A systematic review of postoperative analgesia following laparoscopic colorectal surgery

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Abstract

Objective The use of epidural analgesia is considered fundamental in Enhanced Recovery Protocols. However its value in the perioperative management of laparoscopic colorectal surgical patients is unclear and analgesic regimens vary. The aim of this systematic review was to examine the effects of various analgesic regimens on outcomes following laparoscopic colectomy.

Method A systematic review of studies assessing analgesic regimes following laparoscopic colorectal resection was performed. The primary outcome of interest was length of hospital stay whilst the secondary outcomes included pain, time to tolerate a normal diet, return of bowel function and postoperative complications.

Results Eight studies were identified, five of which compared epidural vs patient controlled analgesia/intravenous morphine. There were no significant differences between the groups in terms of outcomes, except pain control which was superior in the epidural group. Spinal anaesthesia using intrathecal morphine in addition to local anaesthetic, and the use of nonsteroidal anti-inflammatory agents have also been shown to reduce postoperative pain.

Conclusion There is a paucity of data assessing the benefits of postoperative analgesic regimes following laparoscopic colorectal surgery and none of the protocols were shown to be clearly superior. Further studies, including the assessment of spinal analgesia are required to determine the most appropriate analgesic regime following laparoscopic colorectal surgery.

Keywords Laparoscopic, colorectal, analgesia, epidural, spinal, PCA

Introduction

Despite a slow initial uptake [1], there has recently been a substantial increase in the number of units performing laparoscopic colorectal surgery for benign and malignant conditions [2]. The optimal perioperative management of these patients, however, is not clearly established.

Enhanced Recovery Programmes (ERPs), which were initially developed in the context of open surgery, have been used without substantial modification for patients undergoing laparoscopic surgery [3,4]. One of the key elements of the ERP is the use of epidural analgesia [5]. Several studies have investigated the use of epidural analgesia in open surgery [6-11], and their results have been summarized in a recent meta-analysis which showed no significant difference in the length of hospital stay (LOS) but did show better postoperative pain control and a decrease in ileus in the patients managed with epidural anaesthesia [12]. The optimal postoperative analgesic method for patients undergoing laparoscopic colorectal surgery is not known and, as a consequence, this has led to various alternative analgesic methods being employed. These have included epidural analgesia, patient controlled analgesia (PCA), intravenous agents and spinal anaesthesia.

Aim of this systematic review was to examine the current published evidence concerning the impact of differing perioperative analgesic regimens on the short-term outcomes following laparoscopic colorectal surgery.

Method

Study selection

Comparative studies reporting outcomes between different analgesic regimens following laparoscopic colorectal resections were identified from the electronic databases (Pubmed, Medline, the Cochrane Controlled Trials register published by the Cochrane Library, Embase and the Institute of Health and Life Sciences). The search was performed independently by two authors (BL & HT) using the following MeSH search terms: ‘analgesia laparoscopy/laparoscopic’, ‘epidural laparoscopy/laparoscopic’, ‘PCA laparoscopy/laparoscopic’, ‘analgesia laparoscopic colectomy’, ‘patient controlled anaesthesia’,...
‘spinal anaesthesia’, ‘analgesia colon’ and ‘analgesia randomized controlled trial laparoscopic’. These terms were applied in various combinations, together with use of the related articles function to maximize the search. No restriction of language of publication was made and additional articles were retrieved by manually searching reference lists in the identified articles. The most recent search was performed on the 23 September 2008.

**Inclusion criteria**

Studies were included if they reported randomized controlled trials, observational or cohort studies comparing outcomes following the use of different analgesic regimes in patients who had undergone elective laparoscopic colorectal resections for benign or malignant conditions.

**Exclusion criteria**

Studies were excluded from further analysis if the procedure was laparoscopically assisted with a hand port or if a laparotomy incision (including Pfannenstiel) was routinely used to complete the colonic mobilization, but not if incisions were made for specimen extraction and/or anastomosis.

**Outcomes of interest**

The primary outcome of interest was LOS. Secondary outcomes were pain, vomiting, time to tolerate a normal diet, return of bowel function, postoperative complications and re-admissions.

**Quality assessment**

The methodological quality of included RCTs was assessed using the Jadad score [13], giving an overall assessment based on adequate sequence generation, allocation concealment, blinding, addressing incomplete outcome data, selective reporting and other biases (see Table 1).

