DURABLE RESOLUTION OF DIABETES AFTER ROUX-EN-Y GASTRIC BYPASS IS ASSOCIATED WITH MAINTENANCE OF WEIGHT LOSS
Silas Chikunguwo, MD; Patricia W. Dodson, BSN, MA; Jill G. Meador, BSN; Luke G. Wolfe, MS; Nancy Baugh, BSN, NP; John M. Kellum, MD; James W. Maher, MD; Surgery, Va Commonwealth Univ., Richmond, VA, USA

Background: Data on the durability of resolution of Type 2 Diabetes (T2DM) following gastric bypass is limited. Our purpose was to identify the rate of long-term resolution of T2DM and factors associated with durable resolution.

Methods: One hundred and seventy-two diabetic patients who underwent Roux-en-Y gastric bypass between 1993 and 2003 were available for 5-year follow-up. Diabetic status was determined by interview and diabetic medications being received. Patients with complete resolution or recurrence of T2DM were identified.

Results: Follow-up ranged from 5 to 16 years. One-hundred and fifty-three (153/172, 89.0 %) had complete resolution of T2DM with decrease in their mean BMI from pre-op of 50.2±8.2 to 31.3±7.2 kg/m² (mean %EWL= 70.0±18.6). Nineteen (19/172, 11.0%) did not show resolution of T2DM despite mean %EWL of 58.2±12.3 ( p<0.0009). Sixty-six of the 153 patients with initial resolution of their T2DM (66/153, 43.1%) subsequently had recurrence of T2DM with decrease in mean %EWL from 66.0±17.8 to 48.9±27.1. Resolution of T2DM was durable in 87 of the 153 patients (56.9%) despite some weight regain (mean %EWL decrease from 73.0±18.63 nadir to 57.8±21.8 most recently) (p = 0.0261 versus recurrent T2DM). The rate of T2DM resolution was higher in females (90.3%) than males (82.1%) (p<0.05), but was more likely to be durable in males (p = 0.00381).

Conclusion: Early resolution of T2DM occurs in 89% of patients following Roux-en-Y gastric bypass. T2DM recurred in 43.1% and was associated with regain of lost weight. Long-term weight control appears important for durable resolution of T2DM.

HOMA ESTIMATED GLUCOSE DISPOSITION INDEX PREDICTS RESOLUTION OF TYPE 2 DIABETES MELLITUS FOLLOWING LAPAROSCOPIC GASTRIC BYPASS
Richard A. Perugini, MD; Shimul A. Shah, MD; John J. Kelly, MD; Donald R. Czerniach, MD; Demetrius E. Litwin, MD, MBA; Karen A. Gallagher-Dorval, RN; Surgery, University of Massachusetts, Worcester, MA, USA

PL-101.

DURABLE RESOLUTION OF DIABETES AFTER ROUX-EN-Y GASTRIC BYPASS IS ASSOCIATED WITH MAINTENANCE OF WEIGHT LOSS
Silas Chikunguwo, MD; Patricia W. Dodson, BSN, MA; Jill G. Meador, BSN; Luke G. Wolfe, MS; Nancy Baugh, BSN, NP; John M. Kellum, MD; James W. Maher, MD; Surgery, Va Commonwealth Univ., Richmond, VA, USA

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Conclusion: Early resolution of T2DM occurs in 89% of patients following Roux-en-Y gastric bypass. T2DM recurred in 43.1% and was associated with regain of lost weight. Long-term weight control appears important for durable resolution of T2DM.

PL-102.

HOMA ESTIMATED GLUCOSE DISPOSITION INDEX PREDICTS RESOLUTION OF TYPE 2 DIABETES MELLITUS FOLLOWING LAPAROSCOPIC GASTRIC BYPASS
Richard A. Perugini, MD; Shimul A. Shah, MD; John J. Kelly, MD; Donald R. Czerniach, MD; Demetrius E. Litwin, MD, MBA; Karen A. Gallagher-Dorval, RN; Surgery, University of Massachusetts, Worcester, MA, USA
**Background:** Poor insulin sensitivity is thought to be central to the pathogenesis of type 2 diabetes mellitus (T2DM). However, we have demonstrated a wide range of insulin sensitivity among obese individuals with T2DM presenting for gastric bypass (GB). In our series, T2DM is uniformly associated with a reduced beta cell function per degree of insulin sensitivity (IS). This relationship is estimated by the glucose disposition index (DI), the product of (IS) x (beta cell sensitivity). We analyzed a population of severely obese diabetic patients undergoing gastric bypass to identify factors predicting lack of resolution of T2DM.

**Methods:** All patients presenting for GB were included into a prospective database. Homeostatic model of assessment (HOMA) was used to calculate IS (%S), insulin resistance (HOMA-IR) and beta cell sensitivity (HOMA-B). We estimated DI by the formula DI = (%S) x (HOMA-B). Patients were divided into thirds based on these factors individually before any analysis was performed. We used Log rank analysis of Kaplan Meier curves to study remission of T2DM.

**Results:** Of 242 total patients, 52 (21%) had T2DM. DI was lower in diabetic patients, than non-diabetic patients. DI predicted remission of T2DM; probability of remission of T2DM at one year following GB for increasing tertile of DI was 71% vs. 78% vs. 94% ( p = 0.005). Age, HOMA-IR, and HOMA-B were not predictive of T2DM remission.

**Conclusion:** DI, a parameter easily obtained by the clinician, predicts probability of resolution of T2DM in severely obese patients undergoing laparoscopic GB. This is the first presentation of the clinical utility of HOMA estimated DI.

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**PROSPECTIVE RANDOMIZED CONTROLLED TRIAL COMPARING TWO VERSIONS OF LAPAROSCOPIC ILEAL INTERPOSITION FOR THE TREATMENT OF NON OBESE TYPE 2 DIABETIC PATIENTS**

* Aureo L. De Paula, MD*; Antonio Macedo, Dr*; Vladimir Schraibman, MD*; Luis Queiroz, MD**; Cesar Machado, MD*; Sergio Vencio, MD**; 1General Surgery, Albert Einstein Hospital, Sao Paulo, Brazil.; 2Surgery, Hospital de Especialidades, Goiania, Brazil.

**Background:** The objective of this study was to prospectively evaluate the results of two versions of laparoscopic ileal interposition and sleeve gastrectomy for the treatment of patients with Type 2 Diabete Mellitus (T2DM) and BMI<35. In the first one the duodenum was kept in continuity (II-SG) and in the second, the diversion of the second portion of the duodenum was applied (II-DSG)

**Methods:** Laparoscopic procedures were randomly performed in 38 patients. Eighteen were submitted to the II-SG version and 20 to the II-DSG version. Groups were comparable regarding age (56 and 50 years old), sex (13 M, 5F and 14 M, 6F), weight (78 and 86 kg), mean BMI(27 and 30kg/m2), duration of T2DM (9.1 and 9.2 years), dyslipidemia (12 and 8), micro and macroalbuminuria (9 and 9 patients), hypertension (8 and 15), retinopathy (5 and 8), anti diabetic medications (11 oral drugs, 5 oral and insulin and 14 oral drugs, 6 oral and insulin), A1C (8.9 and 8.2) respectively. All patients were followed for at least 2 years.

**Results:** Mean hospital stay was 3 days for the II-SG group and 3.2 for the II-DSG group. There were no hospital readmissions nor reoperations. All patients in both groups achieved lower levels of A1C. In the II-SG, mean A1C was 5.65 (4.9 - 8.1). In the II-DSG mean A1C was 5.05 (4.2 -
Mean BMI lowered in both groups (22.4 - II-SG and 22.7 II-DSG). Normal levels of cholesterol (<200) were observed in 95% in the II-SG group and 100% in the II-DSG group. Triglycerides were lower than 150 in 73% of patients in the II-SG group and 90% of patients in the II-DSG group after 24 months.

**Conclusion:** Laparoscopic II-SG and II-DSG were effective operations in controlling T2DM in a non-obese (BMI<35) population. The diverted version was more effective than the standard one in controlling T2DM.

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**PL-104.**

**5-YEAR OUTCOMES OF PATIENTS OF TYPE 2 DIABETES WHO UNDERWENT LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING**

*Samuel Sultan, BA; Deepali Gupta, BA; Manish Parikh; Heekoung A. Youn, RN, CCRC, MA; Marina Kurian, MD; George Fielding, MD; Christine Ren, MD; Department of Surgery, NYU School of Medicine, New York, NY, USA*

**Background:** Evidence of the positive effects of gastric banding on patients with diabetes continues to mount. Long-term follow-up of such patients, however, is limited. The purpose of this study is to provide long-term outcomes in diabetics undergoing laparoscopic adjustable gastric banding at our institution.

**Methods:** From January 2002 through April 2004, 87 patients with diabetes underwent laparoscopic adjustable gastric banding (LAGB). Study parameters included: preoperative age, gender, race, BMI, diabetes history, fasting glucose level, HbA1c and medications. Data on all patients were collected prospectively and entered into an IRB-approved database.

**Results:** Mean preop age was 50.5 years (21.3 - 72.1). Mean preop BMI was 46.7 kg/m2 (35.1 - 71.9), which decreased to 36.0 kg/m2 by the median follow-up time of 5.2 years (mean = 4.9), yielding a mean of 47.3% excess-weight-loss. The mean time of diabetes diagnosis was 7.1 years before surgery. 88.5% of patients (77/87) were taking medications preop, with 11.5% on insulin. Postoperatively, at 5 years, 45.6% (26/57) of patients were on medications, with 7.0% on insulin. Mean fasting pre-op glucose level was 152.6 mg/dL which decreased to 117.9 at 5-years (P=0.002). Mean preop HbA1c was 7.60 (n=59), versus 6.61 (n=56) at 5-years (P<0.001). Of the 44 patients for which both preop and follow-up HbA1c levels were available, the reduction was comparable and similarly significant (7.59 to 6.63, P<0.001). Overall, diabetes improved (5% HbA1c reduction) in 55.6% (20/36) of patients and resolved (HbA1c < 6, and off meds) in 25.0% (14/56).

**Conclusion:** Our data demonstrates that LAGB delivers substantial sustained positive impact on diabetes in morbidly obese patients, with a significant reduction in HbA1c and an 80% rate of improvement/resolution.

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**PL-105.**

**DECREASED SMALL BOWEL TRANSIT TIME (SBTT) AFTER SLEEVE**
**GASTRECTOMY (SG): POSSIBLE EARLY ILEAL STIMULATION AS AN ADDITIONAL PROPOSED MECHANISM OF ACTION FOR TYPE 2 DIABETES (T2DM) RESOLUTION. SHAH S, TODKAR J, SHAH P, GAGNER M**

Shashank S. Shah, MS1; Poonam S. Shah, MD1; Jayashree S. Todkar, MS1; Michel Gagner, MD2; 1Laparoscopic and Bariatric Surgery, Ruby Hall Clinic, Pune, Pune, India.; 2Department of Surgery, Florida International University, Mount Sinai Medical Center, Florida, FL, USA

**Background:** Initial published data on SG shows better resolution of T2DM & satiety compared to restrictive procedures. Early ileal stimulation as in ileal transposition showed incretin elevations. This prospective clinical study aims to evaluate gastric transit time (T1/2) and small bowel transit time (SBTT) after SG, as a contributory factor.

**Methods:** After informed consent, 67 human subjects were studied: 24 lean CONTROLS (BMI 22.2 ± 2.84 kg/m2), 20 morbidly obese (MO) T2DM (BMI 37.73 ± 5.35) and 22 MO-T2DM postSG (BMI 30.89 ± 5.35) were analyzed for T1/2 and SBTT using standard meal labeled with 3-5 mCi 99mTc-phytate. Imaging was performed every 15 minutes till the tracer reached ileocaecal region. Fasting (FBS) and Postprandial (PBS) serum glucose levels and HbA1c were determined and Three-Factor Eating Questionnaire (TFEQ) simultaneously administered. Nonparametric ANOVA (Kruskal Wallis) & Mann-Whitney U test were applied.

**Results:** Mean SBTT was significantly lower (p<0.05) PostSG (199 ± 65.67 min), than in PreSG (281.53 ± 46.19) and CONTROLS (298.14 ± 9.186). T1/2 values were also significantly shorter (p<0.05) in PostSG (52.78 ± 13.45 min), than in PreSG (73.70 ± 29.04) and CONTROLS (72.84 ± 29.59). HbA1c, FBS and PBS were all significantly lower PostSG. TFEQ revealed significantly earlier satiety (29.02 ± 7.17) for PostSG patients (p<0.05), compared to PreSG (45.83 ± 9.03) and CONTROL (37.88 ± 6.23).

**Conclusion:** Faster gastric emptying and rapid small bowel transit time occurs after SG achieving better glucose homeostasis in T2DM patients. In addition to reduced caloric intake, early ileal stimulation may result in hormonal changes responsible for T2DM resolution after sleeve gastrectomy.

**PL-106.**

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**BILIOPANCREATIC DIVERSION RESOLVES TYPE 2 DIABETES IN PATIENTS WITH BMI 25 TO 35 KG/M2**

Nicola Scopinaro, Professor of Surgery; Gian Franco Adami; Giovanni Camerini; Flavia Carlini; Gabriele D'Alessandro; Annalisa Weiss; Francesco S. Papadia; Surgical Department, University of Genoa School of Medicine, Genoa, Italy.

**Background:** BPD is known to have specific actions which cause very long term resolution of type 2 diabetes in near totality of morbidly obese patients. Since these actions are independent of weight changes, the operation should work as well in diabetic patients with BMI <35.

**Methods:** 27 T2DM patients with BMI <35 were submitted to BPD. There were 17 males, mean age 57 (44-69) yrs, BMI 30.9 (25.3-34.9) kg/m2, diabetes duration 13 (3-28) yrs. All patients were on antidiabetic drugs, and 9 on insulin. 16 patients received standard BPD, whereas 11 had 100 cm biliopancreatic limb and 50 cm common limb. All have reached the one and fourth, 17
the eighth, and 7 the twelve month follow-up.

**Results:** There was one postoperative bleeding and no late complications. Mean fasting serum glucose dropped from preoperative 221 (129-361) mg/dl to 179 (85-352) at one, 156 (89-312) at four, 157 (75-290) at eight, and 107 (83-149) at twelve months. Mean HbA1c dropped from preoperative 9.6 (7.5-13.5)% to 7.5 (5.7-9.8) at one, 7.1 (5.3-10.4) at four, 6.4 (4.6-9.5) at eight, and 5.9 (5.2-6.7) at twelve months. All patients were on totally free diet since operation. A few patients required intermittent hypoglycemic treatment during the first postoperative month, and two of them still needed it at the fourth and the eighth month. Mean BMI was 27.1 (22.9-32.4) at one, 26.0 (22.9-30.4) at four, 25.3 (22.1-30.8) at eight, and 24.8 (22.1-27.1) at twelve months. **Conclusion:** BPD resolves type 2 diabetes in patients with BMI <35 kg/m², without causing any excessive weight loss.

