/l to 5.28 ± 0.82 mmol/l (p=0.0001) and LDL cholesterol from 3.89 ± 0.80 mmol/l to 2.84 ± 0.66 mmol/l (p<0.0001). In conclusion, standard application of statin together with antihypertensive treatment (in single pill) was very well tolerated, safe and associated with significant decrease of total cardiovascular risk.

Conclusion: ET may be a novel therapeutic option to prevent the progression of AS.

P483
Exercise training prevents aortic valve disease in mice.
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1Heart Centre Leipzig, Leipzig, Germany

Topic: Exercise physiology, testing and training
Background: aortic sclerosis/stenosis (AS) is the most common adult heart disease seen in the Western world and its incidence continues to rise. When the severity of AS becomes severe, AS confers significant mortality and morbidity. Thus, adverse events can be avoided or delayed if it is possible to prevent the progression of AS at an early stage of disease. However, no effective therapy to prevent AS is currently established.

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Methods and results: primary aim of this study was to evaluate the effect of ET on the AV thickness. Four-week-old LDL receptor deficient (LDLr-/-) mice were divided into three groups: Group 1 (N), normal diet; group 2 (AS), cholesterol diet developing AS; group 3 (ET), amlodipine 5 or 10 mg respectively, and atorvastatin 10 mg daily ) on total cardiovascular risk reduction, level of blood pressure and plasma lipids in the second phase. Using SCORE system we have found that the risk of fatal cardiovascular event in the following 10 years in the group of 1, 406 patients was 9.21 ± 6.52. This cardiovascular risk was reduced at the end of the second phase with combined amlodipine and atorvastatin treatment to 4.70 ± 3.51 (by 49%) (p<0.0001). Systolic blood pressure decreased from 159.99 ± 14.10 mmHg to 132.01 ± 9.36 mmHg (p<0.0001), diastolic blood pressure from 96.05 ± 8.66 mmHg to 80.83 ± 5.46 mmHg (p<0.0001), total cholesterol from 6.48 ± 0.93 mmol/l to 5.28 ± 0.82 mmol/l (p=0.0001) and LDL cholesterol from 3.89 ± 0.80 mmol/l to 2.84 ± 0.66 mmol/l (p<0.0001). In conclusion, standard application of statin together with antihypertensive treatment (in single pill) was very well tolerated, safe and associated with significant decrease of total cardiovascular risk.

Conclusion: ET may be a novel therapeutic option to prevent the progression of AS.

P484
Influence of exercise type and vascular territory on vascular response to exercise training in healthy rats
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Topic: Exercise physiology, testing and training
Introduction: previous work has demonstrated that exercise training alters endothelium-dependent vasoreactivity of rat abdominal aorta. However, the relation between type of exercise and endothelial function is unknown. The purpose of this study was to investigate the effects of eccentric exercise compared to concentric exercise on endothelial function in rats.

Methods: male Wistar-Kyoto rats were divided into sedentary (n=8) and two exercise groups (n=16). The exercise groups were submitted to a treadmill-training protocol (20min/min, 60 min/ day, 5 days/week, 8 weeks), with either 10% incline (concentric group, n=8) or -10% incline (eccentric group, n=8).

Responses to vasodilative compounds were examined in vitro in rings prepared from thoracic aorta and femoral artery. Concentration-response curves to PE (10^-6 to 10^-3 mol/L) were determined. These response curves to ACh (10^-6 to 10^-5 mol/L) alone or in the presence of 5 x 10^-5 mol/L of N-Warfarin-L-arginine methyl ester (LNAME) were also constructed in rings precontracted to 80% of maximum contractions with PE. Finally, vascular responses to sodium nitroprusside (SNP, 10^-10 and 10^-5 mol/L) were examined.

Results: the present study showed that concentration-response curves to PE did not differ between sedentary and exercise groups. ACh-induced vasodilation was significantly improved after exercise training in eccentric (p<0.03) and concentric (p<0.03) groups in rings of thoracic aorta. However, no difference was detected in response to ACh between eccentric and concentric groups. In femoral artery, significant improvement of Emax (maximal response) was found in response to ACh after exercise training in eccentric (p<0.01) and concentric (p<0.05) groups. Pretreatment of rings with L-NNAME inhibited the ACh-mediated vasodilatation in all groups. Finally, relaxation to endothelium-independent agonist (SNP) did not differ between sedentary and exercise-trained rats.

Conclusion: both eccentric and concentric exercise training did not affect the contractile and relaxation responses of vascular smooth muscle to PE and SNP, respectively. Training-induced enhancement of endothelium sensibility to ACh was the same for concentric and eccentric exercising in thoracic aorta and femoral artery.

P485
Effect of a personalised physical activity programme on weight reduction and endothelial progenitor cells in overweight subjects.
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Topic: Physical activity
Introduction: being overweight, through an increased oxidative stress and inflammation, can lead to a sub-clinical atherosclerosis. In recent years, interest for circulating progenitor cells (CPCs) and particularly for endothelial progenitor cells (EPCs) has risen because of their possible protective role against atherosclerotic diseases.

We aimed this study in order to assess the effect of a personalised physical activity programme on weight reduction and CPCs and EPCs in healthy overweight subjects.

Material and methods: a population of 48 overweight non-diabetic subjects was analysed in a prospective way. Before (T0) and after three months (T1) of a personalised programme of exercise intervention with physical activity, an indirect calorimetry, a tetrapolar electrical bioimpedance, a maximal stress exercise test with maximal oxygen uptake (VO2max), and a series of biochemical analyses were performed. The exercise programme consisted of an aerobic exercise for at least 3 times per week (40 minutes each). The number of CPCs and EPCs were determined pre-exercise by using flow cytometry at T0 and T1. CPCs were defined as CD34+, CD133+ and CD34+/CD133+ while EPCs were defined as CD34+KDR+.

Results: the median age was 49 years (range: 14-64) and the mean BMI 31.2 ± 4.9 kg/m2. At T0, 28 males (52.1%) and 23 females (47.9%). A total of 39 (83.3%) subjects completed the follow-up during 3 months, with a percentage of weight loss of -8.9% (95.4, 24% vs. 98.7 g, 10.5 Kg, p<0.0001). The remaining 9 patients (non-responders), showed a percentage of increase in body weight of 3.1% (95.4, 24% vs. 98.7 g, 10.5 Kg, p<0.05). In responders, BMI, glucose, total cholesterol, LDL cholesterol and systolic blood pressure significantly decreased and fat-free mass and VO2 significantly increased, while no significant improvement for non-responders was observed. In responders, a trend of decrease at T1 for circulating levels of CPCs and EPCs was observed, reaching the statistical significance for CD34+KDR+ cells (0.15 0.0-0.25 vs. 0.32 0.06-0.30 cells/microl, p<0.04). On the contrary, non-responders showed no significant increase in CPCs and EPCs levels. Moreover, an inverse relationship between CD34+/KDR+ cells changes and weight loss was reported (r=-0.15 p=0.04).

Conclusion: three months of physical activity significantly improved anthropometric and cardiovascular risk factors. A beneficial effect was observed regarding the increased number of CPCs in the responders’ group, in relation to weight loss.
Conclusion: age.
LDL and myeloperoxidase plasma levels did not show significant differences among quartiles of
and myeloperoxidase plasma levels significantly decreased from first (1-5 years) to second (6-9
levels predicted oxidised-LDL plasma levels. In normocholesterolemic children oxidised-LDL
regression showed that total cholesterol, 8-hydroxy-2′deoxyguanosine and myeloperoxidase

Methods:

Objective:

Background:

Introduction: peripheral arterial disease (PAD), defined as a chronic obstruction of the arteries
supplying the lower extremities, is a common manifestation of systemic atherosclerosis.
Recently, many advances in the understanding of the development of such vascular disease
have been reported, and a number of novel risk factors have been described: Hyperviscosity, due
to alterations of blood cells and plasma components, may play a role in the pathogenesis of the
disease. Aim of this study was to evaluate the possible association between hemorheological variables and PAD.

Material and methods: the hemorheological variables [whole blood viscosity (WBV), erythrocyte deformability index (DI), plasma viscosity (PLV), fibrinogen] were analyzed in 90 patients (median age: 73, range: 31-87 years; 70 M, 20 F) and in 180 healthy subjects comparable for age and gender (median age: 70, range: 35-89 years; 140 M, 40 F). WBV and PLV were measured using a Rotational Viscometer, whereas DI was measured by a microcomputer-assisted filttrometer.

Results: EF and PLV, but not WBV at 0.512+1 and 94.5+1 shear rates were found to be significantly different in patients as compared to healthy subjects. In order to investigate the possible association between these parameters and the disease we divided the study population into tertiles of their distribution among the healthy control group. At the univariate analysis, we found a significant association between the highest tertiles of PLV (2nd tertile: OR 1.61, 95%CI 1.32-9.86, p<0.01; 3rd tertile: OR 1.21, 95%CI 0.48-2.98, p<0.001) and DI (2nd tertile: OR 0.48, 95%CI 0.25-0.99, p=0.02; 3rd tertile: OR 0.49, 95%CI 0.26-0.93, p=0.03) and the disease. After adjustment for multiple potential confounders, at a multivariate analysis, the highest tertiles of PLV (OR 9.64, 95%CI 3.62-25.72, p<0.0001), and DI (OR 0.49, 95%CI 0.25-0.99, p=0.04) remained to be significantly associated with the disease, as compared to the lowest tertiles.

Conclusions: our data indicate that an alteration of hemorheological parameters, namely PLV and DI, may modulate the susceptibility to PAD. Hemorheological profile in PAD patients could allow to identify patients who might benefit from hemodilution.

P457 Myeloperoxidase overexpression in children with hypercholesterolemia

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Topic: Biomarkers

Introduction:

Objective:

Background:

Methods:

Results:

Conclusion:

P458 Myeloperoxidase overexpression in children with hypercholesterolemia

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1Università di Rome La Sapienza, Rome, Italy, 2La Sapienza, University of Rome, Rome, Italy

Topic: Biomarkers

Introduction:

Objective:

Background:

Methods:

Results:

Conclusion:
P490 Subclinical Left ventricular dysfunction in rheumatic mitral stenosis: correlation with high sensitivity c-reactive protein levels
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1 National Heart Institute, Cairo, Egypt

Topic: Heart disease

Background: In pure rheumatic mitral stenosis (MS), varying degrees of left ventricular (LV) dysfunction occur. There is a controversy regarding whether this deterioration is result of functional or mechanical factors. Doppler tissue velocities of the mitral annulus correlate well with LV systolic and diastolic function. C-reactive protein (CRP) is increased in patients with acute rheumatic fever but it is not known whether plasma levels increase in patients with chronic rheumatic valve disease and their impact on LV function.

Objectives: To investigate left ventricular function by using pulsed wave Doppler tissue imaging (PWTDI) in rheumatic mitral stenosis and correlate this with high sensitivity (hs-)CRP levels.

Patients and methods: The current study enrolled 80 patients with chronic rheumatic mitral stenosis & 36 age and gender matched healthy volunteers as control group. PWTDI data (from each of 4 mitral annular sites, septal, lateral, inferior, anterior) were obtained. Mean peak annular systolic velocity (Sm), mean annular early (Em) and late (Am) diastolic velocities were calculated by averaging of values measured at each site. Precontraction time (TCT), ejection time (ET) and isovolumic relaxation time (IVRT) was estimated for calculation of the myocardial performance index (MPI). hs-CRP levels were measured by rapid immunoplasma and blinded to cardiologist making assessment of LV function.

