

# Thoracic epidurals for on-pump cardiac surgery: a good or bad idea?

**T**horacic epidural anaesthesia (TEA) is not widely used in patients undergoing on-pump cardiac surgery. The main concern is the risk of neuraxial haematoma and spinal cord injury associated with epidural instrumentation and subsequent anticoagulation for cardiopulmonary bypass (CPB). Cardiac patients are often on aspirin and other antiplatelet agents which may further increase this risk.

Although rare, permanent neurological injury is a potentially devastating complication and thus the possible benefits of TEA need to be balanced against this.

## A good idea

TEA causes sympatholysis and thus improves myocardial metabolic supply and demand dynamics. It also increases the diameter of stenotic epicardial artery segments and unstable angina has been successfully treated with this technique.

In 2001, Scott et al conducted the first prospective randomized controlled trial (RCT) on the use of epidurals in cardiac surgery, in which 420 patients were randomized to receive general anaesthesia or general anaesthesia plus TEA. The TEA group had a decreased incidence of supraventricular arrhythmias, respiratory tract infection, postoperative confusion and acute renal failure.

Superior pain control with TEA compared with intravenous narcotics is the most documented benefit, with ancillary advantages such as improved physiotherapy cooperation.

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## A bad idea

Despite the perceived theoretical benefits, an RCT by Lundstrom et al (2005) failed to show any significant improvement in the incidence of hypoxaemia during the first 72 hours postoperatively in patients receiving TEA as opposed to intravenous opiates. Another recent RCT showed that although TEA was associated with improved postoperative analgesia and earlier extubation, it had no effect on biochemical markers of postoperative myocardial injury (Barrington et al, 2005). No study has yet had sufficient power to show that TEA reduces mortality in patients undergoing cardiac surgery.

For most anaesthetists, the overriding fear of using TEA in this setting is the risk of vertebral canal haematoma causing paraplegia. A significant issue is that the incidence of this problem is unknown. Ho et al (2000) quoted a theoretical risk of between 1:1500 and 1:150 000. The first case of this complication was only reported in 2004, when Rosen et al described an 18-year-old male who received TEA for elective aortic valve replacement. On the second postoperative day he was anticoagulated with intravenous heparin for the prosthetic valve. On ambulating he developed back pain; the epidural catheter had blood in it and was removed. The patient subsequently developed motor and sensory loss. He underwent rapid surgical decompression within 5 hours of symptom onset and recovered fully. This case highlights the importance of prompt diagnosis and treatment; this would require local or possibly immediate access to a magnetic resonance imaging scanner and neurosurgical service and many cardiac centres would not fulfil this criterion.

Other unanswered safety questions regarding TEA in cardiac surgery include the time interval between epidural insertion and heparin administration for CPB. In some

studies epidural catheters were inserted the day before surgery, and in others TEA is instituted on the day of surgery at least 1 hour before heparinization. The appropriate response to a bloody tap is also uncertain; practice varies from immediately re-siting the epidural and continuing with surgery to postponing surgery for 24 hours.

## Conclusions

Despite the benefits of the use of TEA with cardiac surgery, the neurological risk remains poorly defined. Because the incidence of epidural haematoma is low, only a large multicentre trial can achieve the statistical power required to reveal the safety of this technique and any potential improvement in mortality. With favourable outcomes from conventional use of general anaesthesia and intravenous opiates, the use of TEA for on-pump cardiac surgery remains a dilemma for the anaesthetist. **BJHM**

- Barrington MJ, Kluger R, Watson R et al (2005) Epidural anaesthesia for coronary bypass surgery compared with general anaesthesia alone does not reduce biochemical markers of myocardial damage. *Anesth Analg* **100**(4): 921–8
- Ho AMH, Chung DC, Joynt GM (2000) Neuroaxial blockade and haematoma in cardiac surgery. *Chest* **117**: 551–5
- Lundstrom LH, Nygard E, Hviid LB et al (2005) The effect of thoracic epidural analgesia on the occurrence of late postoperative hypoxemia in patients undergoing elective coronary bypass surgery: a randomised controlled trial. *Chest* **128**(3): 1564–70
- Rosen D, Hawkinberry DW, Rosen KR et al (2004) An epidural haematoma in an adolescent patient after cardiac surgery. *Anaesth Analg* **98**: 966–9
- Scott NB, Turfey DJ, Ray DA et al (2001) A prospective randomised study of the potential benefits of thoracic epidural anaesthesia and analgesia in patients undergoing coronary bypass grafting. *Anaesth Analg* **93**: 528–35

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