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**SHOULD GASTRIC BYPASS OPERATION BE DONE FOR TYPE 2 DIABETES IN SUBJECTS WITH BODY MASS INDEX 20 - 34 KGS/M2?- AN INITIAL INDIAN EXPERIENCE**

Shashank S. Shah, MS; Jayashree S. Todkar, MS; Poonam S. Shah, MD; Laparascopic and Bariatric Surgery, Ruby Hall Clinic, Pune, Pune, India.

**Background:** The effectiveness of Gastric Bypass (GBP) Operation on type 2 diabetes mellitus (T2DM) in patients with Body Mass Index (BMI) more than 35 kgs/ m² is well known. This study aims to evaluate if GBP is effective and safe for T2DM in subjects with BMI more than 22 but less than 35 kgs/m².

**Methods:** A prospective study was conducted with the approval of the Institutional Ethical committee. 15 T2DM patients with BMI less than 35Kgs/ m² had the GBP operation. Data was kept prospectively at 1, 3, 6 and 9 months after the operation, analyzed and presented in this paper.

**Results:** Male to female ratio was 8 : 7, mean age 35 ± 15 years, mean BMI 28 ± 6 kg/ m², mean HbA1c 11± 3.5%, mean waist circumference 100± 9 cm was noted. 12/15 were on Insulin and 3/15 were on oral hypoglycemic agents (OHA). Mean duration of diabetes was 11.5 ± 8.5 years. At 1 month, 12/15 were off anti diabetic medications. At 3 months, 15/15 (100%) were off all anti diabetic medications. At 9 months 15/15 (100%) were euglycemic and no anti diabetic medications with a mean HbA1c of 5.9 ± 1.5%. Mean BMI change was 2 ± 1.5 kgs/ m² with no deleterious effects.

**Conclusion:** This study appears to confirm the proposition to use the GBP operation to control T2DM in individuals with a BMI less than 35Kgs/ m². Long term and larger studies are needed to confirm this effect.

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**BASELINE DATA FROM ASMBS-DESIGNATED BARIATRIC SURGERY CENTERS**
OF EXCELLENCE (BSCOE) USING THE BARIATRIC OUTCOMES LONGITUDINAL DATABASE (BOLD)

Eric J. DeMaria, MD¹; Michael Warthen²; ¹Duke University, Durham, NC, USA; ²Surgical Review Corporation, Raleigh, NC, USA

Background: BOLD (Surgical Review Corporation or SRC) is a registry of self-reported bariatric surgery patients and outcomes from 456 ASMBS BSCOE that have been activated for data submission. The current study was undertaken to define baseline demographic characteristics of the patients entered into the BOLD registry.

Methods: BOLD data submitted by 397 BSCOE (87% of all BOLD-activated BSCOE) prior to Oct 15, 2008 were analyzed.

Results: 35,215 (70%) of patients registered in BOLD who granted informed consent for research are included in this analysis. 27,195 were adults between age 30-59 with a minority of patients below age 29 (9.3%) or age > 60 (13.2%). Only 247 patients (0.7%) were age<18 yrs. 78.9% of patients registered were described as Caucasian, 10.9% African-American, 5.1% Hispanic, 4.0% Asian, and 0.5% Native American. 25,389 patients had data entered regarding a bariatric surgery procedure with 3,024 (11.9%) having a previous bariatric procedure reported prior to the index procedure. The most common index bariatric procedure was some form of gastric bypass in 13,946 (54.9%), followed by gastric banding in 9,839 (38.8%), sleeve gastrectomy in 409 (1.6%), vertical-banded gastroplasty in 91 (0.4%), and biliopancreatic diversion in 55 (0.2%). The vast majority of index procedures were reported as completed utilizing laparoscopic surgery techniques (22,953 or 90.4%). Only 28 deaths following the index procedure have been reported to date for a mortality 0.1%.

Conclusion: This is the first report of data from the ASMBS-designated BSCOE using the BOLD database. The data reveal important characteristics of patients undergoing bariatric surgery across the United States in centers who have met BSCOE criteria. Future analysis of BOLD data are likely to have a major impact on the specialty of bariatric surgery.

PL-109.

A COMPARISON OF 30 DAY OUTCOMES AFTER PRIMARY AND REVISIONAL BARIATRIC SURGICAL PROCEDURES FROM THE LONGITUDINAL ASSESSMENT OF BARIATRIC SURGERY (LABS) STUDY

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Background: The goals were to compare morbidity and mortality between primary and revisional bariatric surgery and to identify clinical predictors of adverse outcome among patients undergoing revisional surgery in the LABS consortium.

Methods: The LABS-1 (safety) cohort was analyzed, excluding primary gastric banding patients. There were 3806 LABS-1 patients identified: 3578 primary surgery and 228 revisional surgery patients. Demographic, clinical, operative, and 30-day outcome data were compared between groups. A non-linear mixed effect logit model was used to identify independent risk factors for adverse outcome (death, DVT, PE, reintubation, reoperation, or discharge after day 30).

Results: Compared to those undergoing revisional surgery, primary surgery patients were younger (mean age 44 vs. 48 years, p<0.0001), more likely to be male (20.5 vs. 12.7%, p=0.006), heavier (mean BMI 49 vs. 41 kg/m2, p<0.0001), and had more co-morbidities (p<0.0001), including hypertension (56.0 vs. 46.0%, p=0.0044), diabetes (35.7 vs. 20.2%, p<0.0001) and sleep apnea (50.3 vs. 26.9%, p<0.0001). Revisional procedure operative time was longer (mean 184 vs. 144 min, p<0.0001) and associated with greater blood loss (median 100 vs. <50 ml, p<0.0001). Adverse outcome was more likely after revisional surgery (14.9 vs. 5.3%, p<0.0001, odds ratio 2.4, 95% CI 1.5-3.6). After adjusting for patient characteristics previously shown to be associated with adverse outcome, this difference remained statistically significant (odds ratio = 2.3, 95% CI 1.4-3.7). Thirty day mortality was similar in the two groups (0.4%).

Conclusion: Revisional surgery was performed without substantial mortality but with greater incidence of adverse outcome than primary bariatric surgery.

PL-110.

SUCCESSFUL BARIATRIC SURGERY IN THE MOTHER IMPROVES HEALTH OF OFFSPRING
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Background: There is evidence that factors other than lifestyle must be involved in promoting massive obesity. Not only genetic but also factors in utero are suspected to play a role. The most effective treatment of massive obesity is by surgery particularly by a biliopancreatic diversion (BPD). This procedure cures diabetes and the metabolic syndrome in women and consequently changes uterine environment in subsequent pregnancies: a suitable situation for studying implication of intra-uterine factors in transmitting obesity. The objective was to investigate the impact of morbid obesity and subsequent weight loss via BPD on a variety of parameters in children born before (BMS) and after maternal surgery (AMS).

Methods: Mothers with BPD were recruited to participate with their children. We studied 37 families with children born both before (56 BMS) and after surgery (54 AMS) and 20 other families with children born either before (23 BMS) or after (19 AMS) surgery. A medical history questionnaire was completed. Mothers and children were examined and blood was taken for
measuring lipids, glucose and adipose-tissue secreted hormones.

**Results:** After BPD, blood levels of glucose and lipids were lowered in the mothers and the course of pregnancies normalized. AMS children have a lower rate of overweight and obesity (defined using age adjusted cut-points, to correct for age differences), a lower waist circumference and a lower triglyceride, LDL, Cholesterol, C-reactive protein, insulin and leptin; and higher HDL cholesterol and ghrelin. Familial food patterns after maternal surgery, as assessed by questionnaire, did not explain the change.

**Conclusion:** Intra uterine environment may be an important epigenic factor in transgenerational transmission of obesity. FUNDING DISCLOSURE: This work was supported by Canadian Institute of Health Research (KC)

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**LONG TERM RISK OF VENOUS THROMBOEMBOLISM FOLLOWING BARIATRIC SURGERY**

Kimberley E. Steele, MD, FACS¹; Michael Schweitzer, MD¹; Andrew D. Shore, PhD³; Martin Makary, MD, MPH¹; Hien T. Nguyen, MD¹; Anne Lidor, MD, MPH¹; Gregory Prokopowicz, MD, MPH²; Thomas H. Magnuson, MD, FACS¹; ¹Surgery, Johns Hopkins University School of Medicine, Baltimore, MD, USA; ²Medicine, Johns Hopkins University of Medicine, Baltimore, MD, USA; ³School of Public Health, The Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

**Background:** Venous thromboembolism (VTE) is a leading cause of morbidity and mortality following bariatric surgery. To date, most studies have examined only the immediate postop period (the inpatient stay). However, the exact duration of increased postop risk is largely unknown. Consequently, the optimal length of VTE prophylaxis is also unclear. We analyzed a large administrative database to obtain the long-term risk and predictors of VTE in patients undergoing bariatric surgery.

**Methods:** We identified 19,072 patients in a national private insurance claims database who underwent bariatric surgery from 2002 to 2006. Within this cohort, we then found all claims for VTE. We used logistic regression to identify independent predictors of VTE.

**Results:** The overall incidence of VTE was 1.2% at 30 days post-op and 2.0% at 6 mos. 42% of VTE occurred later than 30 days postoperatively. Risk factors of late VTE at 6 mos post-op were male sex, older age, and prior VTE. (see table; all p<.01). Lap banding was associated with a lower risk of VTE (P<.01 vs. gastric bypass).

**Conclusion:** The period of increased risk for VTE following bariatric surgery extends beyond the 30 day postop period. The incidence of early and late VTE appears to be higher in patients aged >55, males, and a history of prior VTE; but less in patients with the gastric band. The high frequency of clinically significant VTE 6 months following bariatric surgery suggests that extended prophylaxis should be considered in patients at higher risk for VTE.

**Long Term Incidence of VTE**

<table>
<thead>
<tr>
<th>Risk of VTE</th>
<th>Incidence of VTE 6 mos post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lap Gastric Band</td>
<td>0.44%(OR=0.2)</td>
</tr>
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</table>
Gastric Bypass

<table>
<thead>
<tr>
<th></th>
<th>2.075%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt;55</td>
<td>3.31%  (OR=5.1)</td>
</tr>
<tr>
<td>Female</td>
<td>1.76%</td>
</tr>
<tr>
<td>Prior VTE</td>
<td>8.44%  (OR=6.3)</td>
</tr>
<tr>
<td>Male</td>
<td>3.13%  (OR=1.7)</td>
</tr>
</tbody>
</table>

PL-112.

LAPAROSCOPIC SLEEVE GASTRECTOMY: 5 YEAR FOLLOW-UP
George Eid, MD\(^2\); Samer Mattar, MD\(^4\); Swati Patel, MD\(^1\); William Gourash, MSN\(^1\); Carol McCloskey, MD FACS\(^1\); Ramesh Ramanathan, MD\(^1\); Philip Schauer, MD\(^3\); \(^1\)Surgery, University of Pittsburgh, Pittsburgh, PA, USA; \(^2\)VA Pittsburgh Healthcare System, Pittsburgh, PA, USA; \(^3\)Cleveland clinic, Cleveland, OH, USA; \(^4\)Univeristy of Indiana, Indianapolis, IN, USA

**Background:** Short and medium-term data appear to support the effectiveness of laparoscopic sleeve gastrectomy (LSG) but there has been sparse long-term data to support its durability. In this study, we report outcomes beyond the third postoperative year in high risk, high BMI patients who underwent LSG.

**Methods:** A prospectively designed database of all patients who underwent LSG as part of a staged approach but, for non-medical reasons, did not proceed to the second stage, was reviewed. Data analyzed included demographics, BMI, co-morbidities, and surgical outcomes. All partial gastrectomies were performed over a 48F bougie.

**Results:** During the period January 2002 - February 2004, there were 77 patients who underwent LSG, and of these, 39 patients had available > 36 months follow up data. The mean age was 52(30-75), and the mean preoperative BMI was 67 (43-91). The mean number of preoperative co-morbidities per patient was 9.2. The incidence of major complications was 15%. The mean overall follow-up was 58 months (36-74). Mean excess weight loss at 36, 48, and 60 months was 58%, 46%, and 42%, respectively; with an overall excess weight loss of 49% for the entire group.

**Conclusion:** In this group of super-obese, high risk patients who underwent LSG, the long-term data indicates both the effectiveness and durability of this operation as a definitive therapeutic option for morbid obesity.

PL-113.

OUTCOMES OF LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING IN LOW BMI PATIENTS
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Background: Current National Institutes of Health (NIH) guidelines recommend bariatric surgery for patients with BMI>40 or BMI>35 with significant comorbidities. However, some preliminary studies have shown that patients whose BMI fall below these criteria may also experience similar weight loss and the benefits associated with it.

Methods: IRB approval was obtained to study the effectiveness of laparoscopic adjustable gastric banding (LAGB) in low BMI patients. Total of 63 patients with a BMI 30-35 with comorbidities (n=14) or BMI 35-40 with no comorbidities (n=49) underwent LAGB. These patients were compared to 475 LAGB patients who met the NIH criteria for bariatric surgery. The excess weight loss (EWL) at 6, 12, 18, and 24 months and the status of their comorbidities were compared between the two groups.

Results: The average BMI was 36.7±2.2 compared to 46.7±7.4 for the control group. The low BMI group had significantly fewer number of comorbidities than the control group. These comorbidities included hypertension, diabetes, hyperlipidemia, GERD, stress incontinence, and obstructive sleep apnea. The mean percentage of EWL in the low BMI group was 33.3±51.3, 39.1±16.0, 37.3±36.4, and 44.5±22.5 at 6, 12, 18, and 24 months, respectively. This was not significantly different from the control group except at 18 months. Both groups showed similar improvement of most comorbidities, except for arthritis (p=0.003).

Conclusion: Moderately obese patients below the current guidelines for bariatric surgery have similar weight loss and associated benefits. LAGB is a safe and effective treatment for patients with BMI 30-35.

PL-114.

EVALUATING GASTRIC EROSION IN BAND MANAGEMENT: AN ALGORITHM FOR STRATIFICATION OF RISK
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Background: Laparoscopic gastric banding has several known complications including gastric erosion. No clear factors result in band erosion but technical factors such as covering the buckle of the band have been implicated. Does band management after surgery, band size or going beyond the manufacturer determined maximum volume have an impact on erosion?

Methods: Retrospective review of a prospective IRB approved database was performed. All patients that were followed between 2002 and 2008 were identified. Maximum band volumes were 4cc for 9.75cm/10cm and 10cc for Vanguard. Bands were defined as overfilled if they were greater than the maximum volume for at least 3 months.

Results: 2437 patients had LAP-BAND surgery with a total of 14/2437 patients with erosion (0.57%). The primary erosion rate was 0.39% (9/2359). These patients were divided into three groups based on the type of band placed: Group A Vanguard (735), Group B 9.75cm/10cm
(1624) and Group C revisions to Vanguard including band around bypass (78). The incidence of gastric erosion by group was: A 0.95% (7/735), B 0.12% (2/1624), C 6.41% (5/78). The difference in erosion between the groups was significant: A vs. B (p=0.005), C vs. A (p=0.003) and C vs. B (p=0.001). There were erosions in each group without overfilling and when comparing the erosion rate in overfilled vs. underfilled bands, there was statistical significance only in Group A 3.18% vs. 0.35% (p=0.006). The erosion rates in overfilled vs. underfilled was for Group B 1.01% vs. 0.07% and for Group C 11.11% vs. 3.92%.

