Editorial

Analgesia Epidural: primero no dañar.

Epidural analgesia: first do no harm.

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The use of epidural analgesia in patients undergoing major abdominal gastrointestinal (GIT) surgery has become routine practice. Multiple, non-randomised, small trials comparing epidural analgesia to 'older' opioid analgesia regimens have produced results that shaped modern practice but are rarely appropriate for modern anaesthesia [1]. Well-structured, randomised controlled trials are few and far between and those that have been performed must be used to guide modern practice [2]. Perceived best practice, influenced by how good the patients look in recovery, is not supported by the evidence to date. Compounding this is a lack of good evidence to accurately assess the complication rate of epidurals [3]. The number needed to treat (NNT) and the number needed to harm (NNH) may be far closer than we think. There is a significant lack of evidence supporting the use of epidural analgesia and we question the routine use of this mode of analgesia in the postoperative period for patients having abdominal surgery. Decisions regarding the use of an epidural in any individual patient, and what we should and should not tell our patients, need to be framed from the best evidence available and not the most evidence available.

An epidural is usually inserted in patients undergoing major abdominal gastrointestinal surgery to provide intra-operative and postoperative pain relief. An effective epidural block is thought to attenuate the neuro-humoral stress response to surgery, potentially improving postoperative cardio-respiratory function and reducing complications [4]. Initial trials and meta-analyses seemed to support this theory [5]. A 1997 systematic review examining the effects of neuraxial blockade on outcome suggested reduced mortality and (serious) morbidity. Data from 141 randomised controlled trials demonstrated an impressive 30% reduction in mortality and a decrease in other major morbidity end-points such as thromboembolism and respiratory infection [6]. However, more recent evidence, and perhaps more critical appraisal of the earlier findings, casts doubt on these seemingly impressive benefits [7].

The multi-centre Australian study of epidural anaesthesia and analgesia in major surgery – the MASTER trial – is the largest multi-centre, non-blinded, randomised controlled trial that examines the use of epidural analgesia in high-risk patients having abdominal surgery [8]. It was conducted predominantly in Australian academic hospitals between 1995 and 2001. This study compared intra- and postoperative epidural analgesia with standard parenteral opioid techniques (control) in 888 high-risk patients undergoing major abdominal surgery. Based on an earlier study [9], it was powered to detect a 20% difference in mortality and morbidity. In stark contrast to previous investigations, the MASTER Trial found no overall significant difference in mortality or major

morbidity when comparing epidurals to control. Mortality at 30 days was low in both groups with a non-significant trend to an increase with epidural use (4.3% control vs 5.1% epidural). For the eight major postoperative morbidity end-points studied, only respiratory failure occurred less frequently in the epidural group (23.3% epidural vs 30.2% control; $p = 0.02$). From the results, it was calculated that 15 patients needed to have epidural management (the number needed to treat, NNT) to prevent one episode of respiratory failure, provided that all the epidurals work well! A recent review found a similar NNT (17) in high-risk patients undergoing abdominal aortic aneurysm surgery, although the 95% confidence limits are very wide (9.8–93.3) [10]. Considering that up to 50% of postoperative epidurals fail completely or give inadequate analgesia, this number will be considerably higher in UK practice [11]. Pain scores were statistically significantly better in the epidural group in the MASTER study but the clinical benefit of a 1-cm improvement in the visual analogue score (VAS) is debatable; in both groups pain scores were low. Similar variable results were also found in a Cochrane review of the use of epidural analgesia in abdominal aortic aneurysm surgery [10].

One area of misconception for anaesthetists involved in gastrointestinal surgery is the effect of epidural anaesthesia on splanchnic perfusion. The physiological effects of high sympathetic blockade and (reduced) systemic blood pressure are well known to anaesthetists and well documented. The consequences of the induced hypotension and the correct method with which to treat it are far less clear. Consideration and understanding of the haemodynamic consequences of epidural anaesthesia on splanchnic blood flow is of importance in the overall management of the patient. Epidural-induced hypotension is common with the high sympathetic blocks required to give adequate analgesia. At present, we have no way of telling which of these patients will tolerate hypotension and which will develop cardiovascular or anastomotic related complications. We could use a physiological pre-operative score or more elaborate cardiopulmonary exercise testing (CPX) in an attempt to risk-stratify these patients. However, there is currently no evidence that such tests allow accurate or useful screening of patients in terms of their ability to tolerate epidural analgesia and its side effects [12]. ‘Fit’ patients may have complicated bowel anastomoses and not tolerate epidural-induced hypotension and ‘sicker’ patients often tolerate them well. In 2002, Gould et al. published intriguing data regarding the effect of thoracic epidural anaesthesia on colonic blood flow and demonstrated that, once epidural block had been established, colonic serosal red cell flux and inferior mesenteric artery flow were more closely associated with changes in mean arterial pressure than with changes in cardiac output [13]. Conversely, volume replacement to relative normovolaemia and an improvement in cardiac output proved to be insufficient to restore normal splanchnic blood flow and the use of a vasopressor to increase arterial pressure was required before colonic blood flow improved. If the splanchnic and other vascular beds are more pressure dependent than we previously believed, then epidural analgesia has the real potential to produce harm. Two papers examining the use of epidural analgesia in colonic surgery found little benefit in terms of postoperative complications [14, 15]. However, there was a trend towards a higher incidence of anastomotic breakdown in the epidural group but