**Statistical analysis**

For studies comparing epidural vs PCA, heterogeneity in reporting between the studies precluded formal meta-analysis of the main outcome of interest (LOS). However, using data from randomized controlled studies only, a crude mean of the length of stay and the secondary outcomes for each analgesic regimen, weighted for the size of individual study populations, was calculated to allow overall comparisons to be made.

**Table 1** Quality assessment of included studies.

<table>
<thead>
<tr>
<th>Study</th>
<th>Type of study</th>
<th>Adequate sequence generation</th>
<th>Allocation concealment</th>
<th>Blinding</th>
<th>Incomplete outcome addressed</th>
<th>Free of selective reporting</th>
<th>Free of other bias</th>
<th>Jadad score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neudecker 1999 [32]</td>
<td>RCT</td>
<td>Unclear</td>
<td>Unclear</td>
<td>Unclear</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Senagore 2003 [33]</td>
<td>RCT</td>
<td>Yes</td>
<td>Unclear</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Taqi 2006 [34]</td>
<td>RCT</td>
<td>Unclear</td>
<td>Uncear</td>
<td>No</td>
<td>Unclear</td>
<td>Yes</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Senagore 2001 [39]</td>
<td>CCT (prospective intervention group vs retrospective control)</td>
<td>No (though it was a consecutive series)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zingg 2008 [37]</td>
<td>Sub-analysis of RCT assessing effect of bisacodyl vs placebo on postoperative ileus</td>
<td>Yes</td>
<td>Unclear</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
<td>Kong 2002 [35]</td>
<td>RCT</td>
<td>Unclear</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Schlachta 2007 [36]</td>
<td>RCT</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
<td>Kaba 2007 [38]</td>
<td>RCT</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>5</td>
</tr>
</tbody>
</table>
Where quantitative dichotomous data was available that compared similar analgesia groups, meta-analysis of the randomized controlled trials was performed according to the recommendations from the Cochrane Collaboration and the Quality of Reporting of Meta-analyses (QUORUM) guidelines [14,15]. The analyses were performed using REVMAN 5.0 (Cochrane Collaboration, Nordic Cochrane Centre, Copenhagen, Denmark). Dichotomous data was assessed using the Mantel-Haenszel statistical method, using a random-effects technique. The random effects model is preferable because of the fact that patients were operated on in different centres using variations in the surgical technique.

Results

Studies identified

The search criteria identified 189 abstracts that related to postoperative analgesia. Of these, 160 were excluded because they assessed other specialities, open or laparoscopically assisted cases, only one analgesic modality or they were letters (see Fig. 1). Twenty-five articles were reviewed in full text of which 17 [11,16–31] were excluded (open surgery n = 15, laparoscopic vs open n = 1, case series describing a single modality n = 1) leaving 8 [32–39] relevant studies for further analysis.

The demographics and outcomes for each study are illustrated in Tables 2 and 3. Three RCTs [32–34], 1 observational (laparoscopic sub-group analysis of a RCT) [37] and 1 consecutive matched cohort study [39] compared epidural vs PCA/i.v. morphine. The other three studies compared (i) different forms of spinal anaesthesia, (ii) the effects of ketorolac vs placebo and (iii) i.v. lidocaine vs placebo.

General Characteristics

Six of the studies reported the routine use of full bowel preparation [32–34,36,37,39], two specifically reported that naso-gastric tubes were not routinely used [36,38] and only one study routinely used abdominal drains [38]. The length of time that the epidural was left in situ varied considerably from 18 h [33] after the end of surgery to 5 days [37] (see Tables 2 and 3).

Senagore et al. [33] in their 2003 study employed early feeding and were the first to report the use of elements of the ERP to laparoscopic surgery. Taqi et al.
### Table 2: Characteristics and outcomes of included studies.