Results: Myocardial velocities of LV (Sm, Em, Am) were found to be significantly lower in MS patients compared to controls (0.5 ± 0.4 vs 0.9 ± 0.3 cm/s, 7.3 ± 1.4 vs 14 ± 0.65 cm/s, 9.2 ± 2.3 vs 11 ± 4.1 cm/s, respectively; p < 0.001 for all). MPI was higher in MS patients than control group (0.63 ± 0.2 vs 0.47 ± 0.3, p < 0.001). Patients with MS were shown to have significantly higher plasma levels of hs-CRP compared to controls (6.5 ± 0.9 vs 2.2 ± 0.3 mg/L, p < 0.001). Significant negative correlation could be established between hs-CRP and Sm (r = -0.67, Em(r = -0.82), Am(r = -0.730) and significant positive correlation was established between hs-CRP and MPI (r = 0.66) with p < 0.001 for all correlations.

Conclusion: Rheumatic mitral stenosis significantly impaired left ventricular long axis function evaluated by PWTDI and this impairment was strongly correlated with hs-CRP level. These results may be an evidence of ongoing low grade systemic inflammation in chronic phase of rheumatic heart disease.

P491 Vasomotor dysfunction and alterations of circulating adhesion molecules in metabolic syndrome patients with insulin resistance

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Topic: Biomarkers

Aim: to evaluate relationships between soluble intercellular tissue adhesion molecule-1 (sICAM-1), soluble vascular cell adhesion molecule-1 (sVCAM-1), soluble E-selectin (sE-selectin), insulin resistance and cutaneous vasomotor responses (endothelial-dependent vasodilatation and periocclusive reactive hyperemia). Results: sICAM-1, sVCAM-1, and sE-selectin were measured by Luminex technology. All parameters were measured in 36 healthy volunteers (healthy control group) and 18 patients without DM. 18 healthy subjects were selected as controls (C). The study groups were divided into non-insulin treated type-2 diabetes mellitus (without insulin therapy and pronounced diabetic complications) (DM) and 18 patients with insulin resistance. MS patients with insulin resistance were divided into two groups: 18 patients with metabolic syndrome patients with insulin resistance. MS patients with insulin resistance were divided into two groups: 18 patients with insulin resistance and 18 patients without DM. 18 healthy subjects were selected as controls (C). The study groups were divided into non-insulin treated type-2 diabetes mellitus (without insulin therapy and pronounced diabetic complications) (DM) and 18 patients with insulin resistance. MS patients with insulin resistance were divided into two groups: 18 patients with insulin resistance and 18 patients without DM. 18 healthy subjects were selected as controls (C).

Results: We measured plasma vascular adhesion molecules in the studied groups: sICAM-1, sVCAM-1, sE-selectin and sICAM-1, sVCAM-1, sE-selectin levels were elevated (p < 0.05). sICAM-1, sVCAM-1, sE-selectin levels were elevated (p < 0.05). Only the patient group with diabetes demonstrated a significant diminution in sLDF compared to the group of healthy subjects (p < 0.05). sLDF was decreased in both patient groups in comparison with the group of controls (p < 0.05), but only in diabetes the decrease of mLDF was significant (p < 0.05). sVCAM-1, sE-selectin and sE-selectin levels were elevated (p < 0.05) in diabetic patient group.

Our findings show that MS patients with insulin resistance have significant cutaneous vasomotor dysfunction but diabetics (with insulin resistance and MS) have also elevated sICAM-1, sVCAM-1, and sE-selectin levels.
P494

Reference values for dynamic responses to incremental cycle ergometry in males and females aged 20 to 70.

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Hospital Cardiologique du Haut-Leveque, Pessac, France, 1Pessac, France, 2Avignon, France, 3Reverso, France, 4Garonne, France, 5Bordeaux, France

Topic: Exercise physiology, testing and training

Purpose: Cardiopulmonary exercise testing (CPX) provides a means of edging evidence of abnormal physiologic functioning. However reference values are rare, old and established in limited and generally non-European populations.

Methods and results: We therefore prospectively evaluated 396 sedentary (less than 2 hours per week of physical and sports activity) individuals (189 male, 199 female, age 20 to 70 yr) and submitted to standard ramp-incremental CPX on an electronically braked cycle ergometer. Protocols were individually adapted (power was increased to the limit of tolerance in a linear ramp pattern -10 to 30 watts per min- to obtain a 8-15 min of exercise duration). The average VO2 for the last 15 s of the test was considered to be representative of the subject’s peak VO2. Ventilatory thresholds were estimated using both gas exchange and ventilatory methods. Functional and maximal aerobic capacities are showed according to age and sex in table.

Conclusion: These data therefore provide a frame of reference for assessing the normacy of the response profiles of standard indices of metabolic, cardiovascular and ventilatory function in sedentary males and females up to 70 yr of age.

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P495

The non-invasive physiological evaluation challenge: correlations between cardio-pulmonary vs impedance-cardiography indices in cardiac patients

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Topic: Exercise physiology, testing and training

Background: The cardiopulmonary exercise test (CPET) is a well established and conceptual test to correlate between CPET (indirect) indices like oxygen consumption (VO2) and cardiac index (CI). On the contrary, the impedance cardiography (ICG), a new non-invasive test, becomes more and more familiar for direct non-invasive measurement of cardiac output, stroke volume and other haemodynamic indices.

Purpose of Study: To correlate between CPET (indirect) indices like oxygen consumption (VO2) and carbon dioxide production (VCO2) vs the direct ICG measurements of cardiac output (CO), stroke volume (SV) during exercise while reaching similar peak-HR in both tests.

Material and Methods: 30 cardiac pts who underwent a CPET and an exercise ICG within up to two weeks were included in the study. Linear correlations were done between the adequate measurements should be preferentially used to limit bias between measurements at different times.

Conclusion: These data therefore provide a frame of reference for assessing the normacy of the response profiles of standard indices of metabolic, cardiovascular and ventilatory function in sedentary males and females up to 70 yr of age.

Table: Cardio-pulmonary vs impedance-cardiography indices in cardiac patients

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P496

Effect of salbutamol on chemoreflex and metaboreflex contribution to endurance performance and muscle strength in nonsmoking men

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Topic: Exercise physiology, testing and training

Purpose: Ventilatory stimulation and its chemical control are important when b2 adrenergic agonists are used in asthma treatment. In elite athletes and general population, asthma is a very common condition. Use of b2 adrenergic agonists by competitive athletes is strictly prohibited by WADA in sport disciplines due to their assumed ergogenic action, such as an increase of peripheral chemosensitivity and metabolism, in endurance performance and muscle strength. The purpose of the present study is to investigate the effect of salbutamol on chemoreflex and the metaboreflex, its ergogenic contribution in nonsmoking men.

Methods: 11 healthy male subjects were measured after 10 pg/min during 30 minutes intravenously salbutamol versus placebo following a double-blind, placebo-controlled, randomised crossover design.

Results: The effects of salbutamol, on MSNA, ventilatory responses to hyperoxic hypercapnia (7% CO2 in O2), DVE/DPaCO2, and isocapnic hypoxia (10 % O2 in N2), DVE/DSpO2, and to an isometric muscle contraction followed by a local circulatory arrest (metaboreflex) were determined at rest, followed by an incremental cardiopulmonary exercise test and maximal isokinetic muscle strength test (Cybex).

Conclusion: Salbutamol increases VE stimulating peripheral chemoreceptors with out any changes on aerobic exercise capacity and muscle strength. Systemic or haemodynamic effects of b2 adrenergic agonist rather than the bronchial actions are involved in the ergogenic effects of salbutamol in healthy subjects.

P497

Strength evaluation after exercise training in chronic heart failure: which modality to use?

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Topic: Exercise physiology, testing and training

Objectives: Changes in peripheral muscle strength after training have been assessed by various techniques in chronic heart failure (CHF) patients. The most frequently used methods are isokinetic dynamometry and the one repetition maximum (1RM) measure. Considering the important variations that have been reported in strength increases throughout various studies of training in CHF, the question arises if both methods assess the changes in muscle strength in a comparable way.

Methods: 30 CHF patients, NYHA class II-III, mean baseline VO2peak 14.8±3.0 mL x kg-1 min-1, mean baseline left ventricular ejection fraction (LVEF) 23±5.5% were assessed for knee extensor and knee flexor strength before and after 40 training sessions by isokinetic dynamometry and 1RM.

Results: Knee extensor muscle strength increased by 7.4% for knee flexor strength by 18.7% if measured by isokinetics. With the1RM method knee extensor and flexor strength increased by 36% respectively 100%. Both techniques were not in agreement for muscle strength assessment; improvements were more important with the 1RM method. However, statistical analysis showed that the 1RM method was biased especially for higher values.

Conclusion: In the follow-up of exercise training programmes in CHF patients, isokinetic measurements should be preferentially used to limit bias between measurements at different times.
P498

Oxygen uptake efficiency slope (OUTES) and neurohumoral activation in patients with heart failure
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Topic: Exercise physiology, testing and training

Recently oxygen uptake efficiency slope (OUTES), measured during cardiopulmonary exercise test, has been described and proposed as a new prognostic factor in patients with HF. Brain natriuretic peptide (BNP) is well known marker of neurohumoral activation and is also an important prognostic marker in CHF. Another marker of neurohumoral activation in CHF is HRR (reduction of heart rate immediately after exercise). Our aim of the study was to evaluate interrelations of HRR, BNP and OUTES in patients with CHF and systolic dysfunction.

Methods: Forty two patients (mean age 50.2 ± 9.3 years, mean EF 26.7 ± 8.1%) and 8 healthy controls (age 45.6 ± 14.7 yrs) underwent cardiopulmonary exercise testing and BNP levels measurement.

Results: there were significant differences between patients and controls in BNP levels (350 ± 520 vs 14 ± 19 ng/ml, p = 0.005), OUTES (1.7 ± 0.4 vs 2.7 ± 0.5, p < 0.001), peak VO2, VE/VO2 slope, and HRR. In patients OUTES was significantly correlated with LVEF (r = -0.62, p < 0.05), peak VO2 (r = 0.72, p < 0.05), VO2 AT (r = 0.54; p < 0.05) and VE/VO2 slope (r = -0.41; p < 0.05), BNP levels (r = 0.49; p < 0.05), and HRR (r = 0.37, p < 0.05). OUTES was not correlated with age, BMI, creatinine level. There was a trend toward higher OUTES in men than women. In multivariable regression analysis (R2 = 0.56, p < 0.0001) including gender, LVEF, BNP levels and HRR, significant independent predictors of OUTES were gender (β =-0.31, p=0.008), LVEF (β=0.44, p=0.02), and BNP (β=-0.35, p=0.01).

Conclusion: OUTES - new parameter of cardiopulmonary exercise test is independently related to BNP levels in CHF. It needs further studies to evaluate its significance as prognostic factor in comparison to BNP.

P499

Heart rate recovery and left ventricular diameter in patients with chronic heart failure: size matters
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1Medical University of Vienna, Vienna, Austria, 2Charite-University Hospital Berlin, Berlin, Germany

Topic: Exercise physiology, testing and training

Purpose: To investigate heart rate recovery (HRR) in patients with chronic heart failure (CHF) in relation to left ventricular (LV) function and size. In patients HRR was significantly correlated with LVEF (r = -0.41; p < 0.05), peak VO2 (r = 0.72, p < 0.05), VO2 AT (r = 0.54; p < 0.05) and VE/VO2 slope (r = -0.41; p < 0.05), BNP levels (r = 0.49; p < 0.05), and HRR (r = 0.37, p < 0.05). OUTES was not correlated with age, BMI, creatinine level. There was a trend toward higher OUTES in men than women. In multivariable regression analysis (R2 = 0.56, p < 0.0001) including gender, LVEF, BNP levels and HRR, significant independent predictors of OUTES were gender (β =-0.31, p=0.008), LVEF (β=0.44, p=0.02), and BNP (β=-0.35, p=0.01).