**Conclusion:** A band that needs to be overfilled may be a sign of an erosion, and patients should have an endoscopy. Band revision carries a higher rate of erosion than primary banding. The Vanguard band carries a higher risk of erosion than the 4cc bands.

**PL-115.**

A CANINE MODEL OF LAPAROSCOPIC ADJUSTABLE GASTRIC BAND (LAGB) PROLAPSE AND THE IMPORTANCE OF A COMPLETE GASTROGASTRIC WRAP

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**Background:** The most prevalent long-term complications in patients undergoing laparoscopic adjustable gastric band (LAGB) surgery are pouch dilatation and gastric prolapse (slippage). A canine model of LAGB and a setup using a pump and pressure transducer was created to mimic esophageal contractions against a LAGB outlet obstruction. Multiple arrangements of gastro-gastric sutures and gastric wraps were then placed and evaluated for their utility in preventing gastric prolapse.

**Methods:** The esophagus of male mongrel dogs was accessed through the right chest and a pressure transducer and an insufflation catheter were introduced. An AP Lap-Band (Allergan, Irvine, CA) was placed using the pars-flaccida technique. 20cc of saline was instilled into the band to produce complete occlusion. Following the placement of multiple different gastrogastric suture configurations, air was insufflated into the gastric pouch via the esophagus.

**Results:** This model confirmed that prolapse can be caused by increased pressure acting on an LAGB outlet obstruction. In addition, prolapse was reproduced with all gastrogastric configurations that did not secure the anterior gastric wall to within 2cm of the lesser curve.

**Conclusion:** In this canine model gastrogastric sutures encompassing the anterior gastric wall were integral in preventing prolapse.
SEVERE ESOPHAGITIS AND BARRETT’S ESOPHAGUS AS AN IMPORTANT COMPLICATION OF ADJUSTABLE GASTRIC BAND

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Background: Adjustable gastric band (AGB) is recognized as an effective treatment for morbid obesity. Its main complications are slippage and erosion. Esophagitis is a known complication of AGB that courses at various degrees. Esophageal metaplasia and Barrett’s esophagus development on AGB patients is still not well defined as in GERD and are much more related to stasis than to gastroesophageal reflux. We aim to present a series of 7 year experience on AGB to report incidence and outcomes of esophagitis and Barrett’s esophagus formation.

Methods: Retrospective case series of 1325 AGB performed from December, 1999 to December, 2007 with mean age and BMI of 34.5 years (12-72y) and 42.5 kg/m² (35-79 kg/m²). Complicated reflux esophagitis (grade C-D, Los Angeles scale) and hiatal hernia larger than 3...
cm were exclusion criteria for AGB. Patients were enrolled to perform upper endoscopy yearly or for symptoms investigation.

**Results:** From 1325 patients, 78%(1033p) underwent post-op upper endoscopies (2.8 tests/patient). 22%(291p) of tests revealed esophagitis (7% grade C-D). Four patients (0.3% from 1325 AGB) with repeated and complicated esophagitis developed Barrett’s esophagus and were converted to lap gastric bypass. Within the esophagitis group, 29p(10%) were converted due to poor quality of life. Band erosion occurred in 14p(1% from 1325 AGB). There was a higher incidence of band erosion in esophagitis group compared to non-esophagitis group (2.7% vs 0.58%,p<0.01).

**Conclusion:** Esophagitis represents an important complication of AGB and may end up in Barrett’s esophagus on those with complicated esophagitis with all the concerns of adenocarcinoma formation. The presence of esophagitis on AGB may lead to more band erosions.

**PL-117.**

**QUALITIES OF LIFE, WEIGHT LOSS, AND RESOLUTION OF CO-MORBID DISEASES AFTER ADJUSTABLE GASTRIC BANDING: ARE THEY RELATED?**

*Brad Snyder, MD; Todd Wilson, MD; Benjamin Leong, MD; Connie Klein, NP; Erik B. Wilson, MD; surgery, University of Texas, Houston, TX, USA*

**Background:** Measuring the mechanisms of outcome is critical for determining the success of our patients after weight loss surgery. We used the measured outcome results of bariatric interval data (MORBID) to classify outcome in terms of weight loss, co-morbid disease, and quality of life. Understanding how these components change over time is vital to ensure rewarding outcomes.

**Methods:** With IRB approval, we prospectively collected quality of life data and calculated the MORBID scores of 342 consecutive post operative and 47 preoperative gastric banding patients. The cohorts were sorted into six groups by years out from surgery. ANOVA was used to determine the differences between the groups. Student’s t-test was used to define differences between the preoperative and postoperative quality of life scores and differences between men and women. Correlations of the MORBID components over time were performed.

**Results:** Weight loss and resolution of co-morbid disease increase over time (r=0.82, 0.74, respectfully); however quality of life did not (r=-0.33) nor did it correlate with weight loss (r=-0.02) or resolution of co-morbid conditions (r= 0.18). By the end of 2.77 years, self esteem was the only component of quality of life to remain significantly higher than the preoperative score. Overall, quality of life scores at 2.77 years were similar to preoperative scores (p=0.93).

**Conclusion:** Gastric banding is a weight loss operation and, thereby, causes weight loss. This consequently results in resolution of co-morbid disease. However, this operation does not change a person’s quality of life. Psychological and social support systems are required to increase this facet of outcome if we are to advance the overall success and well-being of our patients.

**Correlation between Variables**

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<th>Mos</th>
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<th>CoMorb</th>
<th>WtLoss</th>
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A COMPARATIVE STUDY OF CONVENTIONAL LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING VS SINGLE INCISION GASTRIC BANDING
Ninh T. Nguyen, MD; Johnathan A. Slone, MD; Brian R. Smith, MD; Kevin M. Reavis, MD; Surgery, UC Irvine Medical Center, Orange, CA, USA

Background: Laparoscopic gastric banding is commonly performed through 5 trocars with enlargement of the largest for implantation of the port. The aim of this study was to compare the outcomes of conventional gastric banding to those performed through a single incision.

Methods: From April 2008 to October 2008, 11 patients underwent laparoscopic gastric banding through a single, 4.0-4.5 cm incision with implantation of the port through the same incision. The two study cohorts were matched for age, gender, and BMI. Outcome measures included operative time, blood loss, the need for conversion to 5-port laparoscopy, morbidity, and weight loss.
**Results:** There were 3 men and 8 women in each group. There were no significant differences between groups with regard to demographics, operative time, blood loss, and length of hospital stay. Two (18%) of 11 patients in the single incision group required conversion to conventional 5-port laparoscopy. There were no intraoperative complications.

**Conclusion:** Adjustable gastric banding through a single laparoscopic incision is technically feasible, safe, and does not prolong operative time. The procedure can be performed with mostly existing ports, laparoscopic instrumentation, and visualization platforms. Further trials are necessary to determine clinical advantages of this technique.

<table>
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<th>Laparoscopic (n==11)</th>
<th>Single Incision (n=11)</th>
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<tbody>
<tr>
<td>Preoperative BMI (kg/m²)</td>
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<td>39 ± 3</td>
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<tr>
<td>Age (years)</td>
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<td>46 ± 10</td>
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<tr>
<td>Operative time (min)</td>
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<tr>
<td>Estimated blood loss (ml)</td>
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<td>No. patients requiring ICU stay (days)</td>
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<td>Mean hospital stay (days)</td>
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<tr>
<td>Minor complications</td>
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<td>0%</td>
</tr>
<tr>
<td>Late complications</td>
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<tr>
<td>Excess body weight loss (3 months)</td>
<td>24 ± 12%</td>
<td>19 ± 9%</td>
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**A TECHNIQUE FOR NON FASCIAL FIXATION OF THE LAPAROSCOPIC ADJUSTABLE GASTRIC BAND ACCESS PORTS**

*James C. Wellborn, MD; Private Practice, Little Rock, AR, USA*

**Background:** Access port complications occur in 10-20% of patients undergoing Laparoscopic Adjustable Gastric Banding (LAGB). These include infection, leakage, difficult access, erosion, pain, and poor cosmetic results requiring revision. Additionally, traditional fascial fixation techniques require longer operative times and fluoroscopic or sonographic localization increasing the time, expense, and discomfort associated with LAGB. A technique of non fascial fixation of the LAGB access port with minimal complication is described.

**Methods:** From August 2001 to August 2007 1,027 consecutive patients underwent LAGB. 1,008 (97%) patients were available for follow up for greater than 1 year. The access port was placed in a subcutaneous pocket created 2 cm deep to the skin anterior to the rectus sheath, secured to scarpas fascia with 2 non absorbable sutures. The group was analyzed for complications.
Results: The were 0 (0%) early post-operatively infections and 6 (0.6%) late post-operatively infections. Other complications requiring revision were distributed as follows: Skin erosions; 2 (0.2%), poor cosmetic results; 2 (0.2%), malposition; 2 (0.2%), and leakage due to access trauma; 3 (0.3%). Overall, there were 15 (1.5%) access port complications. Additionally, port placement time averaged 5 minutes and no patient required sonographic or fluoroscopic guidance for access.

Conclusion: Non Fascial fixation of the LAGB access port, utilizing a technique familiar to most general surgeons, is associated with fewer complications than traditional fascial fixation. Additionally, operative times, ease of access, and patient comfort and expense are positively impacted by this technique.

PL-120.

REASONS AND OUTCOMES OF LAPAROSCOPIC REVISIONAL SURGERY AFTER LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING FOR MORBID OBESITY
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Background: Laparoscopic gastric banding (LGB) is a purely restrictive procedure which has proven to be an effective tool in achieving weight loss. Low operative morbidity and reversibility are often seen as an advantage of this procedure when compared to other bariatric approaches. We attempt to define the reasons for revisional surgery after gastric banding and their outcomes.

Methods: A retrospective review of a prospectively maintained database was performed between January 2002 and October 2008 at a center of excellence after IRB approval. Patients who underwent revisional surgery after primary LGB were evaluated.

Results: Of 347 patients who underwent primary LGB 99 (28.5%) revisional procedures were performed. These procedures included 38 (10.9%) band removals alone, 12 (3.5%) band removals with conversion to sleeve gastrectomy, 13 (3.7%) band removals with conversion to roux-en-y gastric bypass (RYGBP), 15 (4.3%) band repositioning, 3 band replacements, 12(3.5) were port related procedures (3 relocations, 4 reconnections, 5 replacements), 1(0.9%) patient underwent band placement after failed RYGBP.

Conclusion: Though reversible and efficacious, LGB appears to have a high incidence of complications requiring revisional surgery and/or band removal. Laparoscopic revisional surgery after primary LGB is safe and can be performed with minimal morbidity.

PL-121.

RESOLUTION OF TYPE II DIABETES IN MORBID OBESE PATIENTS WHO UNDERWENT TO LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING: 5 YEARS FOLLOW-UP
Gianni Segato, Medicine; Surgery, Regional Hospital of Vicenza, Vicenza, Italy.
**Background:** Interest in bariatric surgery as an effective method for long-term metabolic control of morbid obese patients with type 2 diabetes is increasing. We analyzed weight loss and changes in use of anti-diabetes medications in obese patients treated with laparoscopic adjustable gastric banding (LAGB).

**Methods:** Between September 1993 and December 2005, 1791 consecutive morbid obese patients underwent LAGB at our Institution. 394/1791 (22.0%) patients had type 2 diabetes at baseline and 52/394 were treated with anti-diabetes medications. Mean follow-up in drug-treated diabetic patients were 3.3±2.0 years (range: 0.25-9 years).

**Results:** Drug-treated diabetic patients were older (age: 47.6±7.5 vs 37.5±10.7 years, P<0.001), heavier (BMI: 49.1±9.5 vs 45.6±7.5 kg/m2, P<0.001) and more frequently affected by comorbidities (hypertension, dyslipidemia, sleep apnoea, heart failure, arthritis) than non-diabetic patients at surgery. Percent of excess weight loss (%EWL) 1 years after surgery was lower (32.4±14.1 vs 41.1±19.9%, P<0.01) in drug-treated diabetic patients than in non-diabetic patients and this difference was maintained over 5 years of follow-up. Both the use of oral anti-diabetic medications and insulin significantly declined after surgery (patients treated with oral anti-diabetic drugs: 52/52 at baseline and 32/52 at the end of follow-up; patients treated with insulin: 6/52 and 2/52). The use of anti-diabetic medications at the end of follow-up was increased in 2/52 (3.8%) patients, unchanged in 9/52 (17.3%), reduced in 16/52 (30.8%), and suspended in 25/52 (48.1%).

**Conclusion:** Weight loss after LAGB was lower in drug-treated diabetic patients than in non-diabetic patients. However, weight loss observed after surgery was associated to a sustained reduction in the use of anti-diabetic medications, in more than 75% of patients.

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**PL-122.**

**LAPAROSCOPIC ROUX -EN-Y GASTRIC BYPASS (LRYGBP) VERSUS LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING (LAGB) 5 YEARS FOLLOW-UP**

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**Background:** Bariatric surgery is an effective alternative of treatment for morbid obesity. Laparoscopic Roux-en-Y gastric bypass (LRYGBP) and laparoscopic adjustable gastric banding (LAGB) are commonly performed procedures. The aim of this study was to evaluate and compare long term outcomes after LRYGBP and LAGB.

**Methods:** Prospective database of all patients that underwent LRYGBP or LAGB with 5 years follow up.

**Results:** From July 2001 to September 2003, 91 and 67 patients underwent LRYGBP and LAGB respectively. 73.6% of LRYGBP and 89.5% of LAGB had 5 years follow up. 89.5% and 76.6% were women respectively. Mean age and BMI was 34.5+-10.9 years and 38.9+-4.5 kg/m2 for LRYGBP and 38.4+-12.4 years and 35.2+-3.6 kg/m2 for LAGB. Mean operative time was LRYGBP 150+-56.3 minutes and 71+-22.6 minutes for LAGB (p<0.05).

Conversion and
reoperation rate was 7.7% and 5.5% in LRYGBP versus 0% in LAGB (p=0.01). Early postoperative complications were observed in 11 and 1 patients (p<0.01) after LRYGBP and LAGB. Late complications were present in 20 and 22 patients respectively (p=NS). %EWL at 5 years was 92.3±26.1% and 63.2±29.9% (p<0.001) for LRYGBP and LAGB respectively. Surgical failure (%EWL<50%) at 5 years was 7.5% for LRYGBP and 41.8% for LAGB. Revisional surgery was needed in 16% of LAGB.

**Conclusion:** A higher %EWL at 1 and 5 years was observed in LRYGBP compared to LAGB. LAGB had >40% of surgical failure and 16% of revision at 5 years follow up.