<table>
<thead>
<tr>
<th>Reference and year</th>
<th>Type of study</th>
<th>Intervention</th>
<th>Epidural Duration of epidural</th>
<th>Fast track elements used</th>
<th>LOS days</th>
<th>Time till tolerating diet days</th>
<th>Time till flatus days</th>
<th>Time till BO days</th>
<th>Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nudecker 1999 [32]</td>
<td>RCT</td>
<td>Epidural Ropivacaine 0.2%, PCA (m), 10</td>
<td>T12-Till 14h on day 2</td>
<td>No</td>
<td>Median (95% CI) 10 (8–11)</td>
<td>Median (95% CI) 2</td>
<td>Median 95% CI 2.3 (1.7–2.7)</td>
<td>Median 95% CI 2.5 (1.3–1.4)</td>
<td>Mean (SD) 3.3 (0.9)</td>
</tr>
<tr>
<td>Senagore 2003 [33]</td>
<td>RCT</td>
<td>Epidural Bupivocaine 0.1% + Fentanyl, PCA (m), 20</td>
<td>T10-T18h after surgery</td>
<td>Yes</td>
<td>Mean (SD) 2.4 (0.85)</td>
<td>Mean (SD) 2.3 (1.34)</td>
<td>Mean 95% CI 2.0 (1.7–2.7)</td>
<td>Mean 95% CI 3.2 (1.3–1.4)</td>
<td>Mean (SD) 3.3 (0.9)</td>
</tr>
<tr>
<td>Taqi 2006 [34]</td>
<td>RCT</td>
<td>Epidural Bupivocaine 0.5%, PCA (m), 25</td>
<td>T9-2.8±0.6 days</td>
<td>Yes</td>
<td>Median (95% CI) 5 (4.6–6.2)</td>
<td>Median (95% CI) 5 (4.2–9.5)</td>
<td>Median 95% CI 2.3 (1.7–2.7)</td>
<td>Median 95% CI 2.7 (1.3–2.7)</td>
<td>Mean (SD) 3.3 (0.9)</td>
</tr>
<tr>
<td>Senagore 2001 [39]</td>
<td>Matched cohort</td>
<td>Epidural Bupivocaine 0.25% + Fentanyl, PCA (m), 22</td>
<td>T10-Following morning</td>
<td>Yes</td>
<td>Mean (SD) 2.8 (0.2)</td>
<td>Median (95% CI) 2.05 (1.0)</td>
<td>Mean (SD) 4.64 (1.58)</td>
<td>Mean (SD) 3.0 (1.4)</td>
<td>Mean (SD) 7.0 (5.2–7.5)</td>
</tr>
<tr>
<td>Zingg 2008 [37]</td>
<td>Observational (sub-group of a RCT)</td>
<td>Epidural Bupivocaine 0.3%, PCA (m), 26</td>
<td>T12-Day 5</td>
<td>No</td>
<td>Median 9</td>
<td>Median 11 (SD)</td>
<td>Median (range) 4 (2–11)</td>
<td>Median (range) 4 (2–10)</td>
<td>Mean (SD) 3.7 (1.5)</td>
</tr>
<tr>
<td>Kong 2002 [35]</td>
<td>RCT</td>
<td>Spinal 0.5% bupivacaine ITM ± PCA (m), 17</td>
<td>T10</td>
<td>No</td>
<td>Median 0.71 (0.5–1.0)</td>
<td>Median 1.17 (0.3–4.2)</td>
<td>Median 2.7 (1.6–2.7)</td>
<td>Median 2.3 (1.5)</td>
<td>Mean (SD) 3.3 (0.9)</td>
</tr>
<tr>
<td>Schlachtsch 2007 [36]</td>
<td>RCT</td>
<td>i.v. Ketorolac ± PCA (m), 22</td>
<td>T10-NA</td>
<td>No</td>
<td>Median (IQR) 2 (2–3)</td>
<td>Median (IQR) 3 (3–4)</td>
<td>Median 2.5</td>
<td>Median 3.0</td>
<td>Mean (SD) 3.1</td>
</tr>
<tr>
<td>Kaba 2007 [38]</td>
<td>RCT</td>
<td>i.v. Lidocaine + Ketorolac ± PCA (m), 20</td>
<td>T10-NA</td>
<td>No</td>
<td>Median (IQR) 1.7 (1–2.7)</td>
<td>Median (IQR) 2.13 (1.7–2.9)</td>
<td>Median 2.0</td>
<td>Median 3.0</td>
<td>Mean (SD) 3.1</td>
</tr>
</tbody>
</table>

