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## Pain after laparoscopic cholecystectomy

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### Authors' objectives

To assess the interventions used to reduce pain after laparoscopic cholecystectomy.

### Searching

MEDLINE was searched from January 1990 to June 1999 using the keywords 'pain', 'cholecystectomy/laparoscopic', 'pneumoperitoneum' and 'laparoscopy'. Bibliographies of retrieved articles were also examined. Although studies reported in any language were eligible, it was not possible to obtain every non-English language article.

### Study selection

#### Study designs of evaluations included in the review

Randomised controlled trials (RCTs) were eligible for inclusion.

#### Specific interventions included in the review

Studies comparing pain-reducing interventions with control interventions were eligible. The following types of interventions were included.

1. Use of non-steroidal anti-inflammatory drugs (NSAIDs): NSAIDs (diclofenac, ketorolac, dipyron, tenoxicam and indomethacin) were administered intramuscularly, intravenously or rectally before, during or after operation, and compared with saline or pethidine control.
2. Intraperitoneal local anaesthetic (mainly bupivacaine) was compared with saline, morphine or no control.
3. Local anaesthetic applied to the wound: bupivacaine was compared with a higher dose of bupivacaine or saline control.
4. Intraperitoneal saline was compared with various other interventions.
5. Removal of insufflation gas: the use of suction drain, drain or aspiration suction was compared with non-suction drain, no drain or no aspiration.
6. Characteristics of insufflation gas: low-pressure insufflation, nitrous oxide, heated and humidified carbon dioxide were compared with high-pressure insufflation, carbon dioxide, and non-heated carbon dioxide.

#### Participants included in the review

Patients undergoing a laparoscopic cholecystectomy were included.

#### Outcomes assessed in the review

Studies evaluating the severity and nature of pain were eligible. Most studies used a visual analogue scale or a verbal rating scale to evaluate pain. Other outcomes mentioned were earlier discharge, supplementary analgesia and post-operative functioning.

#### How were decisions on the relevance of primary studies made?

The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

### Assessment of study quality

The included studies were assessed for quality according to the CONSORT guidelines (see Other Publications of

Related Interest). The authors do not state how the papers were assessed for quality, or how many of the reviewers performed the quality assessment.

### **Data extraction**

The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

The following information was reported in tabular format: author and year of publication; sample size; timing of intervention; details of the active and control interventions; and outcomes.

### **Methods of synthesis**

#### **How were the studies combined?**

A narrative synthesis was undertaken.

#### **How were differences between studies investigated?**

Differences between the studies were investigated by grouping them by the intervention.

### **Results of the review**

Forty-two RCTs were included: of these, 8 RCTs assessed NSAIDs, 13 assessed intraperitoneal local anaesthetics, 3 assessed local anaesthetics injected into the wound, 3 assessed intraperitoneal saline, 4 assessed the removal of insufflation gas, and 6 assessed characteristics of the insufflation gas. The total number of participants was not stated.

None of the included studies complied fully with the CONSORT guidelines. The deficiencies in the methodology included: inadequate description of randomisation methods (5 RCTs); failure to report inclusion and exclusion criteria (4 RCTs); non-blinded evaluation of outcomes (3 RCTs); lack of power calculations (5 RCTs); inadequate description of the methods used to evaluate pain (1 RCT); follow-up limited to short post-operative period (3 RCTs); and failure to mention methods of restriction of randomisation (3 RCTs).

NSAIDs (8 RCTs, 472 patients).

All trials demonstrated a statistically-significant reduction in some aspect of post-operative pain. The reduction was usually short-lived (first 24 hours).

Intraperitoneal local anaesthetic (13 RCTs, 1,136 patients).

Conflicting results were reported with only 8 of the 13 RCTs demonstrating some reduction in pain for the intervention. No benefit was found in earlier discharge or earlier return to normal activity. The dose and concentration of bupivacaine, the local anaesthetic used, varied considerably between trials. Wound local anaesthetic (3 RCTs, 200 patients).

