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"I would have everie man write what he knowes and no more."–Montaigne

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Editorial I

Haematoma and abscess after epidural analgesia

The survey by Meikle and colleagues[1] published in this month's *British Journal of Anaesthesia* highlights the uncommon but catastrophic complication of epidural haematoma. Although the incidence of symptomatic epidural haematoma may appear small, amounting, they suggest, to one case every 2 yr in the UK, it appears that the use of epidural infusions is increasing, alongside an increase in prophylactic anticoagulation and low-dependency care of patients with indwelling epidural catheters.[2] The results of this survey indicate that the incidence of epidural haematoma may, in fact, be significantly higher than suggested by reported cases, and the ongoing national audit by the Royal College of Anaesthetists may give us a better indication of the true risk of this complication.

Similar catastrophic injury may result also from epidural abscess, which has been reported in one UK hospital to occur with a frequency of 1 in 800, when epidural catheters were inserted for postoperative pain management.[3] Our experience from forensic practice is that Meikle (and previous authors) underestimate the incidence of epidural haematoma considerably, but that the experience of Phillips and colleagues overestimates the risk of abscess nationally. The incidence of epidural haematoma and abscess probably varies in different patient populations; Scott and Hibbard[4] reported two haematomas and one abscess after 505 000 epidural blocks in obstetric practice. The incidence in higher risk patients is likely to be greater. For example, Ngan Kee and colleagues[5] reported a higher incidence after thoracic epidural analgesia and Okano and colleagues[6] noted 11 out of 30 patients with epidural abscesses had an underlying illness or were receiving steroid therapy.

Two of us (A.R.A. and J.G.H.) have encountered, in medicolegal practice, 11 cases of epidural haematoma in an 11 yr period (the events occurred between 1997 and 2007) and eight cases of epidural abscess in a 10 yr period (between 1995 and 2004). Failure to discontinue epidural infusions after the presentation of new neurological signs (especially leg weakness) and failure to recognize the urgency of diagnosis and surgery after suspicion of epidural haematoma appear frequently in such cases. In contrast to epidural haematomas, which usually present during the epidural infusion,[7] abscesses often present late and after the patient has left hospital,[3 8–10] but for those which present before discharge and for the large majority of epidural haematomas, our experience is that there is usually a significant delay before diagnosis because junior surgical trainees, inexperienced anaesthetists, or both wrongly attribute the onset of weakness and increasing numbness to the effects of the local anaesthetic. The infusion is usually continued for hours,[7] and sometimes for several days, before the opinion of an experienced anaesthetist is sought, resulting in permanent neurological damage. It is impossible to educate all trainee surgeons and nurses to recognize the significance of these clinical signs, and we agree that strict protocols offer the best solution to early diagnosis, investigation, and treatment.

Although reporting-bias affects the incidence calculated from reported cases, examination using closed-claim analysis has similar flaws. Closed-claim analysis allows a glimpse of cases that would usually not be reported. However, the technique must also underestimate the true incidence of complications because not all patients who suffer complications sue. Patients who decide to sue have usually suffered a significant and long-lasting injury, *and* have been able to secure funding for their claim. In addition, the true incidence of a complication which leads to litigation cannot be estimated accurately from the experience of two individuals. The number of other patients who have entered litigation proceedings in relation to epidural haematoma or abscess in the UK in the last 10–11 yr is unknown.

Another method of estimating the extent of damage caused by specific anaesthetic techniques is to consider the costs of claims handled by large insurance or indemnity organizations. Between April 1995 and October 2005, the Clinical Negligence Scheme for Trusts (CNST), which deals with litigation for all NHS hospitals in England, handled 251 claims associated with epidural blocks.[11]

The claims had a total value of £32 346 737 (an average of £128 871 each). There were lower incidences of brain damage and fatality in claims related to epidural block than in those associated with general anaesthesia. However, there were higher incidences of nerve damage, paraplegia, partial paralysis, spinal damage, and unnecessary pain. We have been unable to establish how many of these claims were related to delay in recognizing the symptoms and signs of epidural haematoma or abscess, but the size of the settlements suggests that the proportion of these 251 patients suffering debilitating neurological injury was not inconsiderable.