Results are given as mean values (SD). IQR, inter-quartile range; ITM, intrathecal morphine; (m), with morphine; (p), with piritramide; NSR, not specifically reported; NA, not applicable; LOS, length of stay; EM, encouraged mobilization; EF, early feeding; COD, catheter out day; (ns), not significant; (s), significant.
| Reference | Type of study | Intervention A | Intervention B / placebo | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
|-----------|---------------|----------------|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nudecker 1999 [32] | RCT | Epidural Ropivacaine 0.2% | PCA | 2 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Senagore 2003 [33] | RCT | Epidural Ropivacaine 0.25% + Fentanyl | PCA | 6 | 6 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Taji 2006 [34] | RCT | Epidural Bupivacaine 0.5% | PCA | 10 | 16 | 3 | 9 | 5 | 5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Senagore 2001 [39] | Matched cohort | Epidural Bupivacaine 0.25% + Fentanyl | i.v. Morphine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zingg 2008 [37] | Observational | Epidural Ropivacaine 0.3% | Metamizol α i.v. Morphine / PCA (m) | 6 | 5 | NSR in lap group | NSR in lap group | NSR in lap group | NSR in lap group | 2 | 0 | 2 | 0 | 2 | 0 | 2 | 0 |
| Kong 2002 [35] | RCT | Spinal 0.5% Bupivacaine + ITM ± PCA (m) | Spinal 0.5% Bupivacaine ± PCA (m) | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Schlachta 2007 [36] | RCT | i.v. Ketorolac + PCA (p) | i.v. Placebo + PCA (p) | 4 (AL) | 1 (AL) | 2 (AL) | 1 (AL) | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Kaba 2007 [38] | RCT | i.v. Lidocaine + Ketorolac = PCA (p) | i.v. saline + Ketorolac = PCA (p) | 4 (AL) | 1 (AL) | 2 (AL) | 1 (AL) | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Lap, laparoscopic group; AL, anastomotic leak; NSR, not specifically reported.
[34] removed the catheter on day 2 in the PCA group and encouraged active mobilization whilst Schlachta et al. [36] removed the catheter on day 1 and avoided abdominal drains and naso-gastric tubes. Kaba et al. [38] avoided naso-gastric tube use, encouraged early feeding and active mobilization but they routinely left an abdominal drain in situ. The other studies [35,37,39,40] did not mention the use of any fast track elements.

**Primary outcome**

**Length of stay**

Seven [32–34,36–39] out of the eight studies measured the LOS. Of the three RCTs comparing epidural vs i.v. opioid, all three [32–34] found no significant difference in LOS between these two methods. The calculated overall average LOS with regards to epidural or i.v. opioid usage in the RCTs was 5.1 vs 5.4 days respectively, comparing 53 vs 55 patients. Similarly in Zingg’s [37] RCT, the sub-group analysis of the laparoscopic resections showed no significant difference in the median LOS which was 9 days vs 11 days for epidural vs PCA. Only cohort study of Senagore et al. [39] 2 years prior to their RCT [33] showed a shorter stay with the use of epidural.

The use of intravenous ketorolac vs placebo significantly reduced the LOS, as did the use of intra-venous lidocaine vs intravenous saline (see Table 2). Study of Kong et al. [35] comparing various spinal anaesthesia formulae did not report the LOS and only measured the pain scores.

**Secondary outcomes**

**Time to tolerating diet**

Three [32,34,37] of the studies comparing epidural vs opioid and one [36] investigating the effect of ketorolac reported the time to tolerating diet. Of the two epidural RCTs, one [32] found no significant difference in the time to tolerance of diet compared with intravenous opioid whilst the other [34] study found this time to be significantly better pain control than 0.5% bupivacaine in the epidural group of Zingg’s study though they were not statistically significant. The use of intathecal morphine in addition to 0.5% bupivacaine resulted in significantly better pain control than 0.5% bupivacaine alone [35]. Similarly, the use of ketorolac or intravenous lidocaine vs placebo both resulted in significantly lower pain scores [36,38].

**Time to passing flatus**

One RCT [34] and one observational study [37] compared epidural vs PCA, whilst two [36,38] other RCTs compared the time till flatus was passed. The one RCT [34] comparing the epidural vs opioid group found the epidural group to have a significantly shorter time to passing flatus with a median of 2 vs 3 days respectively, whilst the one observational study [37] found no significant difference between these analgesic regimes. The independent use of ketorolac and i.v. lidocaine both significantly shortened the time till flatus was passed [36]. The use of intravenous lidocaine resulted in the shortest overall average time till flatus was passed in this review which was 0.71 days [38] (see Table 2).

