

Brief communication

Simple method for monitoring hand perfusion following radial artery harvest for coronary artery bypass grafting

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Abstract

The ever increasing use of the radial artery (RA) as a coronary bypass conduit raises concerns regarding potential local complications following RA harvest in particular hand ischaemia. Transcutaneous pulse oximetry provides a simple non-invasive objective assessment of collateral ulnar blood flow thus providing adequate continuous monitoring of hand perfusion in the early post-operative phase following RA procurement. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Radial artery harvest; Pulse oximetry; Hand perfusion

1. Background

The radial artery (RA) is being increasingly used as the conduit of choice after the internal mammary artery for myocardial revascularization surgery. Hence, concerns regarding potential 'donor' forearm complications following RA harvest including infection, neurologic dysfunction and in particular hand ischaemia, are appropriate.

A simple non-invasive method for monitoring hand perfusion in the immediate post-operative period (48 h) following harvest of the RA as a conduit for coronary artery bypass grafting (CABG) is described. Bedside transcutaneous pulse oximetry provides an objective assessment of collateral ulnar artery blood supply and provides adequate continuous monitoring of hand perfusion.

2. Technique

In the immediate post-operative period following CABG, the patient is nursed and monitored in a cardiac surgical intensive care unit. The application of a pulse oximeter probe (Nellcor Pulse Oximeter, Puritan Bennett Inc. NPB-295 Pleasanton CA 94588, USA) on the radial side of the hand (thumb or index finger) from which the RA was

harvested will provide an immediate objective assessment of adequacy of blood flow to that hand. This is evidenced by the arterial oxygen saturation recording and arterial pressure trace waveform, which can be easily compared with tracings obtained from the contra lateral hand.

3. Discussion

This technique provides a simple, quick, cheap, non-invasive and yet objective means of continuous monitoring of potential ischaemic complications of the forearm from which the RA was harvested. Arterial flow waveforms derived from pulse oximetry have been shown to closely correlate with arterial Doppler waveforms [1] suggesting the former is a reliable method of assessing adequacy of palmar circulation. In conjunction with clinical neurovascular assessment of the operated hand including assessment of digital capillarisation, a useful indicator of malperfusion states, this method may obviate the need for more extensive investigations. Limitations of this technique include poor overall oxygenation and inadequate central perfusing pressures resulting in falsely low tracings peripherally.

Pulse oximetry can also be utilized intra-operatively to evaluate adequacy of collateral flow in patients with an equivocal or critical Allens test. An incision made overlying the distal (wrist) end of the RA where the vessel lies superficially would facilitate clamping the artery and visualizing the effect of this with pulse oximetry tracings. A subsequent objective decision whether to proceed with harvest of the RA can then be made.

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References

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Appendix A. ICVTS on-line discussion

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Message: We believe that adequate preoperative assessment of the radial artery can prevent unexpected intra- and postoperative problems regarding the state of perfusion in the hand. It is convenient both for the patient to avoid soreness in the forearm and for the surgeon to have an alternative graft material decided if there are any preoperative signs of hand malperfusion. Therefore, Allens test in addition to, in doubtful cases, assessment of the arterial oxygen saturation with pulse oximeter preoperatively could be very useful indicators of the malperfusion state in the hand.