Conclusion: OUTES - new parameter of cardiopulmonary exercise test is independently related to BNP levels in CHF. It needs further studies to evaluate its significance as prognostic factor in comparison to BNP.

P501

Allostereon antagonist improves exercise tolerance in 6-minute walk test in comparison with ACE-inhibition in AF patients treated with beta-blockers; open, prospective study
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Topic: Exercise physiology, testing and training

Atrial fibrillation [AF] has moderate negative impact on exercise tolerance. The model of optimal therapy in patients [pts] with various patterns of AF is still not established. The aim of the open, prospective study was comparison of spironolactone [SP][I] and ACE-inhibitor [ACE-I] therapy influence on exercise capacity and ventilatory efficiency after 6 month of therapy in AF patients. The primary endpoint of the study was an improvement of distance walked in 6MWT, and secondary endpoints were changes in heart rate, blood pressure and dyspnea score after exercise test. The study group consisted of 68 patients, age 40-83 years, with persistent and persistent AF. Among them 32 pts were treated with BB and SPIR, dose 25 mg (mean dose: 66.7 ± 8.7; max dose: 106 m; oxygen consumption: 12.3 ± 6.7 ml/min/kg; peak heart rate 127 ± 13 bpm). After 6 month of therapy there were significant differences between patients and controls in BNP levels (350 ± 520 vs 14 ± 19 ng/ml, p = 0.005). No significant differences were observed in baseline values of other studied parameters between 2 groups. HR at rest and max, were respectively: 69.3 ± 16.6/min (ns) and 83.1 ± 13.8/min (p < 0.05). There were no significant differences in exercise-derived variables were noted between group 2 and 3. SPIR correlated significantly with peakVO2/kg (r =0.47), OUES (r=0.40) and peakWatt (r=0.34). (all p<0.01) Multiple stepwise linear regression analysis showed that BNP (adjusted r2 = 0.43), mean arterial pressure and age to be the strongest independent predictors of peakVO2. The proposed model explained 54% of the variability in peakVO2. ROC-analysis showed that the ability of estimated GFR to differentiate patients with impaired maximal exercise capacity (peakVO2<18ml/kg/min) from those preserved exercise capacity (peakVO2>18ml/kg/min) exceeded that of HbAlc, age and indices of central hemodynamic function.

Conclusion: Increasing RD is associated with an impaired maximal exercise capacity and a decreased ventilatory efficiency during progressive exercise in post-HFr ex patients. Moreover, GFR is the strongest independent non-exercise derived predictor of peakVO2 in these patients.
Prognostic value of exercise test after acute myocardial infarction

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Purpose: Exercise test (ETT) had important prognostic role after acute myocardial infarction (AMI). However, this prognostic value was questioned with the increased use of primary percutaneous coronary revascularisation (PCR).

Methods: Three hundred patients (age: 61.9 ± 12.2 years, 186 men) were involved into investigation who arrived to Phase II cardiac rehabilitation 19.3 ± 9.5 days after their AMI. 43 pts (13.7%) had coronary angiography, 43 pts (14.3%) had PCI, 11 pts (3.7%) suffered AMI, 15 pts (5%) had CABG surgery, 8 pts (2.7%) had stent and 26 pts (8.7%) were hospitalised for heart failure. 37 pts (12.3%) for angioma. MACI occurred more frequently in patients with peripheral vascular disease (p<0.05), heart failure (p<0.001), depression, MACI (combination of death, MI, PCI, stroke, and hospitalisation for angina or heart failure), MACIE2 (combination of death, MI, PCI and stroke) and MACIE3 (combination of death, MI, stroke, hospitalisation for angina or heart failure). Kaplan-Meier methodology was used to estimate event-free survival.

Results: The mean duration of follow-up was 457 ± 134 days. 25 pts (8.3%) died, 83 pts (27.7%) had PCI, 6 pts (2%) had CABG surgery, 8 pts (2.7%) had stent and 26 pts (8.7%) were hospitalised for heart failure, 37 pts (12.3%) for angioma. MACI occurred more frequently in patients with peripheral vascular disease (p<0.05), heart failure (p<0.001), depression, MACI (combination of death, MI, PCI, stroke, and hospitalisation for angina or heart failure), MACIE2 (combination of death, MI, PCI and stroke). In patients with patients with heart failure (p<0.001), the independent predictors of MACIE2 were ST and PVD as well.

Conclusion: The exercise-induced ST segment depression is still a valuable prognostic factor in addition to some clinical parameters (diabetes mellitus, PVD) to predict the occurrence of major adverse cardiac events after acute myocardial infarction.
P506
Dynamic exercise training might be the best non-pharmacological measure for preventing the development of high blood pressure and pathological left ventricular hypertrophy in healthy adult males.
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Topic: Physical activity

Purpose: to demonstrate that dynamic exercise training (DET) might avoid the development of essential high blood pressure (HBP) and pathological left ventricular hypertrophy (LVH) in healthy adult males.

Methods: we studied 36 healthy and normotensive young male soccer players (YMSP), aged 20 to 32 years old (mean 24.1 ± 2.7), who fulfilled HET for nine months. We performed cardiopulmonary exercise testing (CPX) and echocardiography so as to estimate left ventricular mass index (LVMI) utilising the Devereux and Reicheck’s formula and dividing by body surface area. We applied the Chi-squared test (Fish’s exact test) and the paired Student’s t-test, considering p ≤ 0.05 as statistically significant.

Results: at the beginning of the sporting season, we found 8 EBPRE (22.2%), whereas only 4 EBPRF (11.1%) were detected at the end of it, p < 0.01. In the trained healthy and normotensive YMSP, those with EBPRE showed statistically significant higher LVMI than those without it (196.9 ± 52.9 vs. 152.28 ± 33.57 g/m², p < 0.004).

Conclusions: according to current general knowledge, the healthy and normotensive YMSP with EBPRE could be prone to develop future essential high blood pressure and pathological LVH. DET decreased the number of EBPRE in our sample of this population. Therefore, it could be hypothesised that systematic DET might constitute an excellent non-pharmacological measure for preventing the appearance of essential HBP and pathological LVH in healthy men in the adult age.

P507
Three-months exercise training of moderate intensity influences haemodynamics and lipids but not hormonal, inflammatory or coagulologic parameters in 50-year-old males with hypercholesterolemia.
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Topic: Physical activity

Aim of the study: to assess whether 3-months’ controlled exercise training (CET) of moderate intensity in middle-aged males with newly-diagnosed hypercholesterolemia influences haemodynamic, lipid, hormonal, inflammatory and coagulologic parameters. Material and methods: thirty eight 50-year-old symptomless males with newly diagnosed hypercholesterolemia (TC < 240 mg/dl, mean 238.3 ± 28.8 mg/dl, range 205-283 mg/dl) were randomly divided into 2 groups: active group A (38 pts) and control group B (20 pts). The participants in group B were only given instructions to change their life-style. Before (CPX-1) and after (CPX-2) CET, patients had OGTT-2 simulating a postprandial glucose challenge. Immediately after CPX-2, patients had OGTT-2 simulating a postprandial glucose challenge. Methods: patients with CHD were included, if the oral glucose tolerance test exhibited a 2-h value > 200 mg/dl (OGTT-1). Using an incremental ramp protocol, a symptom limited CPX was performed on a bicycle ergometer until a respiratory exchange ratio (RER) > 1.20 (CPX-1). One day later, a steady-state CPX of 30 min duration was performed targeting a HR of 90.0 ± 9.5 just below the anaerobic threshold, representing an aerobic exercise testing (CPX-2).

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Conclusions: aerobic exercise intensity for effective postprandial glucose control is rather low in patients with DMT2 and CHD. A specific and concrete recommendation for exercise prescription can be given individually by CPX in this cohort of patients.

P509
Comparision of physical activity of children with congenital heart disease and healthy peers concerning everyday school life and leisure time.
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Topic: Physical activity

Physical activity: the purpose of the described study was to classify physical activity of children with congenital heart disease (CHD) on the basis of healthy peers comparison data. It should be figured out if there were differences concerning sporting performances in sports clubs, school sports and motor basic skills. In addition it should be ascertained if the degree of residual sequelae (RS), the mode of intervention and the presence of initially cyanous have got a bearing on the level of physical activity. In this study 179 children, which are representing a wide spectrum of CHD (94 boys, 85 girls, mean age 10.6 ± 2.7 yrs), were asked 52 questions about the occupation with their heart disease, their social contacts, their kinesthetic and leisure behaviour and also their behaviour in school sports. The control group of 179 healthy children (94 boys, 85 girls, mean age 10.6 ± 2.7 yrs) was picked out by match pairing with same age and gender compared to the children with CHD. These children had also approximately the same number of siblings. It was expected that the children with CHD were not as physically active as their healthy peers. For statistical analysis one twofactorial variance analysis were used. There was no significant difference between the children with CHD and their healthy peers concerning the membership in sports clubs. Children with CHD participated and wanted to participate significantly (p<0.000) less in school sports than their healthy peers. Especially children with moderate and significant RS, children whose cardiac defect do require surgery and children with initially cyanotic heart disease wanted to participate in school sports significantly (p<0.000) less. The intervention group did not have less friends. They also spent as much time with their friends as their healthy peers. Children with CHD were watching significantly more (p<0.05) and longer (p<0.002) TV compared to their healthy peers. They also were significantly more (p<0.001) capable to jump rope than their healthy peers. Also children with moderate RS (p<0.04), children whose cardiac defect do require and whose cardiac defect do not require surgery (p<0.00) and children with initially cyanotic heart disease (p<0.005) were significantly less capable to jump rope than their healthy peers. Concerning the motor basic skills bicycling, swimming, riding kickboard and rollerskate there were differences concerning sporting performances in sports clubs, school sports and motor basic skills. In addition it should be ascertained if the degree of residual sequelae (RS), the mode of intervention and the presence of initially cyanous have got a bearing on the level of physical activity.

Abstracts S111
Effect of cardiorespiratory fitness and obesity on haemodynamic responses in children

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Topic: Exercise physiology, testing and training

Objective: The objective of this study was to examine the influence of cardiorespiratory fitness (CRF) and obesity on arterial blood pressure and its determinants at rest and during sympathetic activation in children.

Methods: A total of 48 healthy children aged 11.6±1.8 (mean ±SD) years (28 boys and 20 girls) participated in the study. Anthropometric data were collected and body mass index (BMI) sex age specific international cutoff values were used for overweight and obesity definition. Accordingly, participants were placed in two equal number groups (n=24 each) obese/overweight (OB/OV) and normal weight (NO). CRF was assessed with the physical work capacity test (PWC170) on a cycle ergometer. OB/OV and NO groups were divided into high (above median) and low (below median) CRF subgroups based on the PWC170 z-scores distribution. Beat to beat systolic, diastolic and mean arterial pressure, heart rate, cardiac output (Modeflow), stroke volume, total peripheral resistance, arterial compliance (Winke$$el$$) and rate pressure product, were recorded with the use of a photoplethysmographic device. Measurements were performed during 5 minutes of rest and 3 minutes of sympathetic activation with isometric product, were recorded with the use of a photoplethysmographic device. Measurements were performed during 5 minutes of rest and 3 minutes of sympathetic activation with isometric product, were recorded with the use of a photoplethysmographic device. Measurements were performed during 5 minutes of rest and 3 minutes of sympathetic activation with isometric product, were recorded with the use of a photoplethysmographic device. Measurements were performed during 5 minutes of rest and 3 minutes of sympathetic activation with isometric product, were recorded with the use of a photoplethysmographic device.