Two of the 3 RCTs reported reduced pain after wound local anaesthetic.

Intraperitoneal saline (2 RCTs, 110 patients allocated to 11 treatment arms).

Groups receiving instilled saline or saline plus bupivacaine were less likely to report pain than the control groups.

Removal of insufflation gas (4 RCTs, 294 patients).

Two of the four RCTs reported a reduction in pain after removal of the gas.

Insufflated gases (6 RCTs, 285 patients).

Three RCTs compared different gases and found benefit for heated and humidified carbon dioxide over carbon

dioxide, gasless abdominal wall lift over standard carbon dioxide pressure, and nitrous oxide over carbon dioxide. Two RCTs found less pain with low-pressure (7.5 to 10 mmHg) insufflation than with high-pressure (14 to 16 mmHg) insufflation. One RCT found less pain with a lower gas flow (2.5 l/minute) than with a higher gas flow (7.5 l/minute).

Size and number of ports: 1 RCT compared 5 and 10 mm epigastric ports and found no difference in post-operative pain.

### **Authors' conclusions**

Pain after laparoscopy is multifactorial. Although many methods of analgesia produce short-term benefit, this does not equate with earlier discharge or improved post-operative function. However, single trials evaluating low-pressure insufflation, heated gas and multimodal analgesia suggest that clinically relevant benefit can be achieved.

### **CRD commentary**

The aims were stated and the inclusion criteria were defined in terms of the participants, interventions, outcomes and study design. Studies reported in any language were eligible, although restricting the search to one database may have resulted in the omission of other relevant studies. No attempt was made to locate unpublished material, thus raising the possibility of publication bias. The methods used to select the studies were not described.

No formal quality assessment was undertaken though methodological deficiencies were mentioned. Some relevant data were presented in tabular format, but there were no details of the methods used to extract the data. The outcomes were not reported in terms of statistical significance and this hindered the interpretation of the results.

A narrative synthesis was appropriate given the clinical heterogeneity among the studies, but there was no focus on better sources of evidence and no discussion of potential sources of heterogeneity. It would have helped if the review had included a summary of the results for each intervention rather than concentrating on describing the individual studies. It was not possible to judge the quality of the evidence on which the conclusions were based since there was no formal assessment of validity.

The authors' general conclusions were supported by the evidence presented. However, the specific comment regarding low-pressure insufflation, heated gas, and multimodal analgesia appears unwarranted.

### **Implications of the review for practice and research**

**Practice:** The authors state that NSAIDs, intraperitoneal bupivacaine, saline and wound local anaesthetics are able to reduce pain after laparoscopic cholecystectomy. They also state that low-pressure insufflation, heated gas and multimodal analgesia may result in clinically relevant benefits.

**Research:** The authors state that further trials are needed to investigate the effect of intraperitoneal local anaesthetic before dissection, and intraperitoneal saline, on the reduction of pain. In addition, research is required to improve the understanding of the pathogenesis of post-operative pain. The authors also state that other potential areas for future research may include antioxidant drugs, improved and selective anti-inflammatory drugs, and the use of sturdier and smaller instruments.

### **Bibliographic details**

Wills V L, Hunt D R. Pain after laparoscopic cholecystectomy. *British Journal of Surgery* 2000; 87(3): 273-284

### **PubMedID**

10718794

### **DOI**

10.1046/j.1365-2168.2000.01374.x

**Other publications of related interest**

Begg C, Cho M, Eastwood S, Horton R, Moher, D, Olin I, et al. Improving the quality of reporting of randomised controlled trials: the CONSORT statement. JAMA 1996;276:637-9.

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Anesthesia, Local; Anti-Inflammatory Agents, Non-Steroidal /therapeutic use; Cholecystectomy, Laparoscopic /adverse effects; Clinical Trials as Topic; Humans; Insufflation; Pain Measurement; Pain, Postoperative /etiology /physiopathology /prevention & control; Sodium Chloride /administration & dosage

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.