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**IMPACT OF STAPLE HEIGHT ON THE GASTRO-JEJUNOSTOMY DURING LAPAROSCOPIC GASTRIC BYPASS: A MULTI-CENTER PROSPECTIVE RANDOMIZED TRIAL**

*Ninh T. Nguyen, MD; Alfons Pomp, MD; Brad Needleman, MD; Dean Mikami, MD; David Provost, MD; Daniel Scott, MD; Dan Jones, MD; Scott Gallagher, MD; Gregory Dakin, MD; Michel Gagner, MD; Michel Murr, MD; Division of Colorectal and Gastrointestinal Surgery, UC Irvine Medical Center, Orange, CA, USA*

**Background:** Background: Gastrointestinal (GI) bleeding and stomal stenosis are frequent complications of construction of the gastrojejunostomy during laparoscopic gastric bypass. Staplers with shorter staple height may minimize GI hemorrhage. The aim of this study was to assess the outcomes after constructing the gastrojejunostomy using a circular stapler with 3.5 mm vs. 4.8 mm staple height.

**Methods:** Methods: From January 2007 to August 2008, 313 patients who underwent laparoscopic gastric bypass, using a 25-mm circular stapler for construction of the gastrojejunostomy, were randomly assigned either 3.5 mm (n=154) or 4.8 mm staplers (n=159). Outcome measures include the incidence of GI hemorrhage, stomal stenosis, and wound infection.

**Results:** Results: The groups were similar with regard to demographics and baseline BMI (47 vs. 48 kg/m2). Operative time (129 vs 130 min), blood loss (89 vs. 86cc), and postoperative hematocrit on day 2 (34.2 vs 34.3 g/dl) were similar between groups. There were no differences in the overall incidence of postoperative GI bleeding from all sources (4.5% for 3.5 mm vs 6.3% for 4.8 mm). However, there was a trend in reduction of GI bleeding arising from the gastric pouch or gastrojejunostomy (1.3% for 3.5 mm vs 5.7% for 4.8 mm). There was a significantly lower rate of stomal stenosis in the 3.5 mm group (3.9% vs 14.5%, p<0.01). Other morbidities for the cohort include leaks (0.6%), wound infection (7.0%), pulmonary embolism (0.6%), early bowel obstruction (0.6%), and reoperation (3.5%). The overall in-hospital mortality was 0.3% and the 30-day mortality was 0.6%.

**Conclusion:** Conclusions: In this prospective, randomized trial, the use of circular staplers with shorter staple height (3.5 mm) during construction of the gastrojejunostomy significantly reduces stomal stenosis and trends toward a reduction in staple-line bleeding.
THERE IS AN INVERSE RELATIONSHIP BETWEEN SURGEON VOLUME AND
ADVERSE OUTCOMES AFTER RYGB IN THE LONGITUDINAL ASSESSMENT OF
BARIATRIC SURGERY (LABS) STUDY
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Steven H. Belle, PhD; Marc Bessler, MD; Anita P. Courcoulas, MD, MPH; David Flum, MD
MPH; James Mitchell, MD; Alfons Pomp, MD; Walter J. Pories, MD; Bruce Wolfe, MD;
1Oregon Weight Loss Surgery, Portland, OR, USA; 2University of Pittsburgh, Pittsburgh, PA,
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Pittsburgh Medical Center, Pittsburgh, PA, USA; 5Department of Surgery, University of
Washington, Seattle, WA, USA; 6Neuropsychiatric Research Institute, Fargo, ND, USA;
7New York Presbyterian Hospital, New York, NY, USA; 8Department of Surgery, East Carolina
University School of Medicine, Greenville, NC, USA; 9Oregon Health and Science University,
Portland, OR, USA

Background: Bariatric surgery is technically demanding surgery performed on high-risk
patients. Both of the U.S. Center of Excellence (COE) programs require surgeons to perform a
minimum of 50 cases per year for accreditation. The aim of this study was to examine the
relationship between surgeons' annual Roux-en-Y gastric bypass (RYGB) volumes and 30-day
patient outcomes.

Methods: LABS includes a 10-center, prospective study examining 30-day outcomes following
bariatric surgery. Outcome following RYGB was risk-adjusted for BMI, past history of DVT, PE
and obstructive sleep apnea (OSA). The data were examined to determine whether there is a
volume below which adverse outcome rates are unacceptably high. Specifically, the COE
threshold of 50 RYGB cases/year was examined, and the relationship between surgeon volume
and adverse 30-day outcome was explored.

Results: LABS includes 3409 initial RYGB operations performed by 31 surgeons, 15 of whom
averaged fewer than 50 cases/year. The crude composite adverse outcome (death, DVT/PE, re-
inervention or non-discharge at day 30) incidence was 9.1% for low volume surgeons and 4.0%
for high volume surgeons. The adjusted relative risk (RR) was 2.2 (95% CI, 1.4-3.5) for low vs.
high volume. Figure 1 suggests that the incidence of the composite adverse outcome decreased
with increasing surgeon case volume [RR 0.89 (95% CI, 0.84 - 0.95) per increase of 10
cases/year], and that the negative effect of higher patient BMI decreased with increasing surgeon
volume.

Conclusion: In LABS, the risk of an adverse outcome was lower as surgeon RYGB volume per
year increased.
VALIDATION OF THE OBESITY SURGERY MORTALITY RISK SCORE (OS-MRS) IN PATIENTS UNDERGOING GASTRIC BYPASS IN A CANADIAN CENTRE
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Background: The Obesity Surgery Mortality Risk Score (OS-MRS) has been proposed as a user friendly tool for assessment and risk stratification for patients undergoing gastric bypass. We aimed to assess the validity of the OS-MRS in 2121 gastric bypass cases performed in our centre.

Methods: Retrospective study of cases undergoing primary gastric bypass since 1983. The 90-day mortality and all mortalities related to complications of surgery were determined. For every case we assigned the relevant risk score based on the patients comorbidities and relevant demographics. We used the Z test to estimate if the difference between the actual and the predicted from the OS-MRS was statistically significant (p value less than 0.05).

Results: In class A there were 1385 (65.3%) cases, in class B 671 (31.6%) cases and class C 65 (3%) cases. The predicted versus actual mortality was 0.3% vs 0.3% for class A (p 0.999), 1.9% vs 1.5% for class B (p 0.569) and 7.5% vs 3% for Class C patients (p 0.250).

Conclusion: In a high-volume centre with > 25 years experience the OS-MRS predicted accurately the postoperative mortality for gastric bypass surgery. It appears to be a user friendly scoring system facilitating the informed consent process. Before the system is unequivocally adopted further validation trials of a prospective nature will be required.

Figure 1. Surgeon’s LABS RYGB volume as a predictor of combined adverse event for RYGB surgeries in LABS. The predicted event rate is weighted for history of DVT/PE and OSA (and thus represents the LABS sample).
### PROSPECTIVE APPLICATION OF THE OBESITY SURGERY MORTALITY RISK SCORE (OS-MRS) MAY IMPROVE OUTCOMES IN HIGH-RISK PATIENTS UNDERGOING BARIATRIC SURGERY

**Rebecca P. Petersen, MD, M.Sc.; Dana D. Portenier, MD; Aurora D. Pryor, MD; James E. Alexander, BS; Christopher J. Myers, MD; Alfonso Torquati, MD, M.Sc.; Eric J. DeMaria, MD; Surgery, Duke University Medical Center, Durham, NC, USA**

**Background:** Among patients undergoing bariatric surgery, the OS-MRS predicts mortality and has previously been validated. However, prospective application of the score has not yet been demonstrated to improve outcome.

**Methods:** OS-MRS identifies 3 risk classes based on 5 risk factors (age≥45yrs, male gender, BMI≥50kg/m2, hypertension, & PE risk factors). We prospectively identified class C (4-5 risk factors) patients presenting to our outpatient clinic and assessed outcome. All patients were counseled to lose weight before surgery. Comorbidities were comprehensively evaluated and treated. Some patients were counseled to undergo a change in their stated preference for gastric bypass to adjustable band/sleeve gastrectomy.

**Results:** 105 Class C patients were identified between 2005-2008 and evaluated an average of 2.2 times before surgery. All comorbidities were evaluated with specialty referrals as needed. Diabetics underwent improved glucose control (goal hgbA1C<8mg%). Weight loss recommendations were accomplished in 25(25%) patients with >10lbs. Index procedures included 95 Roux-en-Y gastric bypass, 9 lap bands, and 1 gastric sleeve. Median follow-up was 362 days. Baseline demographics were age 53±7yrs, male (66%), BMI 54±9, PE risk factors (52%), HTN (96%), DM (67%), and CAD (18%). Outcomes evaluated included: %EWL 50±20, DVT/PE (4%), MI (0%), hemorrhage (2%), and anastomotic leak (6%;n=95). No patient died within 90 days of surgery, as compared to previously reported retrospective cohorts with reported mortality in Class C patients between 2.4 and 7.6%.

**Conclusion:** Prospective application of OS-MRS allows identification of high risk patients who can then be managed with more aggressive pre-surgical interventions. Improved survival may be an attainable goal with directed pre-surgical interventions.
PL-205.

ABNORMAL GLUCOSE TOLERANCE TESTING FOLLOWING GASTRIC BYPASS
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Background: Despite reports of the remission of diabetes and also the incidence reactive hypoglycemia post-RYGB, the effect of a glucose challenge has never been studied in post-RYGB patients.

Methods: 38 RYGB patients, > 6 months post-op, were studied with a glucose tolerance test (GTT) with measurement of insulin levels. Mean age 49.4 +/- 11.6 years, mean pre-operative BMI 48.7 +/- 6.6, mean percent excess BMI lost 63.6 +/- 22.1%, mean weight regain at follow-up 17.6 +/- 18.9 lbs, mean follow-up time 39.9 (6-89) months.

Results: 32/38 patients had an abnormal GTT. 6/38 patients were diabetic. 1 of these patients had a markedly elevated fasting glucose level (FBS). All 6 patients were diabetic pre-operatively. 26/38 had evidence of reactive hypoglycemia at 1-2 hrs post-glucose load. Mean 1 hr insulin level for these 26 patients was 121 +/- 111 µIU/mL. Of these 26 patients, 14 had a maximum to minimum glucose ratio > 3:1 including 5 with a ratio > 4:1.

Conclusion: This study demonstrates that an abnormal GTT is a common finding post-RYGB. 5 of the 6 cases of diabetes required GTT for diagnosis. None were being treated with medications. Reactive hypoglycemia was found in 26/32 patients with insulin values that do not support nesidioblastosis. 14/26 had a rapid elevation followed by sharp decline of serum glucose. We believe rapid emptying of the pouch leads to insulin production and hypoglycemia and may contribute to maladaptive eating behaviors. Finally, our data suggests that GTTs should be incorporated into the routine post-RYGB care.

PL-206.

HELICOBACTER PYLORI INFECTION IS NOT ASSOCIATED WITH POSTOPERATIVE DEVELOPMENT OF MARGINAL ULCERATIONS FOLLOWING GASTRIC BYPASS
Hea Jung Lee, High School¹; David Oliak, MD²; ¹University of California, Irvine, Irvine, CA, USA; ²David Oliak, MD, Orange, CA, USA

Background: To date, there is no consensus about the relationship between Helicobacter pylori infection and marginal ulceration (MU) after Roux-en-Y gastric bypass (RYGB). The goal of this study was to evaluate the relationship between H. pylori and postoperative MU rates.

Methods: The study population consists of 809 consecutive patients who underwent laparoscopic RYGB by one surgeon. Data including demographics, body mass index (BMI), H. pylori infection, and marginal ulcer formation was retrospectively reviewed. Diagnosis of H. pylori infection was determined by intraoperative mucosal biopsy via CLOtest®. Patients with
positive CLOtest’s® were not treated postoperatively. Statistical analysis was done using the chi-square test for dichotomous variables and Student’s t-test for continuous variables.

**Results:** The overall rate of MU in our patient population was 5%. Marginal ulceration rates did not differ significantly between patients who had *H. pylori* infection and those who did not (p=0.31). The rate of *H. pylori* infection among patients diagnosed with and without MU was 10% and 16%, respectively. Demographic distributions including age, sex, and BMI, did not vary significantly between the two groups (p>0.05).

**Conclusion:** Our study suggests that *H. pylori* infection is not involved in marginal ulcer formation after RYGB.

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**PL-207.**

**SURGICAL WEIGHT LOSS OVER 65 - IS IT WORTH THE RISK?**

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**Background:** Weight loss surgery in patients over age 65 has been underutilized secondary to morbidity and mortality concerns of healthcare providers. Comparative outcomes analysis in this patient population has been lacking. The purpose of this report is to evaluate the safety and outcome of gastric bypass in patients over age 65.

**Methods:** A prospective database was used for analysis of safety, operative morbidity, and outcome. All patients undergoing surgery since January 2005 were included.

**Results:** Analysis of 1474 patients demonstrated a higher operative risk profile for patients over 65 (n=100) compared to under 65 (n=1374) related to sleep apnea (45% vs 34%), diabetes mellitus (65% vs 33%), and hypertension (81% vs 57%). Operative outcomes were similar for both groups based on operative time (70 vs 65 minutes), length of stay (1.9 vs 1.3 days), and 30 day readmissions (6.0% vs 7.4%). Postoperative complication rates were low in patients over 65 (bleeding 1.0%; pulmonary 3.0%; cardiac 2.0%; wound 2.0%; and mortality 0%). Percent excess body weight loss in gastric bypass patients was similar in patients over 65 compared to under 65 at 12 months (75.9% vs 77.8%) and at 24 months (75.5% vs 79.2%).

**Conclusion:** This experience represents one of the largest series of laparoscopic gastric bypass in elderly patients. The data shows excellent outcomes compared to a younger population.

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**PL-208.**

**INCIDENCE OF INTERNAL HERNIAS AFTER LAPAROSCOPIC ROUX-EN-Y RETROCOLIC ANTEGASTRIC GASTRIC BYPASS OVER THE LAST DECADE: 1997 TO 2008**

*Tahir E. Yunus, MD; Tienchin Ho, MD; Francisco M. Tercero, MD; Alice J. Jackson, RN, MSN, NP-C, CBN; Abdelrahman A. Nimeri, MD; Keith B. Boone, MD; Kelvin D. Higa, MD; Minimally Invasive Surgery, UCSF-Fresno, Fresno, CA, USA*


**Background:** Laparoscopic roux-en-y gastric bypass (LRYGB) is associated with internal hernias that may present many years later. The incidence of internal hernias is affected by the type of reconstruction and closure of mesenteric defects and has influenced many surgeons to adopt an antecolic route for the roux limb. We have previously reported our experience, which overestimated the incidence. We present the timeline of technique and incidence of internal hernias from 1997 to 2008. All patients (pts) underwent standard limb retrocolic antegastric LRYGB since 1997. Initially, interrupted absorbable suture was used but since 2002 we recommended and utilized running or pursestring closure with non-absorbable suture. This report is a follow up adopting these techniques. We present our data for the incidence of internal hernias over the last decade as our technique has evolved.