this was not statistically significant. This could be explained by the fact that these patients were nursed on general wards and systemic hypotension and hypovolaemia secondary to vasodilatation may not have been as aggressively managed.

Epidural-induced hypotension is a common phenomenon witnessed both peri-operatively and postoperatively in the recovery area and on the wards. Postoperative hypotension should probably be avoided, especially in high-risk patients [16]. Standard therapy for treating hypotension typically starts and ends with fluid loading. For patients managed in a standard ward setting, this is driven by necessity as the use of vasopressors is neither practical nor safe. This probably means, however, that GIT perfusion is compromised in certain patients, and the effect of this is difficult to quantify. In high-risk patients, it can be postulated that this factor in combination with other physiological variables is likely to have a significant impact on morbidity and mortality. Furthermore, excessive fluid loading, which may occur in an attempt to correct epidural-induced hypotension, has largely unknown effects on splanchnic blood flow and in particular supply and drainage of anastomotic regions [17]. The development of localised oedema may be exacerbated by excessive fluid replacement and thus may have a potential effect on anastomotic integrity. Concerningly, animal studies have demonstrated an increase in oedema formation in peri-resectional mesenteric tissue when comparing epidural to control, a factor that seems to be independent of differences in fluid administration [18]. Epidural analgesia has been shown to compromise microcirculation in free flap surgery and the dynamics of blood and tissue fluid flow in resected bowel may be similar [19]. Certainly within some vascular beds pressure rather than flow increasingly appears to be the main factor determining perfusion, substrate delivery and ultimately oxygen delivery.

The question of how best to manage epidural-induced hypotension is not straightforward and has implications on critical care resources. The cause of the hypotension is not (absolute) hypovolaemia but rather vasoparesis and, as such, it is both physiologically and clinically illogical to correct the hypotension using fluids alone. Some may argue that adequate fluid loading in theatre will attenuate the hypotension that can occur with epidurals in the postoperative period but we have little evidence to support this and fluid loading per se is not without risk. The importance of goal directed fluid management in colorectal surgery is increasingly recognised but these goals have not been based on fluid loading in the context of epidural-induced hypotension [20]. Excessive fluid administration may indeed increase morbidity and mortality. The audit commission has stated that the provision of epidural analgesia no longer requires HDU care [21]. However, for patients in whom GIT perfusion is critical, peri-operative management in a HDU setting may be beneficial by permitting the early use of vasopressor therapy. Furthermore, in considering the definition of level 2 critical care patients it is apparent that an epidural infusion complicated by hypotension meets this definition of what was traditionally termed ‘high dependency’ [22]. Currently, use of vasopressor therapy demands the presence of an arterial and central catheter. Many anaesthetists, quite reasonably, would not feel it necessary to site one or either of these invasive monitors in bowel resection patients. Therefore the risks associated with

invasive monitoring need to be weighed up against the risks of GIT hypoperfusion.

Considering the evidence to date, if epidural analgesia is chosen as the preferred analgesic modality for an individual patient undergoing major abdominal GIT surgery, then the risks and benefits need to be carefully and perhaps more realistically weighed up. Ensuring that we do no harm in producing a 'culture' which promotes epidural analgesia is essential, considering the lack of evidence to support a large therapeutic benefit. If we look critically at the available evidence, the generalised use of postoperative epidural analgesia in the majority of patients undergoing laparotomy has little benefit over standard opioid techniques and retains the potential to cause harm. In order to avoid one episode of respiratory failure, amongst patients with pre-existing respiratory disease, the NNT is 17; this information should be given to patients in a form they can understand. The MASTER study may have been a victim of its own success in that it is very difficult to show an improvement in outcome with such a low background mortality rate, but it did show that the control group had a very low mortality rate without the perceived benefits of epidural analgesia. We need to ensure that we focus on achieving low pain scores and not only on the method we are using to achieve it. If it is believed that epidural analgesia is important and evidence supports its use in selected groups, then every effort must be made to ensure that it provides effective dynamic analgesia 24 h a day, with the capacity to manage hypotension rapidly with vasoactive agents, in a safe environment. We do not believe that the literature or best practice allows anything less. This will have large resource implications.

As ever, putting an epidural in is rarely the problem – it is in determining what we do with it after it is sited that the problems start.

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