The incidence of epidural abscess following epidural analgesia in open abdominal aortic aneurysm repair

DAVID WALLACE, ELIZABETH BRIGHT, NJM LONDON

Vascular Surgery Group, Leicester Royal Infirmary, Leicester, UK

ABSTRACT

INTRODUCTION Complications of epidural catheterisation can cause significant morbidity. Epidural abscess following epidural catheterisation is rare and the reported incidence is variable. The purpose of this study was to review the incidence of epidural abscess in patients undergoing open abdominal aortic aneurysm (AAA) repair.

PATIENTS AND METHODS A retrospective case note review of all patients having open AAA repair over a 5-year period.

RESULTS A total of 415 patients underwent open AAA repair between January 2003 and March 2008. Of these, 290 were elective procedures and 125 were for ruptured aneurysms. Six patients underwent postoperative magnetic resonance imaging of the spine for clinical suspicion of an epidural abscess. Two of these (0.48%) had confirmed epidural abscess and two superficial infection at the epidural site.

CONCLUSIONS The incidence of epidural abscess following epidural analgesia in patients undergoing open AAA repair within our department was 0.48%. Although a rare complication, epidural abscess can cause significant morbidity. Epidural abscesses rarely develop before the third postoperative day.

KEYWORDS

Epidural abscess – Epidural analgesia – Abdominal aortic aneurysm

CORRESPONDENCE TO

David Wallace, Vascular Surgery Group, Clinical Sciences Building, Leicester Royal Infirmary, Leicester LE2 7LX, UK
T: +44 (0)116 252 3252; F: +44 (0)116 252 3179; E: sms16@le.ac.uk

Since the 1980s, the epidural administration of local anaesthetic and opioid drugs (EAA) has been extensively used for postoperative pain relief following abdominal aortic aneurysm (AAA) repair.^{1,2} Research indicates that epidural analgesia, regardless of the analgesic agent and location of the catheter is superior to systemic opioid analgesia in high-risk surgical patients.^{1,2} However, the potential risks of EAA include meningitis, epidural haematoma and epidural abscess.^{1–8} The aim of this study was to determine the incidence in our department of epidural abscess following epidural catheterisation for postoperative pain relief in patients undergoing open AAA repair.

Patients and Methods

The hospital radiology computer database was reviewed in all patients undergoing open AAA repair within our department between January 2003 and March 2008. Those patients who were identified as having had postoperative magnetic resonance imaging (MRI) of the spine were further investigated by retrospective case note review.

Results

A total of 415 patients underwent open AAA repair between January 2003 and March 2008. Of these, 290 were elective procedures and 125 were for ruptured AAA. On review of the hospital radiology computer database for each patient, six had undergone MRI of the spine, following AAA repair, for clinical suspicion of an epidural abscess. Radiological confirmation of abscess was present in two of the six patients, with a further two having confirmation of superficial infection only. Erythema and purulent discharge of the epidural site were the main indication for further radiological investigation. One patient underwent MRI following back pain, significant postoperative motor blockade to the lower limbs and evidence of fresh blood at the epidural site. He was found to have spinal cord infarction and oedema at T11/12. The sixth patient had a normal MRI scan.

The two cases with confirmed epidural abscess presented at 5 and 7 days, respectively. Methicillin-resistant *Staphylococcus aureus* (MRSA) cultures were isolated in both patients; after neurosurgical consultation, both were treated with

intravenous antibiotics. MRSA was isolated from one of the patients with superficial infection and coagulase-negative *Staphylococcus* spp. was isolated from the other. Neurological deficit did not occur in any patient diagnosed with either epidural abscess or superficial epidural-site infection. All of the patients had been screened for MRSA prior to or on admission and found to be negative. No more than two attempts were required for initial insertion of epidural in any patient, but postoperative re-insertion was undertaken on ITU in the two patients who later developed an epidural abscess. The duration of epidural catheterisation was 3 and 4 days in the two patients with epidural abscess and 5 and 7 days in the two patients with superficial infection. At the time of the study, epidural catheters were inserted using full aseptic technique.

Discussion

Epidural analgesia and anaesthesia provide superior postoperative pain relief when compared to systemic opioids in patients undergoing AAA repair.² Not only has EAA shown proven benefit in reducing the incidence of cardiac events, renal insufficiency, gastrointestinal complications and acute respiratory failure,² it also significantly decreases the time to postoperative extubation and hence reduces prolonged mechanical ventilation.^{2,9}

It remains unclear whether EAA reduces postoperative morbidity and mortality.^{2,10} Recent advances in less invasive surgery, intensive care facilities and postoperative monitoring have all resulted in reduced mortality rates in high-risk surgical patients.¹⁰ Two large multicentre trials, the MASTER and Veterans Affairs (VA) trial, have failed to identify any overall reduction in mortality or major morbidity in individuals receiving intra- and postoperative epidural therapy compared to those on other anaesthetic and analgesic regimens.^{11,12} However, both the MASTER and the VA trial, in a small sub-group of 374 patients undergoing abdominal aortic repair, did identify that postoperative EAA significantly reduced the incidence of acute respiratory failure.^{11,12} In addition, the VA trial in the same subset of aortic repair patients, identified a significantly decreased incidence of life-threatening morbidity (myocardial infarction and stroke). Of importance, a recent Cochrane review of epidural analgesia in AAA patients has found EAA to offer a statistically significant superior analgesic effect up to 3 days' postoperatively.²