**Methods:** Retrospective review of a prospectively updated database for LRYGB performed between 1997 and 2008.

**Results:** 7353 pts underwent LRYGB, 32 of these pts were converted to open. Over the last decade 220 pts (3.0%) required 224 repairs. 4.9% (11/224) of the repairs were found as incidental findings during other surgeries. 82% (183/224) of repairs were performed in pts who underwent LRYGB between 1997 and 2001. 18% (41/224) of repairs were performed in pts who underwent LRYGB between 2002 and 2008. Hence the mean incidence was 8.5% (183/2141 pts) from 1997 to 2001 and 0.8% (41/5212 pts) from 2002 to 2008 (p<0.0001). 48% (105/220) of pts had preoperative radiological studies done. 38% (40/105) of these studies were interpreted as normal.

**Conclusion:** The current technique for closure of mesenteric defects has significantly reduced the occurrence of internal hernias. The use of non-absorbable suture for a running closure of defects seems to have the lowest incidence.

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**WEIGHT LOSS AT THE FIRST POSTOPERATIVE VISIT PREDICTS LONG TERM OUTCOME OF ROUX-EN-Y GASTRIC BYPASS**

*Lindsey S. Sharp, MD; Aurora D. Pryor, MD; Eric J. DeMaria, MD; Dana D. Portenier, MD; Alfonso Torquati, MD, M.Sc.; Dept. of Surgery, Duke University Medical Center, Durham, NC,*
Background: Despite the Roux-en-Y gastric bypass (RYGB) procedure having been employed for more than 3 decades, there are no normative data to assess the adequacy of postoperative weight loss, similar to pediatric growth charts. The purpose of our study was to create a reliable normative data that can be used as a clinical tool to ascertain trends in weight loss after RYGB.

Methods: To generate the normative data necessary to create a longitudinal weight loss chart (WLC), we used data prospectively collected from 1274 patients who underwent RYGB at Duke University between April 2000 and September 2007. Percent excess weight loss (EWL) was determined for each follow-up clinic visit (1,3,6,12,& 36 months). Normative data were described. EWL velocity was also determined using postoperative data collected at 1 and 3 month visits. Multivariate analysis was used to determine early predictive factors that influence long term results.

Results: The quartiles distribution for EWL is shown in the image. Twelve month postoperative follow-up data was available for 97% of patients. At 12 months follow up, the majority of patients continue to be in the same weight loss quartile where they were initially classified at 1 month postoperatively (p=0.01). The positive predictive value (PPV) for 1st quartile weight loss at 1 month resulting in 1st quartile EWL at 12 months was 39%. Similarly, the negative predictive value (NPV) was 81%. After adjusting for covariates (preop BMI, Age, Sex), the multivariate analysis indicated EWL velocity (1-3 months) as an independent predictive variable for long term EWL (r=0.51 p=0.0001 at 12 months).

Conclusion: We have developed a reliable WLC that can be used to monitor EWL following RYGB. The clinical utility of the WLC is to provide a tool to identify underperformers early postoperatively and potentially intervene to improve outcomes.

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AEROBIC ENDURANCE TRAINING IMPROVES WEIGHT LOSS, BODY COMPOSITION AND CO-MORBIDITIES IN PATIENTS AFTER LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS
Edward Shang, MD; Till Hasenberg, MD; Surgery, University Hospital Mannheim, Mannheim, Germany.

Background: Sudden weight loss following Roux-en-Y gastric bypass (RYGBP) for morbid obesity, such as can result in a concurrent decrease in lean body mass. However the long-time results (weight reduction, elimination co-morbidities) are depending on the post operative treatment. Aerobic edurance training (AET) is well accepted in conservative treatment of obesity as well as of diabetes mellitus type 2 (DM). The aim of this study was to assess the efficiency of
AET on weight loss, body composition and co-morbidities in patients after laparoscopic RYGBP.

**Methods:** In sixty (60) consecutive morbidly obese patients a laparoscopic RYGBP were performed and prospectively randomized into low exerciser group (LE) (AET for 1 x 1h/ week) or multiple exerciser group (ME) (AET for > 2 x 1h/ week). Prospective 24 month postoperative follow up including documentation of early and late complications as well as weight loss, body composition measurement by bioelectrical impedance analysis (BIA) and co-morbidities every 8 weeks.

**Results:** The average BMI (52 kg/m²) and the other baseline characteristics were equally distributed in both groups. There was no major complication and no significantly difference in minor complications postoperatively in both groups. ME showed a significantly faster reduction of BMI (p 0.02), excess weight loss (EWL) (p 0.02), and fat mass (p 0.01), in comparison to LE during the first 18 month. The initial loss of body cell mass (BCM) (p 0.01), and lean body mass (LBM) (p 0.01), were significantly lower in ME and regains faster when compared with LE. ME showed a significantly earlier elimination or improvement of co-morbidities.

**Conclusion:** AET improves weight loss, body composition and co-morbidities after RYGBP during the first 2 years. Additional controlled long-term studies need to be conducted to confirm these positive findings.

PL-211.

LONG TERM RESULTS AFTER LAPAROSCOPIC ROUX EN Y GASTRIC BYPASS: 10 YEAR FOLLOW UP
Tienchin Ho, MD; Tahir E. Yunus, MD; Francisco M. Tercero, MD; Alice J. Jackson, RN, MSN, NP-C, CBN; Abdelrahman A. Nimeri, MD; Keith B. Boone, MD; Kelvin D. Higa, MD; Minimally Invasive Surgery, UCSF-Fresno, Fresno, CA, USA

**Background:** Roux en Y gastric bypass (RYGBP) is the most commonly performed bariatric procedure in the United States. Questions remain regarding the long term results of the laparoscopic approach compared to the open approach. We describe our ten year experience with laparoscopic RYGB (LRYGB) within a single group practice.

**Methods:** Retrospective review of a prospectively maintained database was performed for 109 patients with ten years of follow up (pts) who underwent laparoscopic gastric bypass between January 1997 and October 1998.

**Results:** All pts (109) underwent retrocolic, antegastric LRYGBP. 12 were converted to open. Follow up was complete for 40% of pts at 2 yrs, 28% at 4 yrs, 16% at 6 yrs, 12% at 8 yrs, and 11% at 10 yrs. Mean excess weight loss (EWL) was 60% at 10 years. Although weight loss initially appeared to be less for those converted to the open procedure, there was no difference by ten years. For 20 pts (19.4%), LRYGB failed to achieve an EWL >40%. Six of these pts underwent revisional surgery. Nutritional follow up beyond one year was available in 87% of pts. 56% of these pts had anemia and 42% had low albumin during testing done more than one year after LRYGB.

**Conclusion:** Long term results of LRYGBP are comparable to open gastric bypass 10 years after surgery, with EWL approaching 60%. Common mild nutritional deficiencies make life long
follow up essential.

Percentage Weight Loss Over Time

**PL-212.**

**BARIATRIC SURGERY IN ADOLESCENTS, CASE SERIES IN PRIVATE PRACTICE PROGRAM**  
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**Background:** Obesity is a growing problem among children and adolescents. For many, dieting and exercise achieve an insignificant long term weight loss. A surgical approach is being used at a few specialized centers. No reports on adolescents undergoing gastric bypasses have come from private practice surgeons.

**Methods:** Retrospective chart review of 75 patients undergoing gastric bypass between 16 and 19 years of age. These were 3.2% of the total cases performed by one surgeon in a 6 year period in conjunction with a private practice, multidisciplinary team. Weight, BMI, %EWL, co morbidities, complications, and compliance of follow-up were documented.

**Results:** During initial visit average BMI was 46. At 1 year, the %EWL was 68. Average BMI was 30. % follow-up was initially 54%. BY making direct attempts to contact the patients, we increased the follow-up 83% (office visits) and another 12% via phone consultations. There was 100% resolution of co morbidities. There were two minor perioperative complications that resolved with medical management. Long term, one patient developed iron deficiency anemia due to non compliance with supplements. It resolved with counseling and oral supplementation. % followup and weight loss was similar to the adults who underwent surgery.

**Conclusion:** Weight loss surgery can be performed safely in the adolescent population by an experienced private practice program. Percents of follow-up and compliance with supplementation were similar to the adult population treated during this time. To improve follow-up, programs should have plans in place to reach out to lost patients.
RECURRANCE OF DIABETES AFTER GASTRIC BYPASS IN PATIENTS WITH MID TO LONG-TERM FOLLOW UP
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Background: Studies have shown that Type 2 diabetes (T2DM) improves or resolves shortly after gastric bypass (GBP). There is little data on T2DM recurrence or the impact of weight regain on T2DM status.

Methods: A review of 29 GBP patients with T2DM and 3 or more yrs of follow-up and lab data was performed. Postop weight loss and T2DM status was assessed. Recurrence was defined as HbA1c >6.0% and fasting glucose >124mg/dL and/or medication required after a remission. Patients whose T2DM improved were compared to those who resolved, and those whose T2DM recurred were compared to those whose did not.

Results: T2DM either resolved or improved in all patients (76 and 24% respectively). Patients who resolved were significantly less likely to have required insulin prior to GBP (11 vs 83%; p=.0005). 24% of patients recurred at a mean 4.7±1.7 yrs after GBP. 71% of these patients regained an average 16% of their lost weight. Time when T2DM recurred and percent of lost weight regained was highly correlated (r=.7; p=.12). Recurrence patients were significantly less likely to have required a single oral medication (0 vs 47%; p=.04) and more likely to have required insulin (50 vs 21%; p=.0005) before GBP. Average follow-up time was significantly longer for recurrence patients (6.0 vs 4.5 yrs; p=.03). Men tended to recur more than women (71 vs 32%; p=.06). Greatest EWL, and percent of lost weight regained were similar between recurrence groups. Upper GI xray was normal in 5 of 5 recurrence patients studied.

Conclusion: Recurrence of T2DM is not uncommon after GBP and seems more likely to occur when patients regain even a small amount of lost weight. These data suggest that increased calorie intake and weight gain may overwhelm any benefit of foregut bypass in T2DM resolution and/or that hormonal changes which lead to both weight loss and T2DM amelioration may not be permanent.

BEHAVIOR OF TYPE 2 DIABETES MELLITUS IN OBESE INDIAN PATIENTS SUBMITTED TO SLEEVE GASTRECTOMY
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Background: Sleeve Gastrectomy (SG) is known to produce weight loss. The aim of this study
is to evaluate the postoperative response of type 2 diabetes mellitus (T2DM) to SG. Is there an effect separate from that due to the weight loss?

**Methods:** Patients for weight loss surgery are evaluated and treated using a protocol. The data and follow-up data are kept prospectively. Data on obese type 2 diabetic patients who had the sleeve Gastrectomy between 2004 and 2008 was analyzed at 1 month, 3 month and 1 year and presented in this manuscript.

**Results:** 58 obese type 2 diabetic patients who were operated on during this time period had a sleeve gastrectomy. The mean age was 45 ± 12 years, BMI 47 ± 17 kg / m², waist circumference 120 ± 30 cm and HbA1c 9.8 ± 3.5%. 52 (89%) were on anti-diabetic medication and 6 were on diet control. 43 / 52 (82.69%) were off of anti-diabetic medications at end of 1 month and before any significant weight loss and 9/52 (17.30%) required lesser medication. At the end of 1 year 56/58 (96.5%) were euglycemic without medication and 2/58 (3%) had lesser dose of medication.

**Conclusion:** Sleeve Gastrectomy is an effective procedure for treatment of type 2 diabetes in the obese. The effect is due to additional mechanisms in addition to weight loss.

PL-215.

**COMPARISON OF GASTRIC SLEEVE AND ADJUSTABLE GASTRIC BAND OVER AN EXTENDED TIME FRAME**

*David L. Schumacher, MD; Melissa Rawlins, PA-C; Jerod Grogg, PA-C; Mehul Trivedi; General Surgery, Boonshoft School of Medicine, Wright State University, Kettering, OH, USA*

**Background:** Controversy exists as to which restrictive bariatric procedure will provide the best results regarding weight loss with fewest complications. We compared gastric sleeve (LGS) as a primary procedure and adjustable gastric band (LAGB) over a two year period.

**Methods:** We performed a retrospective study with patients who opted for bariatric procedures from January 2006 until August 2008. There were 785 total laparoscopic bariatric cases, 104 gastric sleeves, and 227 adjustable gastric bands. All charts and medical records were reviewed, patients were contacted to obtain current weight, and statistics were compiled with a 99 percent retrieval of data. The following BMI subsets were compared: 35 - 49 kg/m², 50 - 59, and > 60. Each subset was compared for weight loss and percent excess weight loss (%EWL) at routine follow up intervals. Complications were charted for each subgroup with attention to return to surgery and readmissions.

**Results:** Weight loss and % EWL was greater in the LGS group in all subsets in comparison to LAGB. In the LGS group, there was one major complication (leak) requiring reoperation (.96%), four DVT’s, and two patients with dehydration. In the LAGB group, there were two port flips, two band erosions, one port leak, five band slips, one port seroma, three band removals for intolerance, and one port repositioning. Fourteen patients required reoperation (6.2%).

**Conclusion:** The LGS had greater weight loss with a higher % EWL demonstrating fewer complications when compared with BMI subsets at routine time intervals to the LAGB over an extended duration of two years.
EVIDENCE FOR A METABOLIC MECHANISM IN THE IMPROVEMENT OF TYPE 2 DIABETES AFTER SLEEVE GASTRECTOMY IN A RODENT MODEL

Brian Kadera, BS1; Eric J. DeMaria, MD2; Basil M. Yurcisin, MD2; Moataz Gaddor, MD2; Dana D. Portenier, MD2; 1School of Medicine, Duke University, Durham, NC, USA; 2Department of Surgery, Duke University Medical Center, Durham, NC, USA

**Background:** Sleeve gastrectomy, purported to be a restrictive procedure, is at least as effective at producing weight loss as gastric banding, but may be superior in producing remission of type 2 diabetes. This could be explained by changes in gastric hormones following stomach resection, a possible metabolic effect of the procedure. To study mechanisms of diabetes improvement beyond caloric restriction and weight loss, we studied the sleeve gastrectomy in Zucker Diabetic Fatty (ZDF) rats.

**Methods:** Twenty-eight ZDF rats were randomized to three study groups - sleeve gastrectomy (SG), sham-operation (SO), or sham-operated pair-fed (PF). SG and SO rats were fed ad-lib. PF rats were fed the average daily intake of the SG group. Comparative studies of caloric intake, weight loss, and intraperitoneal glucose tolerance testing (IPGTT) were performed. IPGTT was done pre-operatively and at post-operative day 10, 20, and 30. Difference between means were evaluated using ANOVA or Student t-test as appropriate with significance at P<0.05.

**Results:** Post-operatively, SG rats had lower caloric intake than the SO controls (51.2 ± 5.3 kcal/day vs. 99.3 ± 5.2 kcal/day). Both SG and PF groups had similar and sustained weight loss (-18.1 ± 6.9 gm and -27.5 ± 3.6 gm respectively); however, SG rats had significantly lower area under the curve (AUC) for glucose after IPGTT than their PF counterparts (P<0.05). This is in contrast to SO controls that experienced continuous weight gain (+34.1 ± 5.2 gm) and marked increases in the AUC glucose with IPGTT.

