Systematic review of the impact of operative techniques on postoperative pain in laparoscopic cholecystectomy

Background and Goal of Study

- Laparoscopic cholecystectomy is a commonly performed surgical procedure in which adequate analgesia has a role not only in patient comfort, but also in minimising length of hospital stay.
- Two systematic reviews have examined the role of intraperitoneal, port-site and incisional analgesia in laparoscopic procedures, and two further systematic, qualitative reviews have examined laparoscopic cholecystectomy studies in which analgesia was an endpoint.
- However, these reviews have two limitations:
  - A systematic review of laparoscopic cholecystectomy studies in which analgesia was a factor but placebo addition meta-analysis as well as qualitative analyses has not been performed.
  - A systematic analysis of the techniques used during the laparoscopic procedure itself, for example insufflation methods, to ascertain whether these impact on postoperative pain management, has not been conducted.
- The objective of this systematic review was to compare the efficacy and safety of analgesic, anaesthetic and operative techniques aimed at influencing postoperative pain in adult patients undergoing laparoscopic cholecystectomy.

Materials and Methods

- The review was conducted according to the methods of the Cochrane Collaboration.
- MEDLINE was searched from 1966-June 2002 and Embase from 1988-June 2002 using predefined search criteria and reference lists of identified studies were also searched for further references. Articles were only considered for inclusion where they were in the English language.
- Studies eligible for inclusion were:
  - Those in which all patients or a definable subgroup underwent laparoscopic cholecystectomy.
  - Randomised trials of operative analgesia compared with other placebo or other methods of operative analgesia and anaesthesia aimed at influencing postoperative pain, and randomised trials of operative techniques conducted to examine their effect on postoperative pain.
  - Double-blinding was required for all types of operative analgesia except neuraxial routes of administration where the placement of a catheter for placebo administration would be considered unethical.
  - The use of visual analogue scale (VAS) or verbal rating scale (VRS) was required for inclusion.
- Meta-analysis was conducted on mean differences in postoperative VAS score grouped for 0-6 hours, 6-12 hours and 12-24 hours. VRS scores were converted to VAS scores.

Results

- Fifty-nine studies were included for analysis and 70 studies were excluded. The most common reason for exclusion was the use of open, rather than laparoscopic, cholecystectomy.
- The following studies and outcomes of operative techniques aimed at influencing postoperative pain were identified:
  - Warmed CO₂ pneumoperitoneum (n=84) vs. conventional CO₂ pneumoperitoneum (n=76; 3 studies) The three studies all utilised CO₂ warmed to 37 °C vs. unwarmed CO₂. ¹¹ The studies reported a significant benefit in reducing VAS scores for warmed CO₂ pneumoperitoneum, and a meta-analysis also showed no benefit (figure, weighted mean difference -0.66 [95% C.I. -1.64, 0.32], p=0.19).
  - Low pressure CO₂ pneumoperitoneum (n=66) vs. conventional CO₂ pneumoperitoneum (n=44; 2 studies) Both studies utilised high vs. low pressure arms.¹³ The mean differences were 4.48 mmHg for the first and 7.58 mmHg for the second studies. Low pressure was superior to high pressure pneumoperitoneum in both studies for reductions in VAS scores and use of supplementary analgesics. Low pressure was superior to high pressure pneumoperitoneum for VAS scores.²²
  - Microlaparoscopic cholecystectomy (n=200) vs. conventional laparoscopic cholecystectomy (n=124; 5 studies). All five studies examined standard techniques vs. smaller port sizes.¹⁴ The microlaparoscopic approach was superior to control in reducing VAS scores for three studies, with the remaining two studies showing superiority on the first day only. There was no significant advantage for the microlaparoscopic approach in the use of supplementary analgesics in four studies (not recorded for the remaining study), although the length of convalescence was significantly reduced in two studies.
  - Radially expanding (n=142) vs. conventional cutting trocars (n=156; 2 studies)¹⁵ Epigastric, but not umbilical, pain was reduced in one study and the remaining study showed no significant benefit. One study also reported a reduced incidence of intraoperative port bleeding, and postoperative wound complications and haematoma while the remaining study did not examine this parameter.
  - Additional operative technique studies (9 studies, n=493 active, n=238 control) were grouped, but had disparate protocols and techniques, and therefore meta-analyses could not be performed.

Conclusions

- Of available techniques, microlaparoscopic and low pressure CO₂ pneumoperitoneum appear to have a beneficial effect on post-operative pain in laparoscopic cholecystectomy.
- Warmed CO₂ pneumoperitoneum appears to have no significant benefit vs. unwarmed CO₂.
- Lavage and/or suction may have a role in reducing postoperative pain.
- For other techniques, further data are required for definitive conclusions to be made.

References

1. Marder S et al. / Anesthesiology 1995; 83: 517-83.
2. Marder S / Anesthesiology 2001; 95: 999-1012.