Off-pump coronary artery bypass grafting in patients with left main disease: is it really safe?

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Off-pump coronary artery bypass grafting (OPCABG) in patients with left main disease (LMD). However, although they address in their introduction the fact that patients with LMD are at higher risk of having calcified ascending aortas (AAs), they do not discuss this issue any further.

In the October 2009 issue of your journal, Thomas et al. [1] report the safety of off-pump coronary artery bypass grafting (OPCABG) in patients with left main disease (LMD). However, although they address in their introduction the fact that patients with LMD are at higher risk of having calcified ascending aortas (AAs), they do not discuss this issue any further.

We recently had a case of a 55-year-old woman presenting for 50% LMD, normal left ventricular function, a calcified AA and aortic root as well as bilateral asymptomatic 60% carotid artery stenosis. To avoid cerebrovascular accidents, it was decided to perform OPCABG. However, prior to performing any distal anastomosis, and while displacing the heart to examine the OM artery, the heart very quickly suffered from severe ischaemia, and intractable ventricular fibrillation followed, which led us to a dramatic and prompt conversion to cardiopulmonary bypass under manual massage, using the small middle anterior aspect of the AA (the only disease free site) as an arterial cannulation site. The procedure was then done on a beating heart, avoiding aortic cross-clamping. Arteriotomies of the left anterior descending and OM arteries showed the absence of any antegrade blood flow, which confirmed the occlusion of the left main. The reason for that occlusion was most probably due to the rupture and displacement of an aortic root plaque extending into the left main. Fortunately, the patient was weaned easily from bypass, without inotropic support. No neurological deficit or other complications ensued and the recovery was uneventful.

Although numerous encouraging studies showed the safety of OPCABG in patients with LMD and calcified AA [1–3], this experience indicated that this may not always be the case. Patients with LMD are more prone to having calcified AA and aortic root. We therefore think that in patients with LMD, prior to deciding on performing OPCABG, preoperative thorough assessment of the AA by a computed tomography (CT) scan is very helpful in determining the adequate operative strategy and potential arterial cannulation site (axillary artery or other peripheral arterial site). Should the aortic root be extremely calcified, cardiopulmonary bypass is necessary to avoid dramatic intra-operative haemodynamic instability. The revascularisation could be performed on a beating heart under cardiopulmonary bypass, with no aortic cross-clamping. The choice of total arterial revascularisation or choosing a peripheral arterial site for proximal saphenous grafting should be adapted to each individual case with an aortic ’no-touch‘ strategy in mind [3].

References


Reply to Ziad Khabbaz

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We thank Ziad Khabbaz for his interest in our article [1]. Although many authors favour off-pump coronary artery bypass (OPCAB) in left main disease (LMD), their studies
showed a rate of up to 6.7% conversion to on-pump surgery [2,4]. However, this rate is similar to OPCAB without LMD [2,5]. The patient mentioned in his report is one example, and we also had one case that converted to on-pump coronary artery bypass grafting (CABG). Furthermore, the mode of decompensation of this patient is based on an assumption that may be questionable. The ischaemia resulting in this situation may not be embolus-related and may be aggravated by an otherwise ischaemia or a mitral valve regurgitation. This spiral is not necessarily triggered by a ruptured plaque. If so, how did the authors locate the optimal site of anastomosis? Was there any trans-oesophageal echocardiogram (TEE) done on the table? Was there a regional or global left ventricular (LV) dysfunction? How was the pattern of ST changes?

Displacement of plaques is not the only cause of haemodynamic instability and ventricular fibrillation (VF) during OPCAB with LMD. Extensive manipulation of the heart, especially when the circumflex territory is addressed, often exposes it to critical ischaemia by kinking of left main stem, decapsulation of LV or it can worsen an already valvular incompetence, ultimately leading to VF. In our institution, in case of critical LMD, the left anterior descending (LAD) artery will be bypassed first, then right coronary artery (RCA), because they require less manipulation whilst providing sufficient coronary perfusion. Some surgeons prefer pre-conditioning of the heart.

Calcification and sites of cannulation in aorta and femoral artery are routinely investigated by preoperative ultrasound in our institution. We think that the combination of transthoracic echocardiogram (TTE), intra-operative TEE, and meticulous examination of the ascending aorta (AA) by surgeons is sufficient to locate the calcification and take a decision. Computed tomography (CT), which has never occurred in our cohort, is rarely used in our institution in this circumstance. Unless the patient has extremely calcified porcine ascending aorta, CT might not be superior whilst it actually increases the costs for patient.

Calcified AA can be addressed by various techniques. HEARTSTRING device [3], no-touch or anaortic technique [5], T or Y graft and total arterial revascularisation are available options in our centre. We have never encountered difficulty with severely calcified AA and LMD and would not consider it as the contraindication of OPCAB. However, the surgeons must always be ready for conversion to on-pump, as the chance is similar to OPCAB without LMD. In our practice, the site of cannulation at AA or groin, wherever suitable, will be prepared or exposed, so conversion to on-pump will not take a long time, when necessary. In case of severely calcified AA, it is necessary to prepare for femoral cannulation. However, on-pump beating heart cases were not included in our study.

Although the mobilisation of plaques has never happened to our patient, yet we agree that this is a considerable risk one should be aware of. However, it might be minimised by careful planning of the procedure and manipulation of the heart. The necessity of on-pump CABG in LMD with calcified AA needs to be answered by a separate study. In our experience, OPCAB is still safe and efficient for LMD and calcified AA.

The most significant conclusion from our study is that OPCAB in a patient with LMD is as safe as OPCAB in a patient without LMD, given that the surgeons are qualified enough. Comparing the benefit of OPCAB to potentially adverse effects of on-pump CABG and considering their similar safety, we think that surgeons should be encouraged to use OPCAB in patients with LMD, graft in the appropriate sequence and prepare for plan B.

References


Letter to the Editor

Surgical pericardioscopy with rigid endoscope: a risky technique for an incomplete result

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We read with interest the article written by Rylski and colleagues about a new minimally invasive surgical technique for treatment of delayed cardiac tamponade after open heart surgery [1]. Indeed, the conventional technique in these cases, especially if clots are present, remains re-sternotomy to obtain complete removal of clots, satisfactory pericardial exploration after clamping and, eventually, surgical repair of a bleeding site. However, re-sternotomy needs longer hospital stay and carries a risk of mediastinitis, and some surgeons may prefer subxiphoid approach with the drawbacks of incomplete exploration of pericardium and clot removal. The improvement of this approach by optical guidance with an endoscope, called surgical pericardioscopy, may combine theoretically the two advantages of complete pericardial...