**Conclusion:** While sleeve gastrectomy is considered a restrictive procedure, with weight loss as its primary mechanism, there is evidence for a metabolic effect by virtue of decreased insulin resistance which is not reproduced by pair-fed controls.
Data reported as mean ± SEM. At each post-operative time point, P<0.05 for SG vs. PF. At day 20 and day 30, P<0.05 for PF vs. SO.

PL-217.

Socioeconomic Disparities in Eligibility and Access to Bariatric Surgery: A National Population-Based Analysis
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**Background:** Bariatric surgery is a life-changing and potentially life-saving intervention for morbid obesity. Access to bariatric surgical care among eligible patients may be adversely impacted by a variety of socioeconomic factors.

**Methods:** The national bariatric eligible (BE) population was identified from the 2005-2006 National Health and Nutrition Examination Survey and compared with the adult non-eligible population. The eligible cohort was then compared to patients who underwent bariatric surgery (BS) in the 2006 Nationwide Inpatient Sample, and key socioeconomic disparities were identified and analyzed.

**Results:** There were 22,151,116 people identified as eligible for bariatric surgery by NIH
criteria. Compared with the non-eligible group, the BE group had significantly lower family incomes, lower education levels, less access to healthcare, and a higher proportion of non-white race (all p<0.001). Bariatric eligibility was associated with significant adverse economic and health-related markers, including days of work lost (8 vs 5, p<0.001). Over one-third (35%) of BE patients were either uninsured or under-insured and 15% had incomes below the poverty level. There were 87,749 inpatient bariatric surgical procedures performed in 2006. The majority were performed in white patients (75%) with higher median incomes (80%) and private insurance (81%). Significant disparities associated with a decreased likelihood of undergoing bariatric surgery were noted by race, income, insurance type, and gender (see Figure, all p<0.001).

**Conclusion:** Socioeconomic factors play a major role in determining who does and does not receive bariatric surgery despite medical eligibility. Significant disparities based on race, income, education level, and insurance type continue to exist, and should prompt focused public health efforts aimed at equalizing and expanding access.

![Proportional inequities between the bariatric eligible population and the bariatric surgical population for race, income, insurance, and gender](image)

**PL-218.**

**THE WEIGHT LOSS OR THE PROCEDURE? EFFECT OF DIFFERENT BARIATRIC OPERATIONS ON HYPERLIPIDEMIA**

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**Background:** Bariatric operations improve hyperlipidemias. The known mechanisms are malabsorption and weight loss, but there might be some metabolic effects.
Methods: Of 208 patients who underwent bariatric operations (02/2006-09/2008), in 130(62.5%) preoperative hyperlipidemia was identified. 106 patients with follow-up were included. The operations included 64 R-Y gastric bypasses (RYGB), 5 Duodenal Switches (DS), 19 Sleeve Gastrectomies (SG) and 18 Gastric Bandings (LAGB). Rate of complete resolution of hyperlipidemias was compared between operations, and contributing factors were analyzed. To avoid bias of different extent of Excess Weight Loss (EBL) we compared between operations by groups of the same degree of weight loss. Results are presented as mean±SD.

Results: Mean preoperative cholesterol, LDLcholesterol, and triglycerides were (mg/dL) 203.08±36.58, 124.47±30.65, and 188.25±117.2 respectively, and 38(35.8%) patients received antihyperlipidemics. Postoperatively mean concentrations of cholesterol, LDLcholesterol, and triglycerides were 181.64±41.3, 110.85±36.32, and 125.25±52.58, respectively. Complete resolution of hyperlipidemia at longest follow-up available (277.7±193.5 days) was observed in 48 patients (45.3%), by operation the rates were: DS 80%, RYGB 57.8%, LAGB 16.7%, and SG 21.1% (p<0.001). Multivariate analysis was performed to predict the contribution of EBL and operation type. The resolution of hyperlipidemia was related to the operation type only, with the odds ratios by procedure of 20, 6.85, 1.33 for DS, RYGB and SG, respectively (P = 0.01). After excluding patients with < 40% EBL, the rate of resolution of hyperlipidemia was still significantly different (p=0.01).

Conclusion: RYGB and DS produce highest resolution of hyperlipidemia, which is independent of weight loss. The effectivity of LSG is similar to that of LAGB.

PL-219.

IS BILIOPANCREATIC DIVERSION WITH DUODENAL SWITCH INDICATED IN NON SUPER-OBESE PATIENTS?

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Background: Biliopancreatic Diversion with Duodenal Switch (BPD-DS) is our standard treatment for morbid obesity since the early 90’s. However, many institutions consider BPD-DS only in super-obese patients, due to an allegedly higher risk of complications and protein malnutrition. The purpose of this study was to assess the safety and efficacy of BPD-DS in non super-obese patients.

Methods: All patients with a BMI under 50kg/m2 who underwent a BPD-DS between June 1992 and May 2005 were included in this study (n=810). Data is reported as a mean (range).

Results: Pre-operative BMI was 44.2kg/m2 (33 to 49.9kg/m2). Major intra-operative complications occurred in 7 patients (0.9%) (one liver laceration and 6 splenic injuries). Major post-operative complications occurred in 26 patients (3.2%) (5 duodeno-ileal anastomosis leaks, 5 intra-abdominal abscess, 1 gastric leak, 3 biliary leaks, 1 peritonitis, 3 pneumonia, 3 septic shocks, 2 pulmonary embolisms, 1 pancreatitis, 1 severe metabolic acidosis, 1 intra-abdominal hemorrhage). There was 5 peri-operative deaths (0.61%) (2 pulmonary embolisms, 1 fulminant pneumonia, 1 septic shock, 1 metabolic acidosis of unknown origin). The mean excess weight loss after 8.6 years (3 to 16.7 years) was 76%. 91.3% of the patients had a BMI under 35kg/m2.
and 70% had a BMI under 30kg/m2. 35 patients (4.3%) were re-admitted for malnutrition or metabolic disorders. Among these, 12 patients (1.48%) required a lengthening of the alimentary limb for excessive weight loss.

**Conclusion:** The results of this study suggest that BPD-DS is highly efficient in terms of weight loss in non super-obese patients, with minimal risks of long-term malnutrition. Peri-operative complication rate compares favorably to other bariatric procedures.

**PL-220.**

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**REDUCED HEART RATE VARIABILITY CORRELATES WITH INSULIN RESISTANCE, BUT NOT WITH MEASURES OF OBESITY IN A BARIATRIC SURGICAL POPULATION**  
*Richard A. Perugini, MD; Donald R. Czerniach, MD; John J. Kelly, MD; Demetrius E. Litwin, MD, MBA; Karen A. Gallagher-Dorval, RN; Surgery, University of Massachusetts, Worcester, MA, USA*

**Background:** Obesity is associated with a pathologic predominance of sympathetic over parasympathetic tone. With respect to the heart, this presents as decreased heart rate variability (HRV). Reduced HRV has been associated with increased cardiovascular morbidity. Gastric bypass (GB) reduces cardiovascular mortality, and may impact HRV in a beneficial manner. We sought to identify factors predictive of HRV in a bariatric surgical population, and to follow the effect of GB on HRV.

**Methods:** All patients presenting for GB were included into a prospective database, which included demographics (age, gender, weight, BMI), and predictors of cardiovascular morbidity [C-reactive protein (CRP), and total cholesterol to HDL ratio (chol:HDL)]. Homeostatic model of assessment (HOMA) was used to calculate insulin resistance (HOMA-IR) and beta cell sensitivity (HOMA-B). A 24 hour Holter monitor was used to assess heart rate variability (HRV). HRV, weight loss, and HOMA measures were repeated at two weeks and six months postoperatively.

**Results:** We studied 26 patients undergoing GB. All exhibited reduced HRV. HOMA-IR correlated with HRV index ($r = -0.44, p = 0.04$). Age, gender, weight, BMI, EBW, CRP, chol:HDL and HOMA-B did not correlate with HRV. HRV improved by 180 days postoperatively. At 12 days, change in HOMA-IR correlated with change in HRV index ($r = 0.55, p = 0.08$), while measures of weight loss (change in weight, change in BMI, %EBW lost) did not.

**Conclusion:** HRV in severe obesity is better predicted by degree of insulin resistance, than by degree of obesity. GB leads to an improvement in HRV. This is evidence for an increase in vagal efferent signaling following GB, potentially explaining the reduction in cardiovascular morbidity after GB, and calling into question treatment modalities for obesity whose goal is to block the vagus nerve.

**PL-221.**
PREVALENCE AND DEGREE OF SEXUAL DYSFUNCTION IN WOMEN SEEKING BARIATRIC SURGERY

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Background: Impairment of sexual functioning is prevalent in severely obese individuals, particularly those seeking bariatric surgery. No study, however, has used a validated measure to examine prevalence and degree of sexual dysfunction (SexDys) in women seeking bariatric surgery relative to published norms for women with SexDys and healthy controls (Rosen et al., 2000).

Methods: Sixty-six women participants (M age=43.4±10.4 y; BMI=47.4±8.1 kg/m2) seeking bariatric surgery completed the Female Sexual Functioning Index (FSFI). The 19-item FSFI assesses sexual functioning across six domains (i.e. desire, arousal, lubrication, orgasm, satisfaction, pain) during the previous month, with higher domain scores (0- or 1-6 scale) indicating better functioning. Summing of domain scores yields an FSFI total score (range=2-36; ≤26=SexDys).

Results: Forty-eight (73%) of 66 participants were classified as having SexDys. Average FSFI total score for the entire sample (20.6±9.7) was lower than healthy controls (30.5±5.29) and similar to women diagnosed with SexDys (19.2±6.6). Similarly, participants’ mean scores on individual domains were similar to women with SexDys and lower than healthy controls, respectively [e.g., desire (2.8±1.2 vs. 2.8±1.3 and 4.1±1.1); arousal (3.2±1.9 vs. 2.9±1.4 and 5.0±1.1)].

Conclusion: Women seeking bariatric surgery are clearly a population with marked SexDys. Nearly three-quarters of participants were classified as having SexDys; a rate considerably higher than that observed in the general population (43%). These findings highlight the need to: (1) assess sexual functioning in female bariatric surgery candidates, (2) identify candidates who have SexDys and may require further treatment; and (3) study the weight loss and metabolic effects of bariatric surgery on resolution of SexDys.

PL-222.

"PROVENCARE(SM)" INITIAL RESULTS OF A PROVIDER-DRIVEN PAY-FOR-PERFORMANCE PROGRAM FOR GASTRIC BYPASS SURGERY

Anthony T. Petrick, MD; Michael C. Doll, PA-C; Audrey Bolanowski, MD; Ravi Chokshi, MD; Christopher McCullough, MD; Jon D. Gabrielsen, MD; Christopher D. Still, DO; William E. Strodel, MD; Surgery, Geisinger Medical Center, Danville, PA, USA

Background: Evidence-based health care delivery in the US has been problematic. Pay-for-
performance (P4P) has emerged as a strategy to control cost and reward quality. Our goal was to test whether an integrated health care delivery system could successfully implement an evidence-based P4P program for gastric bypass surgery.

**Methods:** The ProvenCare (PC) program was created for gastric bypass surgery at Geisinger medical center. Components include (1) Establishing evidence-based best practices (2) Establishing a mechanism for patient engagement (3) Developing risk-based pricing for gastric bypass surgery. A working group of bariatric surgeons and medical bariatritians was formed to identify best practices benchmarks for the delivery of bariatric care. The group was supported by administrative specialists, statisticians, and electronic medical record IT specialists. 187 consecutive patients undergoing gastric bypass after May 1, 2008 at Geisinger Medical Center were enrolled in the PC beta-testing process. A cohort of 224 consecutive patients who underwent gastric bypass at GMC by the same 5 surgeons prior to implementation of the ProvenCare program were compared to the ProvenCare group.

**Results:** 37 benchmarks were developed for bariatric care. Compliance increased from 88% to 96% over 5 months. Components included medical, surgical and educational pathways. Demographics, BMI and comorbid conditions were not significantly different. Length of stay was shorter for the PC group than the control group (2.74 vs. 3.01 days; NS). 30-day complications were not significantly different for the two groups.

**Conclusion:** Early results trended toward shorter hospital stays for patients in the program. 100% compliance is anticipated in the next 2 months and will trigger an evaluation of costs and packaging of the program as a fixed price service to the Geisinger Health Plan.

**PL-301.**

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**EVALUATION OF AN INTERACTIVE WEB-BASED CLINICAL TOOL AS AN ADJUNCT TO THE REALIZE BAND ON PATIENT %EWL AND RETENTION RATES**

*John Pilcher, MD; New Dimensions Weight Loss Surgery, San Antonio, TX, USA*

**Background:** To fully realize the long-term benefits of bariatric surgery, surgeons generally believe that patient compliance with long-term follow-up care coupled with regular postoperative contact and support may reduce the rate of late-stage weight regain and loss to follow-up; however, such measures are precluded by the practice’s time and resource limitations. The REALIZE Banding Solution comprises two key components, the REALIZE Band and REALIZE mySUCCESS (RmS), a comprehensive, web-based clinical tool that provides patient monitoring to the surgeon with automated alerts, and allows patients to interactively develop pre- and postoperative goals, customize plans, and monitor personal progress. This ongoing study analyzed the postsurgical %EWL of patients by frequency of RmS use over 6 months and evaluated patient retention.

**Methods:** RmS initiation and use was dependent only upon patient interest; there were no financial incentives. Of the 4000 patients who have used RmS, only those who had entered preoperative weight (within 1 week of surgery) and at least 1 postoperative weight (n=1595) were included in our analysis. Patients using RmS at least weekly were “Frequent Users,” all others were “Average Users.”

**Results:** Frequent users of RmS experienced statistically significant (P<0.05) improvements in
Improved %EWL results are achieved with more frequent RmS use; the data suggest that RmS use results in high patient retention.

Mean %EWL by Frequency of REALIZE mySUCCESS Use

PL-302.

SAFETY AND EFFICACY OF A SIDE-TO-SIDE DUODENO-ILEAL ANASTOMOSIS WITH ENDOTRACT TM

Michel Gagner, MD¹; David Blaeser²; Dale Spencer²; ¹Surgery, Mount Sinai Medical Center, Miami Beach, FL, USA; ²EndoMetabolic Solutions, Inc., Minneapolis, MN, USA

Background: Partial bypass of the GI tract may promote weight loss by decreased absorption of nutrients and changes in incretins. The aim of the study was to evaluate the safety and efficacy of performing a side-to-side duodeno-ileal anastomosis with a new device called EndoTrack TM.

Methods: Seven 40-50 Kg female Yorkshire pigs were allocated to a Duodeno-ileal anastomosis (DIA) with an Endotract device TM, and were compared to a control group (SHAM). Swine’s weights were followed for 56 days. Gastroscopies were also performed at 8 and 28 days. Blood samples were also taken at regular intervals (CBC and Basic biochemistry profiles). At autopsy,
gross changes and histological changes of the liver, duodenum and ileum samples were performed.