Meikle and colleagues[1] recommend that patients should receive neurological observations at least every 4 h and that these observations should continue for at least 24 h after removal of the epidural catheter. This recommendation seems valid in view of the previously reported cases of haematoma and abscess formation after catheter removal.[5 8 12] Every department should have readily available written guidelines regarding the use of neuraxial techniques in patients with potentially altered coagulation.[13] The authors also recommend the cessation of the epidural infusion after the presentation of new neurological signs, with suspicion of epidural haematoma if these signs do not resolve. The authors do not recommend a minimum time interval between the suspicion of haematoma or the cessation of the infusion and MRI scanning; we suggest that no more than 4 h should elapse between the onset of new neurological signs and MRI scanning, and this scan (and ideally, the patient) should be assessed by an expert. Should there be a delay in stopping the epidural infusion after the presentation of new signs, then MRI scanning may need to take place before the local anaesthetic effect of the epidural may be expected to resolve.

In hospitals without expertise to carry out surgical decompression, protocols and procedures need to be in place to ensure that patients are transferred to a unit where surgery can be performed within 12 h of the onset of weakness or increasing numbness to optimize the chance of recovery. In the absence of focal neurological signs, conservative management of epidural abscess may be successful[14–17] but frequently urgent surgical evacuation is required.[9 18–22]

Owing to the low incidence of epidural haematoma, we will never be in a position to introduce true, evidence-based practice. Even if studies of sufficient size are conducted, their relevance will be limited by constant evolution in practice. Thus, we are obliged to apply common-sense and learning to help our patients avoid a life-damaging event. The relative rarity of epidural haematoma and abscess means that expensive and laborious additions to current practice are not appropriate, but the simple measures suggested by Meikle and colleagues need not be expensive or laborious, and we wholly commend them to practising anaesthetists in the UK. It is likely that the introduction of strict protocols would minimize or prevent the development of permanent and disabling neurological injury in a considerably larger number of patients than they suggest.

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References

1 Meikle J, Bird S, Nightingale JJ, White N. Detection and management of epidural haematomas related to anaesthesia in the UK: a national survey of current practice. *Br J Anaesth* 2008; **101**: 400–4
2 Burstal R, Wegener F, Hayes C, Lantry G. Epidural analgesia: prospective audit of 1062 patients. *Anaesth Intensive Care* 1998; **26**: 165–72
3 Phillips JM, Stedeford JC, Hartsilver E, Roberts C. Epidural abscess complicating insertion of epidural catheters. *Br J Anaesth* 2002; **89**: 778–82
4 Scott DB, Hibbard BM. Serious non-fatal complications associated with extradural block in obstetric practice. *Br J Anaesth* 1990; **64**: 537–41
5 Ngan Kee WD, Jones MR, Thomas P, Worth RJ. Extradural abscess complicating extradural anaesthesia for Caesarean section. *Br J Anaesth* 1992; **69**: 647–52
6 Okano K, Kondo H, 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
7 Christie IW, McCabe S. Major complications of epidural analgesia after surgery: results of a six-year survey. *Anaesthesia* 2007; **62**: 335–41
8 Hearn M, Roberts C. Epidural abscess complicating insertion of epidural catheters. *Br J Anaesth* 2003; **90**: 706–7
9 Strong WE. Epidural abscess associated with epidural catheterization: a rare event? Report of two cases with markedly delayed presentation. *Anesthesiology* 1991; **74**: 943–6
10 Sowter MC, Burgess NA, Woodsford PV, Lewis MH. Delayed presentation of an extradural abscess complicating thoracic extradural analgesia. *Br J Anaesth* 1992; **68**: 103–5
11 Catchpole K, Bell D, Johnson S, Boult M. Reviewing the evidence of patient safety incidents in anaesthetics. Internal Report. The National Patient Safety Agency, 2006
12 Yin B, Barratt SM, Power I, Percy J. Epidural haematoma after removal of an epidural catheter in a patient receiving high-dose enoxaparin. *Br J Anaesth* 1999; **82**: 288–90
13 Prophylaxis of venous thromboembolism; spinals and epidurals. SIGN publication No 62, October 2002. ISBN 1899893 03 2. Available from http://www.sign.ac.uk/guidelines
14 Dysart RH, Balakrishnan V. Conservative management of extradural abscess complicating spinal-extradural anaesthesia for Caesarean section. *Br J Anaesth* 1997; **78**: 591–3