Results: At rest, unfit OB/OV children had higher systolic, mean arterial pressure and rate pressure product (index of cardiac oxygen demand) than fit OB/OV children (p<0.05). During HHG the same parameters as well as c carotid output, and s stroke volume were higher in unfit than in fit OB/OV children (p<0.05). Fit OB/OV children did not differ from NO children fit or unfit, in any of the above parameters. Until OB/OV children had greater height, body mass, BMI, waist and hip circumferences than fit OB/OV and NO children of any fitness level. Age and sex were used as covariates in the analyses and CRF was found to have a main effect on systolic blood pressure (p<0.05). CRF was negatively correlated with waist circumference (r Pearson = - 0.59, p = 0.002) in the OB/OV group.

Conclusions: Obese and overweight children with low CRF, unlike their fit counterparts, had an exaggerated systolic blood pressure response at rest and during sympathetic activation, presumably coupled with higher cardiac output and augmented cardiac oxygen demand. These results highlight the importance of fitness for health maintenance in obese and overweight children.

NT-pro-BNP increase at exercise in 66 patients with univentricular heart after total cavopulmonary connection

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Topic: Exercise physiology, testing and training

Objective: NT-pro-BNP is elevated in patients with increased atrial or ventricular diastolic pressure. Increase of NT-pro-BNP during exercise was related to myocardial ischemia, myocardial infarction and inflammatory stress at exercise in acquired heart disease studies. Its value in patients with total cavopulmonary connection (TCPC) is unknown.

Patients and Methods: 66 patients (19 female, 47 male, age 8±5 years) with univentricular heart after TCPC (lateral tunnel in 28 patients, extracardiac conduit in 38 patients) performed a symptom limited cardiopulmonary exercise test on an upright bicycle ergometer. Venous NT-pro-BNP samples were drawn at rest and 2-3 min after peak exercise.

Results: Median NT-pro-BNP at rest was 82 ng/L (range 11-2554) with 4 patients above the upper reference limit of 480 ng/L. A higher NT-pro-BNP at rest was related to a worse aerobic capacity at the exercise test (ln NT-pro-BNP versus peakVO2, r=-0.333, p=0.006). The median increase of NT-pro-BNP at exercise was 6 ng/L (range 0.34 ng/L with all but one patients within the published cut-off of 80 ng/L. In a multiple regression analysis, the increase of BNP was solely related to a higher body mass (ln (NT-pro-BNP versus BMI, r=0.357, p=0.003) and not to any of the investigated functional parameter.

Conclusions: NT-pro-BNP at rest is a valuable predictor of cardiac function in TCPC Patients. However during exercise, there is only a minor increase in NT-pro-BNP. Its extent is considered normal in studies with adult patients and is not related to any investigated functional parameter. Maybe the filling restriction from the lungs prevents atrial and ventricular overload and BNP secretion in Fontan patients.
A Araujo2, E Lopez De Sa1, J Lopez Sendon1

Changes in mean NTpro-BNP levels over ti

P614 Comprehensive cardiac rehabilitation and N-terminal Pro-B-type Natiretic Peptide (NTproBNP) in patients at one year after acute myocardial infarction
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Topic: Cardiovascular rehabilitation

Abstract: Cardiac rehabilitation is a non-specific intervention that affects various functional systems including central haemodynamics and neurohumoral activation. Objective: The aim of the study was to analyse changes in levels of NTproBNP as a marker of myocardial function and afterload in patients after myocardial infarction treated by primary coronary angioplasty and undergoing comprehensive cardiac rehabilitation. Levels of NTproBNP may not only correspond to systolic impairment but also be a sensitive marker of abnormal wall stress preceding ventricular remodelling.

Methods: 50 patients after AMI treated by primary PCI (41M: F, mean age 58 SD11), mean ejection fraction (EF): 54.1 ± 11.4 SD) and NYHA class II. Within 30 days after the procedure all patients underwent early cardiac rehabilitation programme (3 sessions per week for 8 weeks).

Results: NTproBNP levels were maintained during one-year follow-up. Conclusions: NTproBNP levels of NTproBNP significantly decreased during early postinfarction rehabilitation. This finding may be accounted for by a positive effect of physical training on endothelial relaxation, reduced afterload and left ventricular wall stress. The beneficial effects of reduced NTproBNP levels were maintained during one-year follow-up.

P615 Home-based cardia rehabilitation programmes: are they a feasible option?
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Topic: Cardiovascular rehabilitation

Purpose: Home-based rehabilitation programmes (HBP) have been designed for low-risk patients, who can self-manage their training programme without attending a group programme in a rehabilitation centre. The aim of this study is to compare the outcomes of the patients included in the HBP with those who attend the standard rehabilitation programme (SRP) in terms of exercise capacity and lifestyle changes.
Methods: We prospectively evaluated all the patients included in the SRP and in the HBP between December of 2007 and April of 2008. Patients were included in the HBP when they were unable to attend a group programme for physical or geographic reasons. The SRP included exercise training by a medical-trained team and healthcare professional staff members three times a week, while the HBP included home-based aerobic training by a medical-trained team and health professional staff members three times per week for 8 weeks.

Results: We analysed 43 patients, 31 in the SRP and 12 included in the HBP. We compared basal and clinical characteristics of the patients included in both groups. Mean age was 57.6 years in the pre-following SRP vs 60.6 years in the ones included in the HBP, 9.3% were women vs 36% (p<0.01), 65.5% had a STEMI vs 68% and mean LVEF was 55% in both groups. The initial exercise capacity was 7.2 METS for both groups and the exercise capacity at the end of the programme was 11.7 for the SRP and 9.3 for the HBP (p<0.001). The initial BMI was 28.5 for the SRP and 27.6 for the 8 weeks and for the HBP it was 27.9 at the beginning and 27.7 (NS) at the end of the programme.

Conclusions: Patients attending a standard programme in a rehab centre seem to achieve better exercise capacity and more adherence to the lifestyle advice provided by our staff compared to the ones who exercise by themselves. However, home-based rehabilitation programmes appear as an alternative in some low-risk patients who are unable to attend a group programme.

P616 Exercise training in patients with chronic ischemic heart disease: influence on quality of life depending on ejection fraction
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Topic: Cardiovascular rehabilitation

Aim of the study: The study was aimed at evaluation of quality of life, physical performance and parameters of capacity of the transport system of oxygen that we monitored in the patients with chronic ischemic heart disease (CHID) without myocardial infarction with low and high ejection fraction (EF) before and after the combined exercise training (acrobic training combined with resistance elements).

Methods: We examined 71 men (mean±SD) at the age of 61±9.7 years with EF higher than 40% (55.0±7.0%) diagnosed by echocardiography, echocardiography and body mass index (BMI) 27.8±2.0 kg.m-2 and 17 men with EF lower than 40% (6.3±7.8% age 60.4±8.2 years, BMI: 28.6±4.6 kg.m-2 before and after aerobic training combined with resistance exercises (12 weeks, three times a week). We compared the parameters of capacity of the transport system of oxygen (VO2SL.ml.min-1, VO2SL.kg-1.ml.min-1.kg-1), maximum achieved symmetric-limit load (WWmaxSL, WWmaxSL.kg-1.mg-1), and subjective perception of quality of life by means of the questionnaire of quality of life (Seattle Angina Questionnaire, SAQ-1).

Results: In the group of with EF>40% we have found (before versus after) a significant change in WmaxSL (115.6±34.0 v. 124.4±36.2, p<0.001), WWmaxSL.kg-1 (1.4±4.0 v. 1.45±0.43, p<0.01), VO2SL.ml.min-1 (1573±444 v. 1755±440, p<0.05), points in the questionnaire of quality of life SAQ (78.8±18.8 v. 84.5±22.1, p<0.01), SAQ2 (76.5±22.1 v. 85.6±16.9, p<0.01), SAQ3 (89.6±15.2 v. 93.9±8.8), SAQ4 (88.6±15.3 v. 94.9±8.8, p<0.01), SAQ5 (76.7±17 v. 74.8±17, p<0.01). In the group with low ejection fraction we have found WmaxSL (97.2±22.7 v. 112.5±30.9, p<0.05), VO2SL.ml.min-1 (1177±41.4 v. 207.7±6.6, p<0.05), points in the questionnaire of quality of life were not significantly changed SAQ (85.7±10.8 v. 86.4±14.4, p<0.05), SAQ2 (85.3±17 v. 88.8±14.1, SAQ3 (87.8±12.5 v. 91±10.3), SAQ4 (87.3±18.9 v. 90.1±15.2), SAQ5 (75.1±20.9 v. 75.7±21.3).

Conclusions: The twelve-week aerobic training combined with resistance exercises in patients with CHID and EF more than 40% improves capacity of the transport system and subjective perception of quality of life, in patients with lower EF than 40% improves only capacity of transport system.

P617 Can additional dietary advice and exercise reduce central obesity during a cardiac rehabilitation programme
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Topic: Cardiovascular rehabilitation

Purpose: Obesity is a major public health problem with associated morbidity and mortality. Obesity is classified as an independent risk factor for cardiovascular disease and is expected to become the most common health problem of the 21st century. Furthermore, the WHO estimates the global prevalence of obesity has reached 1.6 billion in adults worldwide and its rate is increasing rapidly. Obesity is associated with a number of other conditions related to the endothelial dysfunction and hypercoagulability. The World Health Organisation (WHO) and the American Heart Association (AHA) recommend that overweight or obese individuals lose 5-10% of their body weight over the long term and that physical activity should be incorporated into the lifestyle.

Methods: Participants in the study (n = 49) were routine attendees of a CR programme. The intervention group were requested to walk for one hour, on the days they did not attend the cardiac rehabilitation programme as opposed to 30 minutes in the control group. They were given additional dietary advice following analysis of their food diaries and they attended an additional dietary educational talk given by the researcher. The control group attended the routine CR programme.

Results: The study was analysed using SPSS version 14 and the results demonstrated that there was no significant difference in any of the parameters measured between the intervention and control groups. When the data was analysed collectively for both groups, pre- and post-programme there was significance differences in anthropometric measures (BMI, p=0.02; Weight: p=0.021, WC: p=0.003), lipid levels (TG: p=0.039, LDL: p=0.02), fitness capacity (p<0.001) and levels of physical activity (p=0.001). Systolic blood pressure and levels of anxiety also improved, (p=0.021 and p=0.04). As there was no significant difference in any of the baseline parameters of the two groups and these changes occurred over the duration of the cardiac rehabilitation programme this demonstrates the clear benefit of the programme itself.

Conclusions: The results of this study were analysed using SPSS version 14 and demonstrate the clear benefits of the current programme. It would have been difficult for the intervention group to significantly improve above what the control group achieved over such a short time frame. Obesity remains a significant health problem for cardiac rehabilitation patients and targeted interventions toward weight management are necessary. Intervention in obesity, in addition to the well established risk factors, appears to be an advisable goal in prevention of cardiovascular disease and diabetes.
Effects of exercise training intensity on the augment of whole-body oxygen uptake capacity in coronary artery disease patients: a meta-regression analysis

**Purpose and objectives:** The purpose of this study was to evaluate, in octogenarians patients admitted to a medical centre, the effect of continuous low- vs high-intensity exercise training on the augment of VO2max will be executed in this study.