**Results:** While the SHAM group gained 33.2% more weight at 56 days, the DIA group had shown a weight loss of -6.8%, for a difference of 40.0% between the 2 groups (p < 0.05). One pig developed an incisional hernia. Gastroscopies demonstrated normal healing without ulceration or inflammation at 28 days. Histological examination of the anastomosis at 56 days showed normal and smooth healing, with absence of liver toxicity.

**Conclusion:** Placement of an EndoTract safely and effectively creates an anastomosis between two portions of the small bowel. The anastomosis that is created is robust and permanent, and facilitates a partial diversion of nutrient flow and thus alters the absorption of nutrients. In this porcine model with short follow-up, a side-to-side duodeno-ileal anastomosis provided excellent weight loss without apparent nutritional or aberrant histological changes.

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**INITIAL HUMAN EXPERIENCE WITH A RESTRICTIVE, DUODENAL-JEJUNAL BYPASS LINER FOR THE TREATMENT OF MORBID OBESITY**

*Alex Escalona, MD*¹; *Ricardo Yañez*¹; *Fernando Pimentel*¹; *Manoel Galvao, MD*²; *Luis Ibañez*¹; *Dannae Turiel*¹; *Camilo Boza, MD*¹; *Diego Awruch, MD*¹; *Keith S. Gersin, MD*³; ¹Digestive Surgery. Faculty of Medicine, Pontificia Universidad Católica de Chile, Santiago, Chile.; ²Gastro-Obeso Center, Sao Paulo, Brazil.; ³Department of Surgery, Carolinas Medical Center, Charlotte, NC, USA

**Background:** The EndoBarrier™ Gastrointestinal Liner creates an endoscopic duodenal-jejunal bypass leading to weight loss in morbidly obese patients. The aim of this study was to evaluate the safety and efficacy of the EndoBarrier with a 4 mm restrictor in the morbidly obese patients.

**Methods:** Ten patients were enrolled with a planned evaluation period of 12 weeks. Outcomes measured were percent excess weight loss (%EWL) and minor and major adverse events. After 12 weeks the device was explanted.

**Results:** Of the ten patients, 8 were women. The mean age and baseline BMI were 34.9 years (range: 18-54) and 40 ± 3.9 kg/m² (range 35.8-45 kg/m²). The mean implant time was 33 ± 4 minutes with a mean fluoroscopy time of 14.8 ± 3 minutes. There were no major adverse events. Periodic episodes of nausea and vomiting lead to the endoscopic dilation of the restrictor hole with a 6 mm balloon between weeks 2 and 8 in seven (70%) patients. One subject required a second dilation with a 10 mm balloon. The device was removed endoscopically at the 12th week in all 10 patients. The mean explant time was 47 ± 53.8 minutes (range 10-155 minutes). At week 12th the mean BMI and %EWL were 34.2 Kg/m² (p<0.0012) and 39.8% (range 21.7 - 65.3%), respectively. The mean total weight loss was 16.7 ± 4.4 Kg.

**Conclusion:** The EndoBarrier Gastrointestinal Liner with the addition of a duodenal restrictor is a safe and effective short-term treatment for morbidly obese patients.
**PANCREATIC ISLET ISOLATION IN A RAT MODEL SHOWS INCREASED INSULIN SECRETION AFTER GASTRIC BYPASS**

*Patrick Gatmaitan, MD; Hazel Huang, MS; Olivia Dan, Bachelor degree; Ramy H. Fouad, MD; Sangeeta Kashyap, MD; John P. Kirwan, PhD; Philip Schauer, MD; Stacy A. Brethauer, MD; Cleveland Clinic, Cleveland, OH, USA*

**Background:** Roux-en-Y gastric bypass affords a high remission rate of type 2 diabetes mellitus among morbidly obese diabetic patients. We hypothesize that pancreatic islet secretion is improved after gastric bypass using a rodent model.

**Methods:** Adult male Sprague Dawley-diet induced obese rats were used for the experimental groups (obese-gastric bypass/OGB and obese-sham/OS groups) while age-matched lean male SD rats were used as controls to establish baseline characteristics. Each experimental animal was survived for 28 days. Daily weight, food intake, and isolated islet insulin secretion were documented. At euthanasia, retrograde infusion of collagenase solution into the pancreas was performed. Using established protocol, the islets were isolated and stimulated with glucose and insulin concentration was measured.

**Results:** Fifteen rats were used (lean=5, OGB=5, OS=5). Mean baseline weights were 540.3 grams, 882.5 grams, and 834.9 grams for the lean, OGB, and OS groups respectively. The OGB group lost 31.2% body weight versus 16.3% for the OS group. Average daily food intake was lower in the OGB group (OGB= 9.4 grams/day vs. OS= 18.7 grams/day). Glucose-stimulated insulin secretion from the isolated islets from the OGB group was significantly higher than the lean control as well as the OS group (p 0.004).

**Conclusion:** Islet isolation with glucose stimulation in this animal model provides a direct measurement of pancreatic islet secretion. Utilizing this technique, gastric bypass is associated with increased insulin secretion compared to controls.

**PL-305.**

**THE EFFECT OF WEIGHT LOSS SURGERY ON THE EXPRESSION OF TUMOR GROWTH FACTORS IN MORBID OBESITY**

*Daniel R. Cottam, MD2; Barry L. Fisher, MD1; Giuseppe Pizzorno, PhD2; Amy Ziemba, MS2; 1Surgical Weight Loss Center of Utah, Salt Lake City, UT, USA; 2Nevada Cancer Institute, Las Vegas, NV, USA*

**Background:** Obesity is associated with increased tumorogenesis. Previously, we demonstrated that inflammation in obesity caused cancer fighting cells to display higher surface receptors levels predisposing them to early cell death. Herein, we measured inflammatory tumor growth factors to determine whether inflammation in obesity increases expression of these factors potentially predisposing these patients to higher rates of neoplasia.

**Methods:** 24 patients undergoing weight loss surgery had samples collected preoperatively, at six and 12 months post-surgery. Growth factors analyzed included TNF-alpha, GM-CSF, IFN-g, IL-1b, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, VEGF, HGF, TNF-R1, TNF-RII, DR5, leptin, and
adiponectin. Control samples were obtained, processed, and evaluated in a similar fashion to healthy normal weight volunteers.

**Results:** Tumor growth factors TNF-α, TNF-RI, TNF-RII, VEGF, HGF, IFN-g, IL-2, IL-5, IL-6 all decreased significantly (p<0.05) when compared to preoperative values. IL-4, IL-8, leptin, DR5, adiponectin and GM-CSF did not change statistically over time. IL-1b and IL-10 were below the detection limit at all time points. When obese patients serum was compared to healthy volunteer pooled serum, we found that Leptin, DR5, HGF, VEGF, TNFRI, TNFRII, TNF alpha, IFN-g, GM-CSF, IL4, IL5, IL6, IL-8 were all between 2 to 37 times greater than controls at baseline. Concentrations of these same growth factors were found to have fallen to levels only 1.025 to 3.5 times greater than controls at 12 months.

**Conclusion:** Many inflammatory tumor growth factors are present in higher concentrations in obese individuals. This may explain the higher prevalence of neoplasia in the morbidly obese population.

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**RYGB ALTERS TNF-ALPHA BUT NOT ADIPONECTIN SIGNALING IN THE IMMEDIATE POSTOPERATIVE PERIOD**

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**Background:** Adiponectin has anti-inflammatory effects and is reported to increase with weight loss. Tumor necrosis factor alpha (TNF-alpha) is an important pro-inflammatory cytokine. We demonstrated that RYGB in rats induces weight loss, improves steatosis, and decreases serum leptin with no increase in adiponectin shortly after RYGB. Therefore, we hypothesize that after RYGB, mRNA levels of adipose adiponectin and the corresponding hepatic adiponectin receptor 2 (AdipoR2) do not increase, but that TNF-alpha mRNA levels may instead be altered.

**Methods:** Obese Sprague-Dawley male rats underwent RYGB (n=5) or sham (n=4) and were sacrificed at 9 weeks post-operatively. Adipose and liver mRNA from final tissue samples were quantified by semi-quantitative differential - polymerase chain reaction (PCR) or real-time PCR. Data are mean±SD; for t-test, p<0.05 was significant.

**Results:** After RYGB, adipose tissue adiponectin mRNA levels were not changed (1159+/−293 vs. 1440+/−246; p=0.22 vs. sham). Additionally, hepatic AdipoR2 levels were not significantly altered (0.9+/−0.3 vs. 1.3+/−0.2; p=0.057 vs. sham). However, TNF-alpha mRNA levels decreased in adipose tissue (0.99+/−0.4 vs. 1.81+/−0.4; p=0.044 vs. sham) while remaining unchanged in the liver (1.56+/−0.63 vs. 1.58+/−0.54; p=0.96 vs. sham).

**Conclusion:** Surgically-induced weight loss in a rat model of RYGB does not increase adiponectin signaling in the immediate postoperative period but is associated with decreased pro-inflammatory signaling in adipose tissue. During this period leptin and pro-inflammatory signaling may play a more important role than adiponectin. Longer follow-up is necessary to determine if up-regulation of adiponectin plays a role in weight loss and improvement of steatosis after RYGB.
ENDOSCOPIC REMOVAL OF ERODED ADJUSTABLE GASTRIC BAND (AGB). LESSONS LEARNED AFTER 5 YEARS AND 78 CASES
Manoel Galvao, MD; Almino C. Ramos, MD; Josemberg M. Campos, MD; Manoel Galvao, MD; Abel H. Murakami, MD; Marcelo Falcão, MD; Eduardo G. de Moura, MD; Alex Escalona, MD; Natan Zundel, MD; Metabolic and Bariatric Surgery, Gastro Obeso Center, São Paulo, Brazil.; Surgery and Endoscopy Department, Federal University Of Pernambuco, Recife, Brazil.; Endoscopy Department, University of Sao Paulo, Sao Paulo, Brazil.; Digestive Surgery Department, Catholic University of Chile, Santiago, Chile.

Background: One of AGB complications is partial migration into the stomach leading to a revisional procedure in order to remove it. Despite the regular laparoscopic approach to eroded AGB removal, endoscopy is less invasive and seems more logical. Our aim is to present the procedure and results of endoscopic AGB removal on a 5 years multicentric experience.

Methods: From August, 2003 and June, 2008, 78 AGB between 6 brands (Helioscopie® - 13; Midband® - 12; Lapband® - 17; SAGB® - 33; Maximizer® - 1; AMI - 1) were successfully removed by endoscopy from a total of 82 p (95.1%). 50p (64%) were female. Age and preoperative BMI ranged from 25-55y (mean=36y) and 34-50Kg/m² (mean=43.2Kg/m²). BMI at endoscopic procedure ranged from 24-41Kg/m² (mean=31.8Kg/m²) with maximum postoperative weight loss from 10-65Kg (mean=33.8Kg). The migrations occurred within 6-36 months (mean=6.3m) from AGB. All migrations were diagnosed during upper endoscopy and the symptoms leading to it were pain in 25p(31%), port infection in 21p(27%) and weight regain in 20p(25%). 12p(15%) had their AGB migration diagnosed on routine endoscopies.

Results: 63 AGB (85%) were removed in the first session. The Lapband® was the hardest to remove representing up to 80% of bands that needed more than one session. 4 AGB (5%) were just sectioned. The procedure time varied between 25-150 minutes (mean=55m). 5p (6.4%) developed pneumo-peritoneum which were clinically treated in 3 cases, needed a Verres needle puncture in 1 case and had a conversion to laparoscopy in 1 case with no mortality.

Conclusion: Endoscopic removal of eroded AGB is safe and effective and can be used as first choice procedure in the clinical practice.

PL-308.

REVISIONAL SLEEVE GASTRECTOMY FOR FAILED LAGB/VBG
Mirto Foletto, MD; Paolo Bernante, MD; Luca Busetto, MD; Luca Prevedello, MD; AZIENDA OSPEDALIERA UNIVERSITARIA, Padova, Italy.

Background: Sleeve gastrectomy (SG) is considered an effective multipurpose operation for morbid obesity, though results are still lacking in the long run. We here report our results on SG as revisional procedure for inadequate weight loss and/or complications after LAGB/VBG.
Methods: Since April 2005, 57 (20 M, 37 F) patients, mean age 43.8 years, underwent revisional SG, 52 after LAGB and 5 after VBG. Eleven patients had "open" primary bariatric surgery. The SG was modelled on a 28-34F bougie with an endostapler, after removing the LAGB or the anterior portion of the band in VBG patients. Staple line was buttressed when needed. Upper GI series with Gastrographin was performed within 2 days after surgery and if negative, a soft diet was promptly started.

Results: Six patients required conversion to open surgery. The mean operating time was 120 (90-150) minutes. Two patients on ticlopidine had post-op bleeding (+7 d) and were successfully treated without re-operation. One VBG patient had a p.o. leakage successfully treated with drain and enteral feeding. One LAGB patient died 3 months after SG for septic shock. The median hospital stay was 4 (3-90) days. The mean BMI at operation was 48.4 ± 11.8 kg/m² and dropped to 40 ± 12.9 kg/m² after 1 y (40 pts), with a mean %EWL of 41.9 ± 18. Two patients required duodenal switch for insufficient weight loss (+12 and +24 mos, respectively), while the remaining 55 are still losing weight and doing well. One LAGB patient died 6 mos after re-do SG, without being referred to our Center.

Conclusion: SG seems to be effective, as rescue procedure for failed LAGB/VBG. Staging the procedure could improved safety in LAGB patients. Larger series and longer follow-up are needed.

PL-309.

METABOLIC ACUITY SCORE: IMPACT ON MAJOR COMPLICATIONS FOLLOWING BARIATRIC SURGERY
Melisa C. Cortés, MA; Robin Blackstone, MD; Scottsdale Bariatric Center, Scottsdale, AZ, USA

Background: Co-morbid conditions in obese patients contribute to the incidence and severity of major complications following bariatric surgery and significantly increase the cost of the procedure. Previous publications validate patient factors that increase risk of mortality, however it is currently a rare event. Development of a Metabolic Acuity Score (MAS) to augment BMI may allow accurate preoperative assessment and optimum management of patients. This study proposes a MAS for decreasing major complications.

Methods: Prospectively collected outcomes among patients (N=2256) undergoing Gastric Bypass in a community hospital were evaluated for incidence of major complications, readmissions, and reoperations. Beginning in August of 2006, patients (N=668) were divided into Acuity groups 1-4 based on age, BMI, weight, history of DVT/PE, sleep apnea, diabetes, hypertension, immobility, heart disease, and psychological classification. Acuity groups were compared to each other and to patients (N=1588) that were managed before MAS was implemented.

Results: There was a significant difference in length of stay between each acuity group and group 4 (p<0.001). Readmission rates within 30 days decreased after the MAS was put into practice (9.5% prior to MAS vs. 1.8% after MAS, p<0.001). Post-op infection rates were lower after implementing the MAS (3.8% prior to MAS, 0.7% after MAS, p<0.001) and for post-op DVT (1.0% prior to MAS, 0.1% after MAS, p=0.031).

