Laparoscopic versus open myomectomy: a meta-analysis of randomized controlled trials


CRD summary
This review compared laparoscopic and open myomectomy for patients with fibroids, in terms of operative parameters and outcomes. The authors concluded that, if performed by suitably specialised surgeons in selected patients, laparoscopic myomectomy was a better choice than open surgery. Concerns about the quality of the included trials suggest that this conclusion should be regarded with caution.

Authors' objectives
To compare laparoscopic and open myomectomy for patients with fibroids with regard to operative parameters and outcomes.

Searching
PubMed, China Biological Medicine Database, EMBASE and the Cochrane Library were searched, with no language restrictions, from 1979 to May 2007. Search terms were reported. References of articles acquired were also searched.

Study selection
Eligible studies were randomised controlled trials (RCTs) that compared open surgery with conventional gas laparoscopic in patients undergoing myomectomy. Eligible trials had to clearly document the operative technique and indications for surgery. To be included, trials had to report on at least one of the predefined outcome measures and present the data in such a way that it could be extracted or calculated.

Outcomes included: haemoglobin drop, blood loss, full recuperation at day 15, average hospital stay, time to return to work, pain intensity (measure on the Visual Analogue Scale - VAS) and operation time. Long-term outcomes included pregnancy and recurrence of fibroids at follow-up. Complications were classified as major (life-threatening perioperative conditions, risks of major functional sequelae resulting in temporary inability to return to normal working life for at least three months, major additional surgical procedure) or minor (any complication that did not meet the criteria for a major complication).

The mean age of included patients ranged from 28 to 40 years. Intramural or subserous myomas were present; the diameter of the largest myoma ranged from 3 to 10cms for laparoscopic myomectomy and from 3 to 11cms for open myomectomy.

The authors did not state how the papers were selected for the review.

Assessment of study quality
Quality of included trials was assessed using the Jadad scoring system, which assessed randomization, blinding and description of withdrawals and drop-outs. The authors considered a trial to be high quality if it scored 3 points or more, out of a maximum of 10 points.

The authors did not state clearly how the validity assessment was performed.

Data extraction
Two reviewers extracted outcome data independently from each trial using a predefined review form. One of the reviewers was blinded to publication source and authors' names. Inconsistencies were resolved by discussion.

For dichotomous variables, the summary odds ratio (OR) was calculated. For continuous variables, the weighted mean difference (WMD) was used. In both cases 95% confidence intervals (CI) were reported.
Methods of synthesis
Meta-analysis was performed following recommendations from the Cochrane Collaboration and the QUORUM guidelines. Odds ratios and weighted mean differences were pooled using a fixed-effect model unless there was significant heterogeneity, in which case a random-effects model was used. Heterogeneity was calculated using the $X^2$ test. Yates correction was used for trials containing a zero cell. Publication bias was assessed using a funnel plot.

Narrative synthesis was used where there was significant heterogeneity.

Results of the review
Six RCTs were included in the review (n=576 patients); five RCTs were considered to be high quality. Follow-up ranged from six months to 52 months.

Heterogeneity between studies was not statistically significant for any outcome, except for full recuperation at day 15 and postoperative pregnancy.

Meta-analysis of three RCTs (n=317 patients) showed that haemoglobin drop was significantly lower in the laparoscopic myomectomy group (WMD -1.07mg%, 95% CI -1.22 to -0.92) compared with the open myomectomy group.

Meta-analysis of two RCTs (n=80 patients) showed blood loss was significantly lower in the laparoscopic myomectomy group (WMD -34.12mL, 95% CI -58.64 to -9.60) compared with the open myomectomy group.

Meta-analysis of two RCTs (n=186 patients) showed that pain intensity (VAS score) was significantly lower in the laparoscopic myomectomy group (WMD -2.26, 95% CI -2.69 to -1.83) compared with the open myomectomy group.

Meta-analysis of four RCTs (n=357 patients) showed that operation time was significantly longer in the laparoscopic myomectomy group (WMD 13.28min, 95% CI 9.38 to 17.18) compared with the open myomectomy group.

In a narrative synthesis, the authors stated that the overall rate of patients recovered at day 15 was much higher in the laparoscopic myomectomy group compared with the open myomectomy group.

Meta-analysis of five RCTs (n=535 patients) showed that, overall, fewer complications were associated with laparoscopic myomectomy (OR 0.47, 95%CI 0.26 to 0.85) compared with the open myomectomy group, but there was no significant difference in the rate of major complications (two RCTs, n=279 patients).

There was no significant difference reported in the rate of recurrence (three RCTs, n=252 patients) or postoperative pregnancy (two RCTs, n=251 patients).

A funnel plot of trials reporting on operation time suggested minimal publication bias.

Authors' conclusions
Laparoscopic myomectomy was associated with less haemoglobin drop, reduced operative blood loss, more patients fully recuperated at day 15, diminished postoperative pain and fewer overall complications, but longer operating times, when compared with open myomectomy for patients with fibroids. Major complications, recurrence and pregnancy were similar between treatments.

CRD commentary
The review addressed a clear question with well-defined inclusion criteria. Several relevant sources were searched to identify potential studies, with no restriction on language. The authors attempted to minimise bias and error during the review process by carrying out the data extraction in duplicate. It was unclear whether the study selection and validity assessment were also performed in duplicate, so reviewer error and bias may have been introduced at these stages.

An unusual approach was taken when applying the Jadad score, which usually applies a maximum score of 5 points. The authors approach appeared to set the threshold for a "high quality" trial at a low level. This raised some questions about
the quality of the included trials. The method of synthesis was appropriate. Tests for heterogeneity and publication bias were performed. The level of training of the surgeons involved in the trials was not directly addressed, which may have impacted on the external validity of the review, but this was acknowledged by the authors in drawing their conclusions.

Concerns about potential quality issues suggest that the authors’ conclusion should be regarded with caution.

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

**Practice**: The authors stated that when performed by suitably specialised surgeons in selected patients, laparoscopic myomectomy is a better choice than open myomectomy.

**Research**: The authors stated that there is a requirement for more RCTs with extended follow-up to assess long-term outcomes.

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