Case conferences from the Royal Brompton Hospital: a focus on myocardial ischaemia

JESSICA WILSON, PAUL BHAMRA-ARIZA

This is the first in a regular series of 'Case Conferences' dealing with 'difficult' angina, or patients who present with challenging myocardial ischaemia (even in the absence of symptoms). Decisions are not always either 'right' or 'wrong' in such cases and the purpose is to aim for consensus on an appropriate management strategy. These cases are designed to be interactive and we encourage comments from our readers. We hope that you find these cases interesting and informative and that you join in the debate.

Multidisciplinary team present

- Consultant Cardiologists: *Professor K Fox, Dr P Oldershaw, Dr K Barakat, Dr J Collinson*
- Interventionalist: *Professor C Di Mario*
- Consultant Cardiothoracic Surgeons: *Mr M Petrou, Mr A De Souza*
- Consultants in Imaging: *Professor SR Underwood, Dr V Naidoo, Dr S Prasad*
- Consultant in Pain Management: *Dr G Towlerton*
- Clinical Nurse Specialist: *Christine Wright*

Case conference

RB is a 56-year-old man who underwent coronary artery bypass grafting in 1994 because of ongoing angina following an inferior myocardial infarction two months earlier. Surgery with a left internal mammary graft to the left anterior descending artery and saphenous vein grafts to the diagonal, circumflex and right coronary arteries provided good symptomatic relief following an uneventful post-operative recovery. His resting electrocardiogram (ECG) post-surgery showed infero-lateral ST depression. He has a family history of cardiovascular heart disease and has been prescribed a statin since 1994.

Since his operation he has been asymptomatic. His first exercise tolerance test was performed five years post-surgery and he reached his maximum heart rate with no symptoms. His stress electrocardiogram revealed worsening of the ST depression infero-laterally. Subsequent exercise tests have shown partial left bundle branch block. He was referred for myocardial perfusion scintigraphy (MPS) and an echocardiogram.

MPS (figures 1 and 2) showed that full thickness basal infero-lateral infarction with partial thickness infarction of the apical infero-lateral region. There was peri-infarct inducible ischaemia of the apical infero-lateral region and an extensive separate area of inducible ischaemia that was moderate in the antero-septal region and the apex and milder in the remainder of the septum. Overall, the inducible ischaemia involved the majority of the remaining viable myocardium and spared only the antero-lateral

Royal Brompton Hospital, Sydney Street, London, SW3 6NP.
Jessica Wilson, Senior House Officer
Paul Bhamra-Ariza, Registrar
Correspondence to: Professor K Fox
(email: k.fox@rbht.nhs.uk)
Br J Cardiol 2006;**13**:364–6

Figure 1. Stress and rest thallium-201 myocardial perfusion tomograms in short axis (SA) and vertical (VLA) and horizontal long-axis (HLA) planes. There is extensive infero-lateral infarction with superimposed ischaemia in the apical part of the infarct, and a separate area of inducible ischaemia in the septum and apex. Figure 2 has further details of interpretation

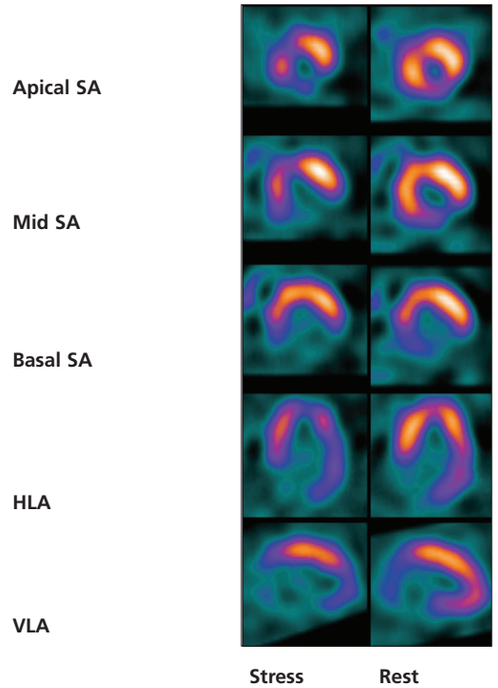
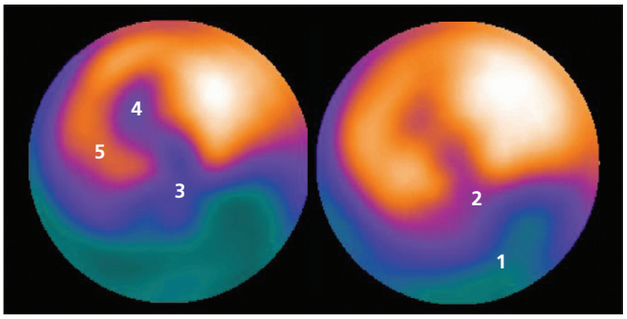
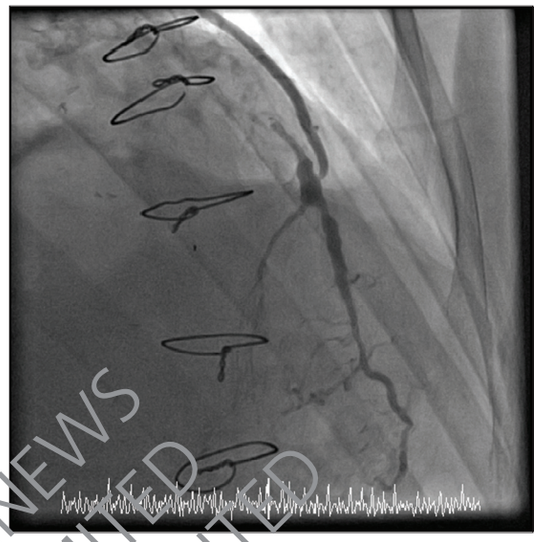