**Methods:** The authors searched MEDLINE and PubMed (from 1966 to November 2007) for randomised controlled trials (RCTs) examining the effects of supervised aerobic exercise training on VO2max in CAD patients with preserved left ventricular ejection fraction (LVEF). Next, the effect of continuous low- vs high-intensity exercise training on the augment of VO2max was compared by means of a meta-regression analysis. Inclusion criteria were: patients with stable heart failure (LVEF < 45%), NYHA II-III with optimal medical treatment, and VO2max < 20 mL/kg/min. The intervention group went on to receive 12 months training once every two weeks whereas the control group received usual care without training. All patients underwent symptom limited exercise test, 6-minute walk test and filled out the Minnesota Living with Heart Failure (MLWHF) and SF-36 questionnaire (excluding bodily pain) at inclusion, 8 weeks and 14 months.

**Results:** 32 patients completed 8 weeks of training and 43 patients remained after 14 months. There were significant improvements in functional capacity after 8 weeks but these declined during the following 12 months. After 8 weeks of training there were significant improvements in Role Physical and Mental Health but a decline in Role Emotion of the SF-36. After 14 months the only significant difference from baseline was in Mental Health. There were no significant differences between the two groups at any time, although the control group tended to have higher scores at inclusion. The MLWHF showed no improvements over time.

**Conclusion:** There were no significant differences between the two groups after 14 months of maintenance training, but both groups had a significant improvement in Mental Health. There is no obvious explanation why there was a decline in Role Emotion after 8 weeks, when Mental Health showed improvements.

**Results for SF-36 with 95% CI**

**SF-36 category** | Inclusion 8 weeks | p 0- & 8-weeks | 14 month | p 0-14 month
---|---|---|---|---
Physical Function | 57.8 (51.7-63.8) | 59.5 (50.4-69.4) | 0.35 | 59.2 (54.3-65.4) | 0.95
Role Physical (RP) | 29.9 (33.0-54.0) | 41.6 (33.0-54.0) | 0.01 | 31.1 (19.9-44.2) | 0.74
General Health perceptions (GH) | 49.9 (44.3-55.1) | 49.3 (43.9-54.8) | 0.7 | 47.1 (40.0-54.3) | 0.50
Vitality (VT) | 53.3 (46.8-59.9) | 54.8 (49.0-60.0) | 0.47 | 53.0 (42.7-57.7) | 0.22
Social Function | 79.4 (74.4-85.5) | 79.4 (72.6-86.6) | 0.71 | 79.4 (69.4-87.3) | 0.50
Role Emotion (RE) | 51.3 (40.8-61.9) | 26.8 (21.5-32.2) | <0.001 | 59.2 (47.5-70.9) | 0.38
Mental Health (MH) | 65.4 (59.2-71.7) | 76.7 (71.3-81.8) | <0.001 | 73.3 (66.5-80.5) | <0.001

**P521**

**Functional evaluation in octogenarians patients undergoing a cardiac rehabilitation programme: correlation between 6min walking test and Rivermead Mobility Index**

**Topic:** Cardiac rehabilitation

**Introduction:** The aim of this study was to evaluate, in octogenarians patients admitted to a cardiac rehabilitation programme, if the Rivermead Mobility Index (RMI) (scale of mobility) is correlated with the functional capacity assessed with the 6-Minute Walking Test (6MWT).

**Methods:** We selected 108 consecutive patients ≥ 80 years (M = 51.5, mean age 82.5 ± 2.7 years, after cardiac surgery n = 92, heart failure n = 56) admitted to our centre for a cardiac rehabilitation programme. All patients were evaluated with the RMI and underwent 6MWT both at admission (RMI1 and 6MWT1) and after (RMI2 and 6MWT2) a period of daily physical training. The ratios RMI2/RMI1 and 6MWT2/6MWT1 were calculated as indexes of improvement (IM).

**Results:** The average in hospital stay was 20 ± 11 days with an average of 11.9 sessions of training for patient. The average distance walked at 6MWT1 and 6MWT2 was 191 ± 116 and 278 ± 122 mt, respectively (p < 0.001). The average score of RMI1 and RMI2 was 8.5 ± 3.4 and 13.1 ± 2.9, respectively (p < 0.001). The values of 6MWT1 and RMI2 results were significantly correlated (rho = 0.56, p = 0.001). The RMI IM was correlated significantly to 6MWT IM (rho = 0.30, p = 0.002). At multivariate analysis, RMI IM was predictive of 6MWT IM even after correction for age, gender, length of hospitalisation and number of sessions of training.

**Conclusions:** in octogenarians, a cardiac rehabilitation programme exerts an improvement both RMI and 6MWT. RMI IM is independently related to 6MWT IM. Thus, RMI could be potentially used to evaluate the improvement of functional capacity even in patients who can not undergo to 6MWT.
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T Sebzda1, A Popielewicz-Kautz4

Objective: research over the past 10 years has broadened our understanding of the values of exercise training in patients with chronic heart failure (CHF). A number of studies have demonstrated exercise programmes to be safe, cost-effective and have a positive impact on physical capacity. Other benefits of exercise include improved quality of life, lower hospital admission rates and reduced mortality. However, these intensive centre-based programmes are usually undertaken at least three times per week at moderate to high intensity and are difficult to replicate in clinical practice. We run a twice weekly programme at lower intensity. We report the outcomes from 2007 and 2008 for our 12 week centre-based exercise and education programme.

Method: patients with stable CHF were enrolled in a twice weekly exercise and education programme. Based on the current research, the programme encompassed 12 weeks of aerobic and strength training. Each session involved 60 minutes of circuit exercise training. Outcome measures were the 6-minute walk test (6MWT), Minnesota living with heart failure questionnaire (MLHFQ), body mass index (BMI) and percentage of body fat using bioelectrical impedance.

Results: a total of 97 patients were enrolled in the programme, with a mean age of 64.2 years and a left ventricular ejection fraction of 29%. 84% of the participants were males and 59% had New York Heart Association Class II. All patients were on angiotensin-converting enzyme inhibitors and beta-blockers unless contraindicated. The mean improvement in MLHFQ was 14%, 6MWT was increased by 79 metres (35%), BMI was reduced by 0.5% in those with a BMI of greater than 25 and percentage of body fat was increased by 3.7% post-programme. The improvements in 6MWT were 76 metres (40%) and 31.5 metres (11%) at 6 months and 12 months respectively. The results of the current study are consistent with a meta-analysis on the effects of exercise-based rehabilitation for patients with CHF, which reported an improvement in the 6MWT by 41 metres.

Conclusions: these are one of the first published results from clinical practice that demonstrates improved patient outcomes for a twice weekly heart failure exercise and education programme. Exercise has been shown to be beneficial for patients with CHF in terms of exercise capacity. Obese patients with CHF have also been shown to benefit from weight reduction with the programme. These positive results can be translated into clinical practice.

D Kalka1, M Sobieszczanska1, J Bolanowski2, W Pilecki1, M Poreba1, W Marciniak3, D Kornacki1

Objective: to assess an effect of the six-month cardiac rehabilitation programme on regular physical training improves physical capacity and positively modifies the heart rate response (HRR-60(1)) and the delta HRR-60. Material and purpose of the study was to assess an effect of the six-month cardiac rehabilitation programme on the heart rate response before and after the rehabilitation (delta of HRR-60). There is a lack of research investigating the relation between the heart rate restitution before and after training. In the current study, the relation between the heart rate restitution before and after the programme was described by the statistically significant Pearson's correlation coefficient (r) of 0.330.

Methods: a study group comprised 179 patients with IHD (the mean age: 64.06 ± 8.41 years) after admission rates and reduced mortality. However, these intensive centre-based programmes are usually undertaken at least three times per week at moderate to high intensity and are difficult to replicate in clinical practice. We run a twice weekly programme at lower intensity. We report the outcomes from 2007 and 2008 for our 12 week centre-based exercise and education programme.

Results: significant from 17.27 ± 8.75 min to 22.46 ± 6.25 min; p < 0.01. Such an effect was not observed in the control group without rehabilitation: 17.67 ± 7.17 min in 18.10 ± 6.77 min; NS. For the rehabilitated patients, the relation between the heart rate restitution before the training [HRR-60(1)] and the delta HRR-60 was described by the statistically significant Pearson’s correlation coefficient (r) of -0.330.

Conclusions: 1. Cardiac training significantly improved HRR-2. The positive effect of training a cycle on HRR appeared to be the best in the patients in whom HRR was the worst before the rehabilitation.

R Hwang1, H Porteous1, F Chuan1, D Korczyk1

Objective: to analyse the impact on life quality for hypertensive patients. The distribution is being done depending on the HTA degree: Hypertensive patients presenting normal high from 22 patients, Degree 1 hypertensive patients: 42 patients, Degree 2 hypertensive patients: 52 patients (24 male and 76 female). Average patients age is 50.2 ± 10.5 years. All patients had been clinically and parametrically evaluated in accordance with Guidelines. The website is updated annually by both representative and the local hospital. A marked gradual improvement of CR service has been observed: in 2005 most hospitals provided a well-run service. This has contributed to a wider availability in the local programmes: 30% increase of smoking cessation efforts, stress management programmes now available in a majority of the country. Furthermore, in several hospitals data from the audit website were used in preventing a threatening cutdown of health care resource for CR.

Conclusion: Annual auditing of hospital-based cardiac rehabilitation by a heartpatients’ organisation has contributed to maintenance and in some aspects further extension of the quality of clinical CR practice.

S Iurciuc1, I Suceava1, M Iurciuc1, G Cioraca1, L Craciun1, C Avram2, S Dragan1, S Manca1

1University of Medicine, Timisoara, Romania, 2West University, Timisoara, Romania

Objective: the psychological impact of heart disease is critical, often invalidating the patient to a greater degree than the organic heart lesion itself. CR scale evaluates patients from two components: Anxiety and Depression. Physical exercise improves cardiovascular patients life quality. Materials and methods: the study batch includes recently detected hypertensive 150 patients. Their distribution is being done depending on the HTA degree: Hypertensive patients presenting normal high from 22 patients, Degree 1 hypertensive patients: 42 patients, Degree 2 hypertensive patients: 52 patients (24 male and 76 female). Average patients age is 50.2 ± 10.5 years. All patients had been clinically and parametrically evaluated in accordance with Guidelines. The website is updated annually by both representative and the local hospital. A marked gradual improvement of CR service has been observed: in 2005 most hospitals provided a well-run service. This has contributed to a wider availability in the local programmes: 30% increase of smoking cessation efforts, stress management programmes now available in a majority of the country. Furthermore, in several hospitals data from the audit website were used in preventing a threatening cutdown of health care resource for CR.

Conclusion: Annual auditing of hospital-based cardiac rehabilitation by a heartpatients’ organisation has contributed to maintenance and in some aspects further extension of the quality of clinical CR practice.
### P526

**Correlation between CD34+ and exercise capacity, functional class, quality of life and noradrenaline in heart failure patients.**

VO Carvalho1, MA Ruiz2, IA Bouch1, GV Guimarães1

*1Heart Institute (InCor) HCFMUSP, São Paulo, Brazil, 2London, United Kingdom*

**Topic:** Cardiovascular rehabilitation

**Background:** Previous study associated CD34+ with functional class (NYHA) in heart failure patients. The aim of this study was to correlate CD34+ to exercise capacity, functional class, quality of life and noradrenaline in heart failure patients.

