Pre-operative coronary revascularisation before non-cardiac surgery: think long and hard before making a pre-operative referral

Many of us use the ‘American College of Cardiology/American Heart Association (ACC/AHA) 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery’, to inform our practice [1]. These guidelines are downloadable free from http://circ.ahajournals.org and propose that there are no clear cut indications for coronary revascularisation before non-cardiac surgery. Coronary revascularisation may be useful in patients in whom it would be indicated in the absence of surgery; for example those with stable angina and left main stem disease, stable angina and triple vessel disease (particularly if the left ventricular ejection fraction is < 50%), unstable angina and/or acute ST-elevation myocardial infarction (MI). However, in most cases, coincidental findings suggesting asymptomatic coronary artery disease are probably best left alone.

In this edition of *Anaesthesia*, Biccard and colleague [2] have systematically reviewed randomised controlled trials of pre-operative coronary revascularisation for vascular surgery and conclude that there is no advantage with pre-emptive revascularisation and there may be complications. *Anesthesia & Analgesia* 1992; 74: 181–8.


considerable harm, as pre-operative angioplasty was associated with increased 30 day MI and composite death and MI. Their methodology identified 235 papers which filtered down to just two that met their inclusion criteria. Only prospective randomised trials of pre-operative coronary revascularisation that reported mortality and non-fatal MI in patients undergoing vascular surgery were included. The two trials meta-analysed were the Coromary Artery Revascularisation Prophylaxis Study (CARP) and the more recently published Dutch Echocardiographic Cardiac Risk Evaluation Applying Stress Echo (DECREASE-V). Between the two trials a total of 7739 high cardiac risk patients were screened, from which 621 were randomised to receive pre-operative revascularisation, or not. So what does this systematic review add to the existing literature? Well, CARP and DECREASE-V considered ‘coronary revascularisation’ by coronary artery bypass grafting (CABG) or percutaneous coronary interventions (angioplasty). The meta-analysis performed by Biccard and colleague analyses the effects of the two interventions independently. The results support the findings of other studies that suggest that angioplasty in the lead up to elective surgery may increase mortality but also suggest that ‘CABG may improve long term outcomes in vascular surgical patients. The indications for and timing of CABG in vascular surgical patients needs further research.’ Such a comment is a timely reminder that one of the main purposes of systematic reviews and meta-analyses is to generate questions not answers.

To better understand the lack of an obvious benefit from pre-operative revascularisation it helps to review the big picture. In the majority of patients undergoing elective non-cardiac surgery cardiac ischaemia resulting in death or prolongation of hospital stay is a relatively uncommon post-operative morbidity event [3]. However, post-operative morbidity and mortality is very commonly associated with pre-existing cardiac failure manifest as exercise intolerance or poor functional capacity. Studies have shown that although there is some relationship between the location of severe coronary stenoses and the location of postoperative MI, coronary thrombosis occurs commonly at the site of milder stenoses [4, 5]. Therefore, pre-emptive revascularisation may not fix the problem and brings with it both delay and its own risks including, in particular, the complexities of care surrounding anti-coagulant medication. Working from first principles, it is not surprising that angioplasty close to the time of surgery is associated with a worse outcome than CABG, as the anti-coagulant ‘tug of war’ tends to favour the surgery and therefore sets up the new stent for ‘elective thrombosis’. Many stents have been deployed pre-operatively to open up a lesion that was probably not going to be the one to have caused a problem which is, in itself, rare. So beware the cardiology referral prompted by pre-operative assessment that may expose patients to the unnecessary risks associated with ‘stentomania’.

The increased use of Cardiopulmonary Exercise Testing (CPX) provides an objective measure of fitness for surgery. It has allowed many of us to see clearly and understand better the different risks to the patient undergoing major non-cardiac surgery associated with cardiac failure as a result of myocardial ischaemia, as distinct from myocardial ischaemia perse. As reported by Older et al. [6] in one of his original published series of patients undergoing major intra-cavity surgery, a low Anaerobic Threshold with early ST segment depression during a CPX test was associated with a mortality rate of 42%, whereas patients without cardiac failure and late ST segment changes in exercise testing had no significant increase in post-operative mortality (4%) when compared to patients with no ischaemic changes.

What can we take away from this opportunity to reconsider the selection of patients for referral for possible coronary revascularisation prior to non-cardiac, non-vascular surgery? If you are currently guided by the ACC/AHA 2007 guidelines there is no need to change your practice [1]. At my institution, we have found that local guidelines agreed by surgeons, anaesthetists, intensivists and cardiologists can further help to smooth the patient pathway. Broadly, if pre-operative evaluation reveals possible coronary artery disease then patients booked for elective surgery should be referred to a cardiologist as subsequent evaluation and intervention may improve outcome (if the criteria outlined in paragraph one are met i.e. intervention would be indicated in the absence of surgery). I now warn patients that, if the cardiologist finds that they need extra treatments to help their heart, their surgery may be delayed by up to a year (i.e. the longer interval suggested between placement of a drug eluting stent and elective surgery). The majority will be able to have their elective surgery much earlier than this and they are pleased. A tiny minority that does end up with a 12-month postponement have hopefully had their expectations better managed. Conversely, patients booked for scheduled surgery for cancer, with a very few exceptions (e.g. unstable angina), are unlikely to benefit from pre-operative revascularisation and, in my opinion, surgery should not be delayed. The discovery of possible coronary artery disease in these patients should influence informed consent, their peri-operative care pathway and the members of the post-operative multi-disciplinary team. Ideally, a cardiologist should agree pre-operatively to be closely involved in the patient’s post-operative care.

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References