Epidural abscess after epidural catheterisation is rare.¹⁻⁸ We identified two cases of epidural abscess in 415 patients undergoing AAA repair, resulting in an abscess rate of 0.48%. A Danish study of epidural catheters inserted over a 1-year period found nine cases of epidural abscess in 17,372 patients, a rate of 0.05%,⁵ whilst no cases of epidural abscess were identified in a large Swedish study of 9232

patients.¹⁵ The reported frequency of epidural abscess ranges from under 0.0002% in larger studies¹⁴ to 3% in smaller cohorts.⁷

The two patients who developed an epidural abscess had their epidural catheters re-sited in the ITU. At the time of the study, it was uncommon for epidural catheters to be re-sited in ITU patients (once or twice a month in all ITU patients). Thus, although we do not have data concerning the number of epidural catheters re-sited in the 409 patients who did not have a postoperative MRI scan, it was certainly a very infrequent event.

The two patients who developed an epidural abscess in our study made a full recovery with no residual neurological deficit. Unfortunately, the prognosis is not always so encouraging. Persistent neurological deficit occurs in between 44–50% of cases resulting of epidural abscess^{1,5} with mortality reportedly as high as 18%.¹⁵ In a 1-year national survey, four of nine patients with epidural abscesses did not regain full neurological function.⁵

Whilst the superior analgesic efficacy of postoperative EAA for patients undergoing AAA repair is indisputable, the potential complications are significant. Epidural analgesia provides superior pain relief over systemic opioids up to 3 days' postoperatively² and the majority of documented cases of epidural abscess occur after at least 3 days of epidural catheterisation.^{1,5}

Conclusions

Following the results of this study, we have introduced the following policies in relation to epidural analgesia:

1. All epidural catheters are removed by the end of the third postoperative day.
2. Epidural catheters are not re-inserted postoperatively.
3. Epidural catheter sites are inspected on a daily basis.
4. We have agreed a policy with the radiology department and spinal surgeons for the rapid investigation and assessment of patients with infected epidural sites. In particular, this required agreement that these patients are candidates for 'out-of-hours' MRI scanning.

References

1. Wheatley RG, Schug SA, Watson D. Safety and efficacy of postoperative epidural analgesia. *Br J Anaesth* 2001; **87**: 47–61.
2. Nishimori M, Balantyne AC, Low JHS. Epidural pain relief versus systemic opioid-based pain relief for abdominal aortic surgery. *Cochrane Database Syst Rev* 2006; Issue 3.
3. Christie W, McCabe S. Major complications of epidural analgesia after surgery: results of a six-year survey. *Anaesthesia* 2000; **62**: 335–41.
4. Holt HM, Anderson SS, Anderson O, Gahrn-Hansen B, Siboni K. Infections fol-

- lowing epidural catheterization. *J Hosp Infect* 1995; **30**: 253–60.
5. Wang LP, Hauerberg J, Schmidt JF. Incidence of spinal epidural abscess after epidural analgesia; a national 1-year survey. *Anesthesiology* 1999; **91**: 1928–36.
 6. Phillips JMG, Stedeford JC, Hartsilver E, Roberts C. Epidural abscess complicating insertion of epidural catheters. *Br J Anaesth* 2002; **89**: 778–82.
 7. Strong WE. Epidural abscess associated with epidural catheterization: a rare event? Report of two cases with markedly delayed presentation. *Anesthesiology* 1991; **74**: 943–6.
 8. Okano K, Haruhiko K, Tsuchiya R, Naruke T, Sato M, Yokoyama R. Spinal epidural abscess associated with epidural catheterization: report of a case and a review of the literature. *Jpn J Clin Oncol* 1999; **29**: 49–52.
 9. Yeager MP, Glass DD, Neff RK, Brink-Johnson T. Epidural anaesthesia and analgesia in high-risk surgical patients. *Anesthesiology* 1987; **66**: 729–36.
 10. Buggy DJ, Smith G. Epidural anaesthesia and analgesia: better outcome after major surgery? *BMJ* 1999; **319**: 530–1.
 11. Rigg JRA, Jamrozik K, Myles PS, Silbert BS, Peyton PJ, Parsons RW *et al*. MASTER Anaesthesia Trial Study Group. Epidural anaesthesia and analgesia and outcome of major surgery; a randomised trial. *Lancet* 2002; **359**: 1276–82.
 12. Park WY, Thompson JS, Lee KK. Effect of epidural anaesthesia and analgesia on perioperative outcome: a randomised, controlled Veterans Affairs Cooperative Study. *Ann Surg* 2001; **234**: 560–71.
 13. Dahlgren N, Tornebrandt K. Neurological complications after anaesthesia: a follow-up of 18,000 spinal and epidural anaesthetics performed over three years. *Acta Anaesthesiol Scand* 1995; **39**: 872–80.
 14. Scott DB, Hibbard BM. Serious non fatal complications associated with epidural block in obstetric practice. *Br J Anaesth* 1990; **64**: 537–41.
 15. Ballantyne JC, McPeck B, Lau J. Does the evidence support the use of spinal and epidural anaesthesia for surgery? *J Clin Anaesth* 2005; **17**: 382–91.

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