**Methods:** Patients answered the Minnesota Living with Heart Failure Questionnaire and tested for 20 minutes before an investigator collected a blood sample. After this, patients performed a cardiopulmonary exercise test to determine the heart rate at anaerobic and ventilatory threshold and oxygen consumption at peak effort, anaerobic and ventilatory threshold. One other blood sample was collected during the peak effort to investigate the noradrenaline and CD34+ levels.

**Results:** Rest and peak %CD34+ did not show correlation with any variable.

**Conclusion:** %CD34+ and %CD34-VE/VCO2 did not correlate with exercise capacity, functional class, quality of life and noradrenaline in heart failure patients.

### Table: CD34+ and %CD34+ results

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Rest CD34+</th>
<th>P</th>
<th>Rest %CD34+</th>
<th>P</th>
<th>Peak CD34+</th>
<th>P</th>
<th>Peak %CD34+</th>
<th>P</th>
</tr>
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<tbody>
<tr>
<td>0.38</td>
<td>0.071</td>
<td>0.18</td>
<td>0.976</td>
<td>0.28</td>
<td>0.189</td>
<td>0.27</td>
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<tr>
<td>LVEF (%)</td>
<td>0.03</td>
<td>0.888</td>
<td>0.00</td>
<td>0.237</td>
<td>0.04</td>
<td>0.857</td>
<td>0.04</td>
<td>0.857</td>
</tr>
<tr>
<td>Peak VO2</td>
<td>0.32</td>
<td>0.137</td>
<td>0.38</td>
<td>0.341</td>
<td>0.28</td>
<td>0.381</td>
<td>0.32</td>
<td>0.116</td>
</tr>
<tr>
<td>SLOPE</td>
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<td>0.25</td>
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<td>0.16</td>
<td>0.449</td>
<td>0.25</td>
<td>0.241</td>
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<tr>
<td>VE/VCO2</td>
<td>0.05</td>
<td>0.797</td>
<td>0.08</td>
<td>0.101</td>
<td>0.02</td>
<td>0.898</td>
<td>0.07</td>
<td>0.723</td>
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<td>HR-AT</td>
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<td>0.404</td>
<td>0.19</td>
<td>0.122</td>
<td>0.13</td>
<td>0.555</td>
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<td>VO2-AT</td>
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<td>0.869</td>
<td>0.09</td>
<td>0.294</td>
<td>0.02</td>
<td>0.912</td>
<td>0.03</td>
<td>0.888</td>
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<td>VO2-VT</td>
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<td>0.43</td>
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<td>0.35</td>
<td>0.100</td>
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<td>Time ET</td>
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<td>0.576</td>
<td>0.157</td>
<td>0.613</td>
<td>0.22</td>
<td>0.311</td>
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<td>MELHO</td>
<td>-0.10</td>
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<td>0.00</td>
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<td>0.600</td>
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<td>NYHA</td>
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<td>0.13</td>
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<td>Rest</td>
<td>0.23</td>
<td>0.287</td>
<td>-0.15</td>
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<td>noradrenaline</td>
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<td>-0.33</td>
<td>0.633</td>
<td>-0.37</td>
<td>0.07</td>
<td>-0.38</td>
<td>0.07</td>
</tr>
</tbody>
</table>

### P528

**Differences in patient outcomes following participation in cardiac rehabilitation programmes of 3-4, 6 or 12 months duration**

SL Grace1, K Green2, S Gravely-Wright3, N Suskin4, DE Stewart5

1York University, Toronto, Canada, 2University of Toronto, Toronto, Canada, 3London Health Sciences Centre, London, Canada, 4University Health Network, Toronto, Canada, 5London Health Sciences Centre, London, United Kingdom

**Topic:** Cardiovascular rehabilitation

**Purpose:** Cardiac rehabilitation (CR) results in significant health benefits. However, there is variation in programme duration, and little is known about the optimal duration of CR for patient outcomes. The objective of this study was to examine differences in patient outcomes in CR programmes of 3-4, 6 or 12 months duration.

**Methods:** 436 cardiac outpatients from a larger prospective, observational study who attended 1 of 33 CR programmes completed 2 mailed surveys 9 months apart. Patients were categorised based on the duration of CR programme they had attended: 3-4 (n=10 sites), 6 (n=20 sites) or 12 (n=3 sites) months. Self-reported patient outcomes were assessed at 9 months. Outcome measures included body mass index, activity status (DSM), depressive symptoms (BDI-II), physical activity (PASE), quality of life (SAQ), recurrent events, and percentage of CR sessions attended. Kruskal-Wallis H tests and chi-square tests were used to determine differences in patient outcomes based on CR duration.

**Results:** There were significantly more self-reported recurrent events experienced by patients in the 6-month CR programmes compared to 3-month programmes (p<0.013). Furthermore, patients in 3-month programme were significantly more likely to complete a greater percentage of their CR sessions, compared to those in a 6-month programme (p<0.044). All other variables did not significantly differ by programme duration.

**Conclusion:** While replication is needed, the optimal duration of CR programmes may be six months, because of the lower occurrence of recurrent events when compared to CR programmes of shorter duration.
O546 A meta-analysis of randomised control trials of home-based secondary prevention programmes: Comparisons to usual care and hospital-based cardiac rehabilitation

AM Clark1, M Haykowsky2, J Kryworuchko3, J Scott2, M Desmeules4, W Luo4, G Liang1, FA McAuley1
1Edmonton, Canada, 2University of Alberta, Edmonton, Canada, 3University of Ottawa, Canada

Objective: To identify the effectiveness of home-based secondary prevention programmes for Coronary Heart Disease (CHD) compared to usual care and hospital-based cardiac rehabilitation.

Methods: Meta-analysis following a search of 19 different indexing databases, existing systematic reviews, reference lists, and contacted experts. Studies included had to evaluate a predominantly or exclusively home-based intervention that addressed one or more CHD risk factors using a randomised trial with either a usual care or cardiac rehabilitation comparison group. Data had to be extractable for CHD patients only and reported in English as a full published paper or thesis. Results: Out of 507 citations screened, 39 papers reporting 36 unique trials were reviewed. Trials evaluated interventions that were primarily provided through: phone / manuals-based (n=16), telephone-based (n=12), home visits-based (n=5), or electronic (n=2), or unknown means (n=1). One trial did not state mode of delivery. Trails used usual care (n=20), cardiac rehabilitation (n=9) and or both usual care and cardiac rehabilitation comparison groups (n=7).

Conclusion: Compared to usual care, home-based interventions significantly improved quality of life (WMD 0.23; 95% CI: 0.02 to 0.45), systolic blood pressure (-4.36 mm Hg; 95% CI: -6.50 to -2.22), smoking cessation (DP: -14.95% CI: 2.0 to 26.0), total cholesterol (SMD -0.33; 95% CI: -0.57 to -0.08), and depression (SMD -0.33; 95% CI -0.59 to -0.07). Effect sizes of improvements were small to moderate and trials were of low to moderate quality.

Comparisons between home-based interventions and cardiac rehabilitation could not be made reliably due to the small number of trials and high levels of heterogeneity. Costs of home-based interventions for studies reporting this were around US$300.00 per patient.

O544 Does intensive post-graduate education improve adherence to cardiovascular disease guidelines among general practitioners

J Melissen1, P Schultz-Larsen2, K Roslund1, M Thomsen4, S Madhusudan1
1Frederiksborg Hospital, Frederiksborg, Denmark, 2General Practice, Virum, Denmark, 3General Practice, Aars, Denmark, 4Hvidovre Hospital, Copenhagen, Denmark

Objective: To determine the impact of an intensive postgraduate educational intervention on the adherence of general practitioners to cardiovascular disease guidelines.

Methods: A randomized controlled trial was conducted involving 54 general practitioners from 54 general practices in Denmark. The intervention group received an intensive postgraduate educational intervention consisting of 9 mandatory sessions, while the control group received usual care. The primary outcome measure was the percentage of patients adhering to cardiovascular disease guidelines.

Results: The intervention group had a significantly higher percentage of patients adhering to cardiovascular disease guidelines compared to the control group (p < 0.001). The results of the other motor tests did not differ.

Conclusions: A low threshold intervention in kindergartens with involvement of the parents leads to a reduction of the children’s BMI in this short period, but not to a significant improvement of their motor ability.

O543 Coronary mortality declines in the USA between 1980 and 2000; how much of the fall can be attributed to primary versus secondary prevention?

B Young1, JA Critchley1, S Capewell2
1University of Newcastle, Newcastle-upon-Tyne, United Kingdom, 2University of Liverpool, Liverpool, United Kingdom

Objective: To determine the impact of an intensive postgraduate educational intervention on the adherence of general practitioners to cardiovascular disease guidelines.

Methods: A randomized controlled trial was conducted involving 54 general practitioners from 54 general practices in Denmark. The intervention group received an intensive postgraduate educational intervention consisting of 9 mandatory sessions, while the control group received usual care. The primary outcome measure was the percentage of patients adhering to cardiovascular disease guidelines.

Results: The intervention group had a significantly higher percentage of patients adhering to cardiovascular disease guidelines compared to the control group (p < 0.001). The results of the other motor tests did not differ.

Conclusions: A low threshold intervention in kindergartens with involvement of the parents leads to a reduction of the children’s BMI in this short period, but not to a significant improvement of their motor ability.
O545  
Do health behaviours explain socioeconomic differences in all-cause mortality, and in fatal and non-fatal cardiovascular events: evidence from the PRIME Study  
J Woodside1, JWG Yarnell1, CC Patterson1, DR Arveiler2, P Amouyel1, J Ferrieres1, A Bingham1, P Ducimetiere1  
1Queen’s University Belfast, Belfast, United Kingdom, 2MONICA-Strasbourg, Strasbourg, France, 3MONICA-Lille, Lille, France, 4MONICA-Toulouse, Toulouse, France, 5INSERM U780, Villejuif, France  

Topic: Socio-demographic factors  
Objective: we examine the contribution of health behaviours to the socioeconomic gradient in all-cause mortality and in fatal or non-fatal cardiovascular events.  
Methods: 10,993 men aged 50-59 years were examined in 1991-94 in centres in Northern Ireland and France. Men were screened for evidence of coronary heart disease (CHD) and followed annually for 10 years by questionnaire for incident cases of CHD and stroke. Deaths and cardiovascular events (coronary deaths, myocardial infarction and stroke) were documented by clinical records and were reviewed by a medical committee. Eight indicators of socioeconomic status were used including educational level and a summary index of material conditions. Health behaviours included lifetime smoking habit (pack years), alcohol consumption, physical activity and fruit and vegetable consumption.  
Results: at 10 years of follow-up there were 544 deaths from any cause, and 440 fatal and non-fatal cardiovascular events in men without evidence of cardiovascular disease at baseline. Socioeconomic gradients were evident for all health behaviours. After adjustment for country and age, socioeconomic gradients were further adjusted for health behaviours. For fatal and non-fatal cardiovascular events by 10 years of follow-up health behaviours explained 46% and 36% of the socioeconomic gradient in education level and material conditions respectively (see Table). Additional adjustment for established risk factors increased the proportion of the socioeconomic gradient accounted for.  

Conclusion: health behaviours in men, assessed at 50-59 years, appeared to contribute only moderately to the socioeconomic gradients in cardiovascular incidence and in all-cause mortality, but established risk factors make a further substantial contribution to this gradient.  