**Time to bowels open**

Four studies reported on this outcome. Of the two RCTs [32,34,37] that compared epidural vs PCA, both of these studies reported a reduced time till bowels opened in the epidural group, though this was only significant in one [34] of the studies. The overall average time was 2.0 days vs 2.8 days in the epidural vs intravenous opioid groups respectively. Zingg’s study [37] also showed a significantly shorter time till bowels opened with the use of epidural compared with PCA. The use of intravenous lidocaine vs placebo was shown to significantly lower the dose of PCA morphine required and was associated with a significantly shorter time to bowels opening (1.17 vs 2.13 days) [38].

**Pain**

Six [33,34,36–39] of the eight studies reported on pain, with two [33,34] RCTs comparing epidural vs intravenous opioid. In both of these RCTs, the pain scores (visual analogue scale of 0–10) were significantly lower in the thoracic epidural group. The calculated overall averages were 2.5 vs 5.4 in the epidural vs intravenous opioid groups respectively. Pain scores were also lower in the epidural group of Zingg’s study though they were not statistically significant. The use of intathecal morphine in addition to 0.5% bupivacaine resulted in significantly better pain control than 0.5% bupivacaine alone [35].

**Nausea and vomiting**

Two [33,34] RCTs comparing epidural vs PCA reported on the incidence of nausea and two [32,34] RCTs
reported on vomiting although in none of the studies was nausea and vomiting precisely defined. There was no statistically significant difference between the PCA vs epidural studies in terms of nausea or vomiting (see Figs 2 and 3).

**Post-operative complications and re-admissions**

The overall complications were reported in two [33,34] RCTs comparing epidural vs PCA and in two other studies [36,39]. One [33] of the RCTs reported no complications in both groups and consequently the odds ratio was not estimable. The other by Taqi et al. [34] reported five complications in each group that included a pleural effusion, gastric ulcer, wound infection, paralytic ileus and abdominal wall haemorrhage, but no reported anastomotic leaks [34]. In the study comparing ketorolac vs placebo, the incidence of anastomotic leaks was higher in the ketorolac group (4 leaks) vs the placebo group (1 leak) (P-value not reported) [36].

Four studies [33,34,36,39] compared re-admission rates. Of the two [33,34] incorporated in the meta-analysis comparing PCA vs epidural, there was no significant difference in the re-admission rate with an OR of 0.56 (95% CI of 0.12–2.65) (see Fig. 4). There was also no significant re-admission rate in the ketorolac study [36].

**Urinary retention and hypotension**

Two [32,33] PCA vs epidural RCTs reported on urinary retention and whilst no significant difference was
demonstrated between these two methods, there was a nonsignificant trend towards higher levels of urinary retention in the epidural group with an OR of 0.29 (95% CI of 0.03–3.00) (see Fig. 5). Hypotension was reported in two [33,37] studies, 1 of which was a RCT that showed no significant difference between the epidural vs PCA groups. In the second study which was Zingg’s subgroup analysis [37], hypotension was more frequent in the epidural group though this was not statistically significant.

Discussion

Whilst the use of epidural or PCA has been extensively investigated in open surgery, there is a paucity of data comparing the various analgesic regimes available in laparoscopic surgery. The ERP has increasingly been used for laparoscopic surgery in its un-modified form with thoracic epidural use being a key feature of the ERP. Whilst some centres are using this modality, other units are using PCA, and alternative forms of postoperative pain control are being investigated.

Results of this systematic review have highlighted the relative lack of evidence comparing outcomes between differing analgesic regimes. At present, there is no convincing evidence to suggest the superiority of either PCA or epidural in terms of LOS for laparoscopic colorectal surgery. In the short term, no significant difference has been identified in terms of adverse events, although postoperative pain appears better controlled in those using PCA, and alternative forms of postoperative pain control are being investigated.

The major limitation of the present study is the inability to provide a quantitative meta-analysis comparing LOS between the groups, because of an overall lack of comparative studies together with the heterogeneity in reporting that exists between these studies. Hence, for the primary outcome a crude average from the mean/median, weighted for the size of the population, was calculated. Although this incorporated randomized studies, the results of this analysis which used means and medians, should be interpreted with caution as the potential exists for bias to have been introduced. Whilst the dichotomous data was reported in the RCTs in a form permitting meta-analysis, similar quantitative pooling of data was not possible in relation to the primary outcome data because of differences in the manner in which the results of individual studies was presented. Attempts to contact the authors of the RCTs who had reported their data as medians were unsuccessful. The clinical heterogeneity in the conduct of the individual trials, and the statistical heterogeneity in reporting have therefore limited the extent to which quantitative meta-analysis is possible and appropriate, although such pooling of data may be possible in the future as further similar studies are published.