15 Leys D, Lesoin F, Viaud C, *et al*. Decreased morbidity from acute bacterial spinal epidural abscesses using computed tomography and nonsurgical treatment in selected patients. *Ann Neurol* 1985; **17**: 350–5
16 Hanigan WC, Asner NG, Elwood PW. Magnetic resonance imaging and the nonoperative treatment of spinal epidural abscess. *Surg Neurol* 1990; **34**: 408–13
17 Mampalam TJ, Rosegay H, Andrews BT, Rosenblum ML, Pitts LH. Nonoperative treatment of spinal epidural infections. *J Neurosurg* 1989; **71**: 208–10
18 Borum SE, McLeskey CH, Williamson JB, Harris FS, Knight AB. Epidural abscess after obstetric epidural analgesia. *Anesthesiology* 1995; **82**: 1523–6
19 Del Curling O, Jr, Gower DJ, McWhorter JM. Changing concepts in spinal epidural abscess: a report of 29 cases. *Neurosurgery* 1990; **27**: 185–92
20 Hlavin ML, Kaminski HJ, Ross JS, Ganz E. Spinal epidural abscess: a ten-year perspective. *Neurosurgery* 1990; **27**: 177–84
21 Lange M, Tiecks F, Schielke E, Yousry T, Haberl R, Oeckler R. Diagnosis and results of different treatment regimens in patients with spinal abscesses. *Acta Neurochir (Wien)* 1993; **125**: 105–14
22 Danner RL, Hartman BJ. Update on spinal epidural abscess: 35 cases and review of the literature. *Rev Infect Dis* 1987; **9**: 265–74

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Editorial II

NICE and warm

Inadvertent perioperative hypothermia, defined as core body temperature $\leq$36.0°C, is a common consequence of anaesthesia. Its adverse effects are well known to anaesthetists and include greater intraoperative blood loss and consequent blood transfusion.[1] After operation, inadvertent perioperative hypothermia can lead to an increased rate of wound infection,[2] morbid cardiac events,[3] and pressure sores,[4] and also a longer stay in both recovery and hospital.[5] These are apart from the subjective discomfort and wound pain which cold and shivering may cause the patient. Significantly, maintaining normothermia perioperatively can modify these adverse effects.

Despite this knowledge, implementation of warming strategies remains patchy. An audit in the hospital of one of the authors (C.M.H.) indicated that there is an incidence of inadvertent perioperative hypothermia in the region of 20% and that there is inconsistency in the methods of warming used. There are no active temperature management protocols and, as with anything that may cost money, there is resistance to more aggressive prevention of inadvertent perioperative hypothermia on economic grounds. In the USA, where there are guidelines,[6] compliance remains poor. It has been suggested that there are a number of factors contributing to this: a misguided belief that forced-air warming can increase the rates of infection,[7] surgeons' complaints of discomfort, inconsistent monitoring (hindered by the inconsistency between different thermometers and sites of measurement), and a simple lack of appreciation of the causes and consequences of inadvertent perioperative hypothermia.[8] Additionally, even where there are standards such as those of the American Society of Anesthesiologists (ASA),[9] they are criticized for being vague and giving flexibility at the expense of clear guidance.[8]

Recognizing the significance of inadvertent perioperative hypothermia and the deficiencies in current practice in the UK, the National Institute for Clinical Excellence (NICE) convened a guideline development group to address the issue. This culmination of the group's work came with the publication of the 'Management of inadvertent perioperative hypothermia in adults' guideline.[10]

The guidance is divided into the pre-, intra-, and postoperative phases. Before operation, the key recommendations are that a formal assessment of the risk of hypothermia should be undertaken for each patient and that patients themselves should be empowered by being given information that will help them minimize that risk. Another important element is that the temperature should be measured in the hour before surgery. Should it be $<$36.0°C, unless the operation is life or limb saving, active warming should be initiated until such time as the patient is normothermic.

Intraoperatively, the recommendations are that forced-air warming is commenced as early as possible, preferably in the anaesthetic room, for any patient having surgery with an anaesthetic time (i.e. from first anaesthetic intervention to arrival in recovery) of $>$30 min, or who has two or more risk factors for inadvertent perioperative hypothermia. I.V. fluids should be warmed when $>$500 ml is to be given.[11 12] These recommendations therefore encompass the majority of operations and infusions.

Monitoring is an integral part of perioperative thermal management and one that remains neglected.[13] The guide recommends that core temperature should be recorded at