Risk of death or CV event at 10 years  

<table>
<thead>
<tr>
<th>Socioeconomic All deaths</th>
<th>Cardiovascular</th>
<th>% explained</th>
<th>Adjusted for</th>
<th>% explained</th>
<th>Adjusted for</th>
<th>% explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational level1</td>
<td>(n=544)</td>
<td>(n=440)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted also for country/age</td>
<td>0.61</td>
<td>0.74</td>
<td>33%</td>
<td>0.76</td>
<td>0.87</td>
<td>46%</td>
</tr>
<tr>
<td>Material conditions2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted also for health behaviours</td>
<td>0.51</td>
<td>0.61</td>
<td>21%</td>
<td>0.73</td>
<td>0.83</td>
<td>36%</td>
</tr>
</tbody>
</table>

1 Higher versus Primary Education; 2 High versus Low Material Condition
OS58
Cardiopulmonary exercise testing in patients with chronic heart failure: prognostic comparison from peak VO2 and VE/VCO2 slope.
F M Sarullo1, J Birascia1, D Fernandez2, P Di Pasqua2, S Patena2, A Castello1
1Buccheri La Ferla Fatebenefratelli Hospital, Palermo, Italy, 2G.F. Ingrassia Hospital, Palermo, Italy, 3University of Palermo, Palermo, Italy

Methods: We performed CPET in 184 pts (146 M, 38 F, mean age 59.8 ± 12.9 years), with stable CHF (67 coro artery disease, 88 dilated cardiomyopathy), in NYHA functional class II (n=107) - III (n=77), with left ventricular ejection fraction (LVEF) < 45%, between January 2005 and December 2006. The ability of peak VO2 and VE/VCO2 slope to predict cardiac related mortality (CRH) and hospitalization (HSH) within 12 months after evaluation was examined.

Results: peak VO2 and VE/VCO2 slope were demonstrated to univariate Cox regression analysis both to be significant predictors of CRH and HSH (p < 0.001). Non survivors had a lower peak VO2 (20.49 ± 1.70 ml/kg/min vs 14.11 ± 0.02 ml/kg/min, p < 0.001), and steeper VE/VCO2 slope (41.8 ± 8.07 vs 29.9 ± 6.47, p < 0.0001) than survivors. By multivariate survival analysis, the VE/VCO2 slope as a continuous variable was an independent prognostic factor (N=6, relative risk 1.01, 95% CI 0.91 - 1.11, p = 0.01). CRH was 75% in patients with VE/VCO2 slope > 35.6 and 25% in those with VE/VCO2 slope < 35.6 (p = 0.03) and 65% in patients with peak VO2 < 12.2 ml/kg/min (p = 0.047). CRH was 77% in patients with VE/VCO2 slope > 32.5 and 25% in those with VE/VCO2 slope < 32.5 (p = 0.001) and 65% in patients with peak VO2 < 12.2 ml/kg/min (p = 0.047). The VE/VCO2 slope was demonstrated with ROC curve analysis to be equivalent to peak VO2 in predicting CRH (0.89 vs 0.89). Although area under the ROC curve for the VE/VCO2 slope was greater than peak VO2 in predicting CRH (0.88 vs 0.82), the difference was non statistically significant (p = 0.13).

Conclusions: these results support the use of VE/VCO2 in CHF patients. The VE/VCO2 slope, as an index of ventilatory response to exercise, is an excellent prognostic parameter and improves the risk stratification of CHF patients. It is easier to obtain than parameters of maximal exercise capacity and is of equivalent prognostic importance than peak VO2.

OS59
Erythropoietin treatment improves peak VO2 and oxygen uptake efficiency slope (OUES) without changing VE vs. VO2 slope in anemic patients.
H Itoh1, K Kondo1, Y Ebi1, A Goda2, T Maeda1, T Shimada3, T Sumiyoshi1, H Itoh1
1Buccheri La Ferla Fatebenefratelli Hospital, Palermo, Italy, 2G.F. Ingrassia Hospital, Palermo, Italy

Methods: thirty-seven hemodialysis patients with anemia (48.8 ± 13.6 years, 26 male, mean age 54.5 ± 13.9 years) were included in this study. Hemoglobin concentration was 8.3 ± 0.5 g/dl at the time of dialysis. The subjects were divided into two groups. The patients in the treatment group received an erythropoietin (EPO) injection (200 mIU/kg body weight) and 2 hours after the injection, the patients were subjected to a cardiopulmonary exercise test (CPET) to measure the cardiac output.

Results: the patients who received the EPO injection had a higher peak VO2 (15.4 ± 4.5 ml/kg/min vs 13.9 ± 4.5 ml/kg/min, p = 0.047) and a larger OUES (0.112 ± 0.040 ml/kg/min per ml/dl of Hb vs 0.076 ± 0.033 ml/kg/min per ml/dl of Hb, p = 0.001) than the patients who did not receive the EPO injection. The VE/VCO2 slope did not change significantly in both groups (10.4 ± 5.3 ml/kg/min vs 10.4 ± 5.3 ml/kg/min, p = 0.37) and the VO2 at peak Ergo-Des relative to the peak VE was 0.94 ± 0.13 in the EPO group and 0.99 ± 0.12 in the control group, which was not statistically significant (p = 0.19).

Conclusions: EPO treatment improves peak VO2 and OUES without altering the VE vs. VO2 slope.

OS60
Chronotropic incompetence is a major predictor of impaired response to exercise training in heart failure patients
M Zurek1, H Sander2, J-P Schmidt1
1Swiss Cardiovascular Centre Bern, Bern, Switzerland

Methods: We studied twenty-six consecutive heart failure patients (20 male, mean age 45.5 ± 13.9 years) with severe exercise limitation. All patients had NYHA functional class III. The patients were randomly assigned to either a standard aerobic exercise training program, or an exercise training program that was specifically designed to improve chronotropic incompetence. The exercise training protocol consisted of moderate intensity aerobic exercise 3 times a week for 12 months. Patients were followed clinically for 36 months after the start of training. The study was approved by the ethical committee of Bern University.

Results: At baseline, the group of patients with chronotropic incompetence had a significantly lower peak VO2 than the group without chronotropic incompetence (14.1 ± 4.4 ml/kg/min vs 16.3 ± 3.9 ml/kg/min, p = 0.039). After 12 months of aerobic exercise training, the group of patients with chronotropic incompetence showed a significant improvement in peak VO2 (14.1 ± 4.4 ml/kg/min vs 20.6 ± 4.9 ml/kg/min, p = 0.031), while the group without chronotropic incompetence did not improve at all (16.3 ± 3.9 ml/kg/min vs 16.3 ± 3.9 ml/kg/min, p = 0.87). The difference in the improvement of peak VO2 between the two groups was statistically significant (p = 0.015).

Conclusions: Chronotropic incompetence is a major predictor of impaired response to exercise training in chronic heart failure patients. Patients with chronotropic incompetence improved peak VO2 by 48% while patients without chronotropic incompetence did not improve at all. The improvement of peak VO2 in patients with chronotropic incompetence was significantly greater than the improvement in patients without chronotropic incompetence (p = 0.015).

OS61
Course of exercise capacity, ventilatory efficiency and left-ventricular function in the second year after orthotopic cardiac transplantation
RK Binder1, JP Schmid1, T Carrel1, H Saner1, P Mohacsyi1, R Hulling1
1University Hospital Bern, Bern, Switzerland

Topic: Exercise physiology, testing and training

Methods: Twenty-six consecutive heart transplant recipients (20 male, mean age 45.5 ± 13.9 years) underwent orthotopic cardiac transplantation (HTx). Some patients showed a poor response to exercise training in the first year after HTx. The aim of this study was to investigate whether aerobic exercise training during the second post transplant year in heart transplant recipients was able to improve peak VO2 and other cardiopulmonary parameters.

Results: peak VO2 increased significantly in the group of patients who improved peak VO2 (14.1 ± 4.4 ml/kg/min vs 20.6 ± 4.9 ml/kg/min, p = 0.031), while the group of patients who did not improve peak VO2 (16.3 ± 3.9 ml/kg/min vs 16.3 ± 3.9 ml/kg/min, p = 0.87) did not change. In the group of patients who improved peak VO2, the VO2 at peak Ergo-Des relative to the peak VE was 0.94 ± 0.13 in the EPO group and 0.99 ± 0.12 in the control group, which was not statistically significant (p = 0.19).

Conclusions: Patients with chronotropic incompetence improved peak VO2 during exercise training. The improvement in peak VO2 was greater in patients with chronotropic incompetence than in patients without chronotropic incompetence (p = 0.015).

ORAL SESSION VI
Exercise testing in chronic heart failure. How to treat exercise deficiency Saturday, 9 May 2009, 08:30–10:00 Location: C6
O562 Improvement of ventilatory efficacy after ventricular resynchronisation is not correlated to enhancement of systolic left ventricular dysfunction
J Jaussaud1, H Douard2, P Blanc3
1Hopital Cardiologique, Pessac, France, 2Hopital Cardiologique du Haut-Leveque, Pessac Cedex, France

Topic: Exercise physiology, testing and training

Background: The minute ventilation-carbon dioxide production (VE/VCO2) slope obtained during exercise testing possesses, as peak oxygen consumption (peak VO2), a strong prognostic value in heart failure. Ventricular resynchronisation is a non-pharmacological treatment for advanced heart failure with intraventricular conduction delay refractory to drug therapy.

Method: Thirty subjects (age: 60.4±12.3) underwent symptom limited exercise testing with ventilatory expired gas analysis (CPX) before and six months after ventricular resynchronisation. VE/VCO2 slope was measured from rest to end exercise. Echocardiographic evaluations were performed within 2±1 days of CPX in stable clinical and pharmacological conditions.

Results: Mean left ventricular ejection fraction (LVEF) increased from 25.1±7.7% to 29.5±8.3% (p=0.005). Left ventricular end systolic and end-diastolic volume significantly decreased from 155±65 to 128±55 and from 203±76 to 179±70 ml. Exercise tolerance as evaluated by NYHA class (from class 2.9±0.4 to 1.9±0.4 - p<0.001), peak VO2 (from 13.1±3.1 to 15.3±5.6 - p<0.01), and VE/VCO2 slope (from 44.4±19.2 to 35±1.38 - p<0.01), was significantly optimised by the therapy. However no correlation was found between echocardiographic changes (LVEF, end systolic and end-diastolic volumes) and improvement of peak VO2 or ventilatory efficacy (VE/VCO2 slope) (all r=0.15 to 0.24 - p>0.05).

Conclusion: Ventricular resynchronisation optimised ventilatory response and aerobic capacity of patients suffering from refractory chronic heart failure, but independently of echocardiographic parameters improvement.

O563 Long-term physical rehabilitation in patients with persistent atrial fibrillation and heart failure
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Topic: Physical activity

The purpose of the study was to estimate the efficiency of long-term physical training with individual selection of physical activity in patients with persistent atrial fibrillation (AF) and heart failure (HF).

Methods: 86 subjects with AF and heart failure I-III (NYHA) examined according to the protocol of AF and HF were included in the study. Inclusion criteria were stable condition, normal heart rate, heart failure compensation. Antiarrhythmic drugs of I-II class shouldn’t be used, during first 48 hours since hospitalisation antithrombotic therapy should be started in combination with β-blockers. Echocardiography was held, tolerance to physical exercises estimated by 6-min walking test. Subjects were observed during a year. The 1st group (n=46) performed regular physical training besides medical supplies, the 2nd group (n=42) took their medicines without physical exercises. According to their self-control journals and clinically: Groups were compared according to the age (65.7±10.1 and 64±9.7), sex (males 30%, females 70%). Duration of AF existence in the 1st group was 4.4±1.2 years, in the 2nd - 3.9±1.4, frequency of AF paroxysms was 8.5±4.5 and 7.5±3.3 correspondingly. Average functional class of HF was 2.2±0.9 and 2.1±0.7. The 1st group subjects did physical exercises more than 3 times a week with individual selection of physical activity therapeutic training, walking, bicycling, treadmilling), speed, duration, intervals of rest and activity orienting on their own sensation. 76% of subjects preferred therapeutic training and walking.