Figure 2. Polar plots from stress and thallium-201 myocardial perfusion scintigraphy. The apex is in the centre, the basal myocardium around the circumference, the anterior wall is at 12 o'clock, the lateral wall is at 3 o'clock, the inferior wall is at 6 o'clock and the septum at 9 o'clock. There is full thickness basal infero-lateral infarction (1), partial thickness apical infero-lateral infarction (2), peri-infarct ischaemia (3), moderate antero-septal and apical ischaemia (4) and milder ischaemia of the remainder of the septum (5)



Stress Rest

Figure 3. Angiogram showing stenosis at the point of insertion into the LAD territory



region. The echocardiogram confirmed impaired left ventricular function with normal left ventricular cavity dimensions. The lateral wall, inferior wall and basal intraventricular septum were noted to be hypokinetic.

An angiogram was requested to assess the patency of his grafts and he was prescribed clopidogrel in case the procedure proceeded to angioplasty. He developed an anaphylactic reaction to clopidogrel and was treated with adrenaline, antihistamines and bronchodilators. Two days later he underwent angiography with ticlodipine cover, which revealed a completely occluded right coronary artery, diffusely diseased left anterior descending coronary artery proximally and a severe lesion in the proximal circumflex artery. There was retrograde flow from the left to the right coronary artery via collaterals. The vein grafts to the right coronary and diagonal branch of left anterior descending coronary arteries were occluded. The graft to the circumflex coronary artery was patent and the left internal mammary artery branch to LAD was patent but with stenosis at the point of insertion into the LAD territory (figure 3).

Multidisciplinary discussion

The case was presented at the Royal Brompton Hospital Multidisciplinary Angina Meeting to discuss the preferred management strategy. Three potential options were suggested: surgical revascularisation, percutaneous coronary intervention (PCI) to the left internal mammary artery (LIMA) using ticlodipine or medical management. Surgery was ruled out as the patient already had a mammary graft and it was felt that the risk/benefit ratio in an asymptomatic man was not acceptable. PCI was the preferred option as it was felt that the patient evidently had silent ischaemia and the extent of ischaemia in relation to the remaining viable myocardium was large. Progress of the lesion in the LIMA was considered likely and would place the patient at increased risk.

This case illustrates the difficulty of managing asymptomatic post-operative patients with occluded grafts and, in particular, a stenosed graft involving the left anterior descending artery (LAD) and subtending a large amount of viable myocardium. The long-term effectiveness of coronary artery bypass surgery (CABG) is limited by the progression of disease in both native vessels and graft stenoses, with approximately 50% being occluded within 10 years[1] although the outcome of CABG has been substantially improved by the use of arterial grafts, in particular the LIMA to the LAD. Chest pain and exercise testing have traditionally been used for screening but MPS is superior in detecting progression of prognostically important disease in symptomatic and asymptomatic patients after coronary artery bypass graft surgery.[2] Painless ischaemia has a similar prognostic importance as painful ischaemia and surgical revascularisation improves outcome in both cases.[3] In contrast, the prognostic benefit of PCI in patients with painful ischaemia is less clear and its benefit in silent ischaemia is unknown. MPS may be used to detect silent progression of prognostically important disease[4] in symptomatic and asymptomatic patients more than five years after bypass surgery.

Comment

Patients such as this are difficult to manage in that there is no evidence, or even clinical experience to guide us as to what approach will provide the best outcome for this patient. Few would offer this patient repeat CABG but many may consider a

medical approach rather than PCI. We also have the problem of antiplatelet therapy since the patient is allergic to clopidogrel and would require ticlopidine. Prolonged use of ticlopidine has risks, particularly a low but definite incidence of agranulocytosis and we will therefore have to decide between using a bare metal stent with four weeks ticlopidine and a drug-eluting stent with either four weeks' or 12 months' ticlopidine.

- **Please write to us with your comments and we will try and publish a balanced view of your thoughts.**

References

1. Dahan M, Viron BM, Faraggi M *et al*. Diagnostic accuracy and prognostic value of combined dipyridamole exercise thallium imaging in haemodialysis patients. *Kidney Int* 1998;**54**:255-62.
2. Lauer MS, Lytle BM, Pashkow F, Snader CE, Marwick TH. Prediction of death and myocardial infarction by screening with exercise thallium testing after coronary artery bypass grafting. *Lancet* 1998;**351**:615-22.
3. Hecht HS, Shaw RE, Chin HL, Ryan C, Stertzer SH, Myler RKl. Silent ischaemia after coronary angioplasty: evaluation of restenosis and extent of ischaemia in asymptomatic patients by tomographic thaliium-201 exercise imaging and comparison with symptomatic patients. *J Am Coll Cardiol* 1991;**17**:670-7.
4. Nallamothu N, Johnson JH, Bagheri B, Heo J, Iskandrian AE. Utility of stress single photon emission computerized tomography (SPECT) perfusion imaging in predicting outcome after coronary artery bypass grafting. *Am J Cardiol* 1997;**80**:1515-21.