Furthermore, the overall results should be interpreted in relation to the fact that adherence to the ERP between studies was variable and it is possible that well designed studies in which both populations are subjected to strict ERP protocols may generate different results. In addition the position of the individual surgeon on their laparoscopic learning curve is not clearly stated and the experience of the operating surgeon in the colorectal unit may impact on the degree to which accelerated postoperative care may be undertaken in the context of laparoscopic colorectal resection. Ongoing studies such as the EnROL (Enhanced recovery open vs laparoscopic) trial may help to answer the question of how long laparoscopic patients, with epidurals are likely to remain in hospital when treated within an ERP. Interestingly, Basse et al. found that that the median hospital stay was 2 days in both the open and laparoscopic groups when treated within an ERP [41].

There is considerable variation in the LOS documented in existing studies. A study published in 2003 reported a mean LOS of 2.4 and 2.3 days respectively for epidural vs PCA [33] whilst a recent study published in 2008 reported stays of 9 vs 11 days respectively [37]. Whilst the prolonged use of epidural anesthesia (5 days) may have lengthened the hospital stay in the epidural group, it is unclear why the nonthoracic epidural group remained in hospital for so long. Such variations are a
recurring theme in this literature and could potentially be minimized by the use of standardized postoperative protocols.

The findings of several large trials comparing epidural analgesia vs PCA in patients undergoing major open surgery have shown that pain is better controlled with thoracic epidural but with no difference in mortality or morbidity. Despite the benefits in terms of pain control, the length of time that an epidural should remain in situ remains a contentious issue. Within the studies reviewed the length of time that an epidural was left in-situ varied from 18 h [33] to 5 days [37]. For open surgery, the recommendation is that the epidural should be left in situ for 48 h. In our unit and others [42], many patients undergoing laparoscopic colonic resections are discharged home on day 2 and consequently leaving an epidural in for 48 h would hinder their progress. If patients are well enough to go home at 1–2 days, then the epidural should be removed some time before this raising the issue of whether a spinal may be more appropriate. The use of epidural anaesthesia is labour intensive, and despite the presence of a dedicated nursing team, its use may delay mobilization because of motor block. Furthermore, epidural failure rates of up to 40% have been reported. The use of spinal anaesthesia postoperatively may offer many advantages with its lower complication rate, higher insertion rate, lack of unilateral blocks and lack of prolonged motor block.

Whilst most of the studies initially compared epidural vs PCA, there have been trials published that have investigated alternative methods. Only one study, published in 2002, assessed the use of spinal anaesthesia in laparoscopic colorectal surgery [35]. In this study, intrathecal 0.5% hyperbaric bupivacaine was compared with intrathecal 0.5% hyperbaric bupivacaine with 0.2 mg of intrathecal morphine and found the later to be more effective for pain control. None of the RCTs, though, have compared the use of epidural or PCA against spinal anaesthesia.

More recently, Kaba et al. reported the use of intravenous lidocaine for postoperative pain control [38]. They found a significantly shorter LOS, time to passing flatus, bowels opening and better pain scores in patients who received intravenous lidocaine. The doses that were used were equivalent to cardiac doses previously used for arrhythmias. Whilst they used these doses postoperatively on the ward with no complications, some may raise concern regarding the use of this dose, unsupervised on a ward.

Schlachta et al. found that the use of non-steroidal anti-inflammatory drugs (NSAIDs) was significantly beneficial in controlling postoperative pain [36]. They did however report five anastomotic leaks in 44 patients, four of which were in the NSAID group. This leak rate was higher than their previous leak rate of 2.5% in the last 750 cases. The precise reason for this discrepancy is not clear, but the authors felt it not to be related to the use of NSAIDs.

With the significant expansion of laparoscopic colorectal surgery, further trials are required to assess the most appropriate analgesia for patients undergoing laparoscopic colorectal surgery. Trials are needed to compare these various analgesic regimes within an ERP.

References
A systematic review of postoperative analgesia


37 Zingg U, Miskovic D, Hamel CT, Erni L, OeriL D, Metzger U. Influence of thoracic epidural analgesia on postoperative...