Results: among the 1st group subjects their life quality improved. Physical tolerance increased over 20% in the 1st group and decreased over 10% in the 2, emotional condition improved over 22% and became worse over 9% in 1 and 2 group correspondingly (1<0.005). Distance increasing in 6-min walking test was over 52±6.3 m (p<0.01), in the 2nd group the distance shortened over 19.3±2.5 m (p<0.005). During observation there was no relapses of AF in 69% subjects from the 1st group, in 20% there was 1 relapse without hospitalisation, 11% needed medical care. Subjects of the 2nd group divided equally: 50% subjects didn’t have any relapses, 30% had 1-2 relapses and 22% demanded hospitalisation (1<0.01).

Conclusions: physical training with individual selection of physical activity in combination with rate control and optimal anticoagulation are safe for subjects with AF and HF. After long-term physical training life quality improves and physical tolerance increases. Regular physical training may lead less frequency of AF relapses.
OS57 Multicellular cardiac dysfunction in diabetes and insulin treatment: Role of glucose-induced PKC-bII activity

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Purpose: Diabetes mellitus is an independent risk factor for cardiovascular disease and little attention is addressed on PKC-bII in cardiac multicellular dysfunction.

Methods: In animal experiments, normal Sprague-Dawley rat, streptozotocin-induced diabetic rat, insulin-treated and physiological saline-treated diabetic rat were administrated with a serial of evaluations including pressure measurements, angiography and permeability observations under electron microscope, histopathologic analysis for cardiac microvascular endothelium cell (CMECs), TUNEL, and Western blotting for PKC-bII. In cell research part, CMECs in four different mediums (normal medium, high-glucose concentration medium, insulin-stimulated and physiological saline-stimulated high-glucose medium) were investigated with MTT, apoptosis, quantitative permeability assessment and Western blotting.

Results: 1. Accompanied with more active expression of PKC-bII and higher apoptosis rate in diabetic model, either increased microvascular permeability or pathological angiogenesis is observed, and which is attenuated in certain extent while receiving insulin treatment. 2. Accordant results from cell research were obtained. Compared with normal group, CMECs in high-glucose medium are demonstrated with poor proliferation, more notable apoptosis, increased permeability of cell monolayer, and augmented PKC-bII expression. Insulin-stimulated group proves a mild performance between normal and high-glucose group.

Conclusions: Increased PKC-bII activity has been implicated responsible for the pathogenesis of cardiac multicellular dysfunction in diabetes and elevated glucose is sufficient to induce these effects. PKC-bII is indicated to occupy an important position in the whole process of insulin treatment.

OS58 Ethnic differences in physiological cardiac adaptation to intense physical exercise in highly trained female athletes

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Topic: Sports cardiology

Background: Intense physical exercise is associated with modest increases in left ventricular wall thickness and cavity size. The magnitude of increase in cardiac dimensions is affected age, gender, size and type of sport. Studies confined to male athletes indicate that athletes of African/Caribbean (black) BA origin develop left ventricular hypertrophy of greater magnitude than Caucasian (white) WA athletes of similar age and size that participate in identical sporting disciplines. The impact of ethnicity has not been studied in female athletes. The aim of this echocardiographic study was to compare left ventricular cardiac dimensions in female WA and BA.

Methods: Between 2006 & 2008, 110 nationally ranked female BA and 193 WA of similar age (BA 21 yrs +/- 4.62 range 14-35 vs WA 20 yrs +/- 4.03 range 14-35.5 yrs) were included amounting to a 75% difference in MLVWT. RA exhibited a greater left annular diameter compared to WA (35.6mm +/- 4.2 range 31-48 vs 32.4-43mm +/- 4.79 range 25-47 P<0.001). LVM was also significantly greater in BA vs WA (169g/m2 +/- 37 range 95-210 vs 150 g/m2 +/- 30 range 89-212; P<0.001). There were no differences between the two ethnic groups with respect to the left ventricular end-diastolic cavity size (BA 49.8mm +/- 3.5 range 39.5-58 vs WA 47.8mm +/- 4.3 range 40-62; p=0.95), aortic root diameter (BA 21.7mm +/- 2.9 range 23-38 vs WA 26.4 +/- 2.8 range 17-33; P=0.28). In contrast with previously published literature in WA, 2 (0.3%) female BA (but none of the female WA) exhibited a MLVWT >120mm.

Conclusion: Black female athletes exhibit a greater MLVWT and LVM compared with white female athletes of similar age and size participating in identical sporting disciplines. The precise mechanism for exaggerated hypertrophic response in black athletes in responses the increased preload and afterload associated with exercise in BA remains to be elucidated.

OS59 Mismatch between heart failure patients in exercise training trials and the real world

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Topic: Cardiovascular rehabilitation

Objective: Physical exercise training in patients with chronic heart failure (CHF) was contraindicated until the early 1990s, when clinical studies proved the opposite. Exercise-based medicine uses physicians to translate results from clinical trials to their patients. This how, even today, if real world patients are represented in clinical trials we can extrapolate data to the general population future exercise training trials need to include.

Methods: We combined literature for heart failure with synonyms for physical exercise training and searched PubMed, MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, IN Web of Knowledge and CINAHL. Patients’ characteristics were compared with demo-graphics data of CHF patients in Europe and North America.

Results: 130 training studies (TS) were evaluated. Patients in TS were significantly younger than in EHF (59.6 +/- 1.4 years; p<0.001) and FHS (59.6 +/- 1.4 years; p=0.001). Age distribution between male and female patients was 55% vs. 45% in EHF, 51% vs. 49% in FHS and 81.5% vs. 18.5% in training studies (p<0.001). Patients in EHF were in NYHA functional class 2.10 +/- 0.98 and in a significantly better clinical shape than patients in training studies (2.41 +/- 0.32; p=0.001). Ischemic cardiomyopathy was the primary cause of heart failure in 69.0% (+/- 2.62% in EHF, in 53.5% in FHS and in 39.9% (24.6% in TS (p<0.001). Coronartiries like diabetes (EHF: 27.0% +/- 0.8%, FHS: 19.5% +/- 0.8%, TS: 18.2% +/- 0.8%; p=0.001), hypertension (EHF: 53.0% +/- 11.4%, FHS: 74.3% +/- 11.4%, TS: 28.1% +/- 10.5%; p=0.001), and beta-blockers (EHF: 49.0% +/- 10.0%, FHS: 36.9% +/- 8.5%; p<0.001) were underrepresented in training studies ACE-inhibitors (O7.4% +/- 15 vs. 61.8% +/- 5.7%; p<0.001) were more commonly used in EHF than in TS.

Conclusions: CHF patients in clinical trials do not represent real world. We need to extrapolate data to the general population future exercise training trials need to include representative patients. Otherwise, knowledge gained can only be translated to a minority of our patients.
Prediction of coronary heart disease risk by Framingham and SCORE risk assessment varies by socioeconomic position

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Purpose: It has been suggested that the Framingham risk score (FRS) may underestimate coronary heart disease (CHD) risk in populations at increased risk of CHD such as lower socioeconomic groups. However, the variation in FRS prediction by socioeconomic position across Britain has not been documented. It is also not known whether the recent Systematic Coronary Risk Evaluation (SCORE) prediction varies across socioeconomic groups. This study aimed to assess the performance of FRS and SCORE in different social class groups in middle-aged British men.

Methods: The study comprised a socially and geographically representative sample of men aged 40–59 years from 24 British towns, recruited in 1978-80. Social class, based on the longest-held occupation, ranged from I (professionals) to V (unskilled workers); social classes I, II, III-non-manual were grouped as ‘non-manual’, social classes III-manual, IV and V were grouped as ‘manual’. Predicted 10-year risk was calculated for CHD events (fatal and non-fatal) with the FRS, and for CHD mortality using SCORE. Previous angina, myocardial infarction or stroke were grouped as ‘non-manual’, social classes III-manual, IV and V were grouped as ‘manual’.

Results: Predicted 10-year CHD risk was greater than observed CHD risk both for FRS and SCORE. Over-prediction of CHD events using FRS was highest in social class I and decreased progressively to social class V; the predicted/observed risk was 2.30 in social class I and 1.19 in social class V. Sensitivity of the FRS at a 10-year CHD risk threshold of ≥20% (27% of men), declined from 53% in social class I to 37% in social class V; specificity of FRS was also higher in lower social classes. Over-prediction of CHD mortality using SCORE was also higher in social class I (15%) than in social class V (11%), although the trend was not as strong as for FRS. Sensitivity of SCORE prediction at a 10-year CHD mortality risk threshold of ≥5% (29% of men) was higher in non-manual (85%) compared to manual (57%) social classes; the pattern for the sensitivity in identifying risk across the six social classes was less consistent than that observed for the FRS. Specificity of SCORE prediction at the ≥5% threshold was also greater in non-manual groups.

Conclusions: Framingham and SCORE risk prediction varied according to socioeconomic groups in British men. These scores are more likely to identify individuals with greater CHD risk in higher socioeconomic groups. Inequities in primary prevention are, therefore, likely to result. There is a need to consider strategies to adequately estimate and communicate risk in lower socioeconomic groups who are at increased CHD risk, to ensure equitable primary prevention.

Cost-utility of a cardiovascular prevention programme in highly educated adults: a randomised controlled trial

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Purpose: little is known about the costs and the effects of cardiovascular prevention programmes that are targeted at medical and behavioural risk factors and use computer tailoring.

Methods: a general sample of 314 highly educated adults was recruited in Belgium and included in a randomised controlled trial of an intensive intervention and a standard intervention. Participants in the intensive intervention condition received medical assessments and could choose for behaviour change interventions (access to a tailored website, individual coaching and group sessions). Participants in the standard intervention condition received medical assessments for data collection. The latter condition was comparable to a preventive consultation in general practice following the guidelines. Cost data were registered from a health care perspective and the short-form 36 (SF-36), the international physical activity questionnaire (IPAQ) and a validated fat intake questionnaire were used to measure effectiveness. Outcome measures were costs, quality adjusted life years (QALYs), the Incremental cost-effectiveness ratio (ICER) and behaviour change. Non-parametric bootstrap analysis and sensitivity analyses were performed.

Results: of the participants, 219 completed the questionnaires at baseline, at 6 months and after one year. The ICER was −80.421/QALY when including the developmental costs of the intensive intervention. The incremental cost of the intensive intervention was 433 and the incremental effectiveness was 0.005 QALYs. The majority (69%) of the cost-effect pairs after bootstrap analysis were located in the northeast quadrant, suggesting more effect but at higher costs. Nevertheless, 31% of the cost-effect pairs were located in the northwest quadrant, suggesting higher costs without additional effect. Without the developmental costs of the intensive intervention, the ICER dropped to −21.055/QALY. For intensive physical activity and fat intake, however, 83% and 89% and of the cost-effect pairs were located in the northeast quadrant.

Conclusions: the intensive intervention was not cost-effective compared to a standard intervention in a general sample of highly educated adults after one year of intervention. Perhaps cardiovascular prevention programmes cannot result in large QALY differences in healthy people on the short-term. Further research is needed to determine the cost-utility of this intervention for different target groups on the long-term.
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