Conclusion: Recognition of specific patient acuity characteristics through the implementation of
MAS and aggressive preoperative and peri-operative management has led to lower major complication rates and decreased the incidence of readmissions and reoperations following gastric bypass surgery.

PL-310.

ZERO INTERNAL HERNIA RATE USING A RERTOCOLIC, RETROGASTRIC ALIMENTARY LIMB IN 847 LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS OPERATIONS
Linda Miyashiro, MD; William Fuller; Mohamed Ali, MD; UC Davis, Sacramento, CA, USA

Background: Retrocolic, retrogastric placement of the alimentary limb during laparoscopic Roux-en-Y gastric bypass (LRYGB) has been implicated in a higher rate of internal hernia (IH). This study examines the incidence of IH in our series of LRYGB with retrocolic, retrogastric routing of the alimentary limb accompanied by routine secure closure of all mesenteric defects.

Methods: Over a four-year period, 847 patients underwent LRYGB. Our operative technique utilizes retrocolic, retrogastric placement of the alimentary limb. The jejunal mesenteric defect, the mesocolic defect, and the Petersen defect are routinely closed in running fashion with non-
absorbable suture.

**Results:** The study population had mean age of 42.4 +/- 9.3 years and mean preoperative BMI of 45.3 +/- 5.6 kg/m2. Mean operative time was 154 +/- 25 minutes. Mean excess body weight loss at one year was 70%. Patients have been followed for 1-3 years postoperatively, with a follow-up rate at one year that ranges between 60% and 70%. The incidence of IH among this large study population was 0%. Nine patients (1.1%) presented with symptoms concerning for IH; most commonly nausea, vomiting, and episodic, crampy abdominal pain; from one month to two years after initial surgery. On laparoscopic reexploration, four patients had adhesive small bowel obstruction, three patients had adhesions without obstruction, and two patients had negative exploration.

**Conclusion:** IH is a serious complication of LRYGB that can lead to catastrophic morbidity and mortality. We advocate vigilant screening for this complication and laparoscopically exploring patients with worrisome symptoms. Our data indicate that a routine and consistent technique to securely close mesenteric defects can significantly reduce the risk of IH associated with retrocolic, retrogastric placement of the alimentary limb during LRYGB.

PL-311.

**POSTOPERATIVE ICU STAY IS NOT REQUIRED FOR PATIENTS WITH OBSTRUCTIVE SLEEP APNEA UNDERGOING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS**

*Brandon T. Grover, DO*¹; Danielle M. Priem²; Michelle A. Mathiason, MS²; Kara J. Kallies, BA²; Gregory P. Thompson, MD³; Shanu N. Kothari, MD⁴; ¹Medical Education, Gundersen Lutheran Medical Foundation, La Crosse, WI, USA; ²Research, Gundersen Lutheran Medical Foundation, La Crosse, WI, USA; ³Pulmonary Medicine, Gundersen Lutheran Health System, La Crosse, WI, USA; ⁴General & Vascular Surgery, Gundersen Lutheran Health System, La Crosse, WI, USA

**Background:** Many programs admit patients with obstructive sleep apnea (OSA) to the ICU following laparoscopic gastric bypass (LGB), fearing pulmonary complications. Our practice is to admit these patients to the surgical ward. Our aim was to evaluate the perioperative course and outcomes in morbidly obese patients with OSA undergoing LGB compared to those without OSA (non-OSA).

**Methods:** We performed a retrospective review of our prospective database on 650 consecutive LGB patients between September 2001 and March 2008. Following LGB all patients were transferred to the surgical ward. Patients with polysomnography confirmed diagnosis of OSA were compared to similar patients without evidence of OSA. Statistical analysis included t-tests and chi-square analysis.

**Results:** There were 217 patients who met inclusion criteria for the OSA cohort and 368 for the non-OSA cohort. 65 were excluded from the analysis due to insufficient medical documentation of sleep apnea diagnosis. Demographics were similar between groups. Based on the respiratory disturbance index, 74% of the OSA patients had severe sleep apnea. See table below for outcomes.

**Conclusion:** Morbidly obese patients with OSA undergoing LGB have a similar perioperative
course as those without this co-morbidity. These patients had no increase in postoperative pulmonary complications. Routine admission of patients with OSA to the ICU after LGB is not indicated.

<table>
<thead>
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<th>Perioperative Data</th>
<th>OSA</th>
<th>Non-OSA</th>
<th>P-value</th>
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<td>Length of hospital stay (days)</td>
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</table>

PL-312.

**ABSORBABLE PROSTHETIC REINFORCEMENT PATCH FOR GASTRIC POUCH FISTULA CLOSURE AFTER LAPAROSCOPIC GASTRIC BYPASS**

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**Background:** Bariatric surgery continues to be the most effective treatment for morbid obesity. Although safety has continued to increase, the numbers of patients with complications have increased with the numbers of bariatric procedures performed. Leak from the gastric pouch staple line or gastrojejunostomy(G-J) will often lead to sepsis, prolonged hospital stays and death even with aggressive management. Primary repair of the fistula often fails; prolonging hospital stay and increasing total cost of care and disability to the patient. Our goal was to improve the success of primary fistula repair, thus decreasing the morbidity of this complication. We present our experience with the use of an absorbable prosthetic mesh reinforcement placed laparoscopically for primary repair of acute anastomotic or staple-line failures.

**Methods:** Retrospective review of a prospective comparison using two different absorbable meshes in 10 patients with gastric pouch or G-J fistula during the first postoperative week. We used a Vicryl® mesh in six and a Surgicel® patch in four cases.

**Results:** All patients had a good recovery with zero mortality. Fistula healing occurred within an average of 12 days with no cases of stenosis. Patients had intensive care unit support for an average of 2 days.

**Conclusion:** Leak treatment remains as a challenge to Bariatric surgeons and often leads to long-term morbidity, reoperations and prolonged hospital stay. The absorbable prosthetic
reinforcement patch improves fistula healing rates and decreases the morbidity and mortality of this complication. There was no difference between the bioabsorbable materials. Comparative controlled studies with more patients should be performed to confirm the benefits of this approach.

INCISIONLESS REVISION OF POST ROUX-EN-Y BYPASS STOMAL AND POUCH DILITATION: MULTI-CENTER REGISTRY RESULTS
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Background: Surgical revision for weight regain after Roux-en-Y gastric bypass (RYGB) has partially failed to gain acceptance due to higher complication rates associated with standard

PL-313.
approaches. Endolumenal revision of stoma and pouch dilatation should intuitively confer a better risk profile. However, questions of clinical safety, durability, and weight loss need to be answered. We report our multi-center intra-operative experience and post-operative follow-up to date utilizing the EndoSurgical Operating System™ (EOS) for this patient subset.

**Methods:** Patients who had regained significant weight 2+ years after RYGB after losing ≥ 50% of EBW post-RYGB were endoscopically screened for stomal and/or pouch dilatation. Qualified patients underwent endolumenal revision using the EOS to reduce stoma and pouch size by placing anchors to create tissue plications. Data on safety, intra-operative performance, post-op weight loss, and anchor durability were recorded to date as part of 2 year post-op follow-up.

**Results:** 116 consecutive patients were prospectively studied. 112 (97%) were technically successful in placing anchors intra-operatively. Average stoma diameter and pouch length reduction was 50% and 44%, respectively (N=112). O.R. time averaged 87 minutes. There were no significant complications. At 3 months post procedure (N=50), an average of 33% of weight regain post-RYGB was lost. Median weight loss/%EWL was 21 lbs (9.5kg) and 21% respectively. 3 month EGD results confirmed presence of anchors with stoma and pouch reduction still present.

**Conclusion:** Incisionless revision of stoma and pouch dilatation with the EOS can be performed safely. 3 month data shows anchor durability and clinically significant weight loss. Patients remain actively followed for weight loss outcomes.

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**LAP TOTAL GASTRECTOMY AS AN ALTERNATIVE TO TREAT DIFFICULT FISTULAS AFTER SLEEVE GASTRECTOMY**

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**Background:** Despite bariatric surgery societies as ASMBS and Brazilian Metabolic and Bariatric Society(SBCBM) advocate the Sleeve Gastrectomy(SG) only in selected patients under restricted protocols, it has become very common for popular considerations as an easier and low-morbidity procedure. High-volume centers which are used to receive and treat bariatric complications are increasingly admitting patients with SG complications. Among them Hiss angle fistulas sometimes are very hard to heal. We present a series of Lap total Gastrectomy(LTG) for the treatment of SG fistula.

**Methods:** We have collected prospective data on 8 referred patients that were submitted to LTG due to post-SG Hiss angle fistula that could not be solved by surgery or endoscopic means.

**Results:** Half of patients was male with age ranging from 18-62 years (mean 46y). The number of surgical reinterventions for fistula treatment ranged from 1-6 (mean 3.16). Patients were submitted to endoscopic treatment with a mean of 5.66 sessions (3-8) using fibrin glue, meshes, clips and prosthesis. Mean time from SG to LTG ranged from 6-18 months (mean 12.33m).
Surgical time of the LTG ranged from 4-7 hours (mean 5h30m) with a mean hospital stay of 7 days (5-12d). Complications occurred in 2 cases, with pneumonia in one case and intestinal obstruction in another caused by adhesions within 5 days from LTG. It seems that besides some good literature, SG fistulas and mortality rates could be higher than in Gastric Bypass. SG fistulas are more difficult to manage and heal with a longer recovery time. When fistulas do not heal with conservative surgery nor endoscopic treatment after 6 months, more aggressive surgical alternatives as LTG could be necessary.

**Conclusion:** LTG for the treatment of SG fistula could be the only alternative in some cases and can be performed safely with low rates of complications.

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**IS THE DUODENAL SWITCH FEASIBLE, SAFE AND EFFICIENT IN PATIENTS WHO FAILED ADJUSTABLE BAND GASTROPLASTY AND VERTICAL BANDED GASTROPLASTY?**

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**Background:** The aim of this retrospective consecutive study was to evaluate the feasibility, safety and efficacy of laparoscopic conversion of adjustable band gastroplasty (ABG) and vertical banded gastroplasty (VBG) into duodenal switch (DS).

**Methods:** Between November 2003 and February 2007, laparoscopic conversion into DS was performed in one-step in 43 patients, 31 after ABG and 12 after VBG. Reason of conversion after ABG was weight regain (6) and insufficient %EWL (25); after VBG weight regain (9) and insufficient %EWL (3). Mean interval time between ABG, VBG and conversion into DS was 42.5+/−28.9 months and 172.2+/−86.9 months respectively. Mean %EWL at the time of the conversion was 9.4+/−21.3% after ABG and 20.8+/−30% after VBG.

**Results:** Mean operative time was 205.8+/−44.8 minutes (ABG) and 210.9+/−53.7 minutes (VBG). There were no conversions into open surgery. Operative mortality was 1 patient in both groups (sudden death; sleeve gastrectomy leak). Major complications occurred in 6.4% of the patients with ABG (1 hemoperitoneum, 1 jejunooileostomy leak), and in 50% of the patients with VBG (1 sleeve gastrectomy leak, 4 duodenoileostomy leaks, 1 pancreatitis, 1 respiratory insufficiency). Mean hospital stay was 5.5+/−5 days (ABG) and 34.5+/−50.3 days (VBG). 28 patients after ABG and 8 patients after VBG were followed-up for a mean time of 26.6+/−15.2 months and 43.5+/−6 months respectively. Mean %EWL was: after ABG 79.6+/−23.7%, after VBG 85.1+/−20%. Reoperation for late complication was required in 6 patients (ABG) and in 4 patients (VBG). Two patients died within 8 months after redo for VBG.

**Conclusion:** According to these results, laparoscopic conversion of ABG into DS seems feasible and efficient; in our hands conversion of VBG into DS seems to be associated with major complications and even death.

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**PL-315.**
DOES THE SECOND PROCEDURE IN STAGED BARIATRIC SURGERY CAUSE SIGNIFICANT WEIGHT LOSS AND COMORBIDITY REDUCTION?

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Background: Given the fragile health of super morbidly obese patients, bariatric surgeons often advocate a lower risk first-stage operation which leads to enough weight loss to support a more major second-stage operation such as a roux-en-y gastric bypass (GBP). In this study, we evaluate if second-stage surgery leads to increased weight loss and further reduction in comorbidities in patients who have had first-stage sleeve gastrectomy (SG) or jejunal–ileal bypass (JI) procedure.

Methods: We retrospectively reviewed records of patients undergoing two-stage surgeries for weight loss from January 1997 to 2007. We noted the change in BMI, %EBWL after each stage.

Results: We identified 10 patients (7 female, 3 male), mean age 44.2 years, mean preoperative BMI 66.2 (range 51-81), who underwent a second-stage surgery at mean 10.3 months (range 6-13). The first-stage consisted of 5 SG and 5 JI. The two groups were well matched in age and mean BMI preoperatively. SG had a mean 35.8%EBWL and a 40% reduction in comorbidities compared to JI which had 43%EBWL and a 46% reduction in comorbidities. After the second-stage GBP there was a significant decrease in BMI (p=0.003), additional %EBWL (p=0.05), and % of comorbidities resolved (p=0.045). Although there was no difference detected after the first-stage, patients who had JI ended up with a significant (p=0.038) greater %EBWL after GBP (62.6 vs. 46.6).

Conclusion: Second-stage surgery causes significant reduction of co-morbidities and weight loss in bariatric patients and should be performed when indicated.

PL-317.

IS SMALL BOWEL OBSTRUCTION AFTER ANTECOLIC AND ANTEGASTRIC LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS (LRYGBP) A PREVENTABLE COMPLICATION

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Background: Small bowel obstruction (SBO) after LRYGBP may be related to surgical fine points. Aim: To analyze the frequency and characteristics of postoperative SBO in 2 cohorts of patients who underwent LRYGBP using different techniques.

Methods: In a 4-year period, 359 patients underwent LRYGBP as an initial procedure at our clinic. Patients were divided into 2 groups. In group 1 (n=187) the mesenterium of the jejunum was widely opened, the mesenteric defect was closed and the Petersen space was not sutured. In
group 2 (n=172) the mesenterium was not divided and both, the mesenteric folds and the Petersen space were closed. Episodes of SBO, etiology, treatment and outcome were comparatively analyzed.

**Results:** There were 141 males and 218 females with a mean age of 41±11 years. Preoperative BMI was 43.2±7 Kg/m2. In Group 1, 29/187 patients (15.5%) developed SBO in a mean follow-up of 15±6.4 months. In group 2, 1/172 (0.5%) developed SBO 8 months after surgery. Mean EBWL at the time of obstruction was 82.2±22.7%. Internal hernia was responsible for the obstruction in 28 patients (18 through the mesenteric defect and 10 through the Petersen space). Obstruction was successfully resolved by laparoscopy in 26 patients. Conversion was necessary in 3 and 1 was treated by open surgery. One patient presented intestinal perforation after revision.

**Conclusion:** Surgical details such as leaving the mesenterium unopened and closing of all created defects significantly decrease the incidence of small bowel obstruction due to internal hernias in antecolic and antegastric LRYGBP.