Laparoendoscopic single-site versus traditional laparoscopic surgery in patients with cholecystectomy: a meta-analysis

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CRD summary
The review concluded that laparoendoscopic single site cholecystectomy was associated with a higher cosmetic score and a lower physical quality of life score than traditional laparoscopic cholecystectomy and had similar operating time, complications, blood loss, hospital stay and pain score. Potential for missing relevant studies and a limited evidence base make the reliability of the authors' conclusions uncertain.

Authors' objectives
To compare traditional laparoscopic cholecystectomy with laparoendoscopic single site cholecystectomy.

Searching
MEDLINE (from 1966), EMBASE (from 1980), Web of Science and Cochrane Central Register of Controlled Trials (CENTRAL) (from 1955) were searched up to October 2011 for studies in English; search terms were reported.

Study selection
Randomised controlled trials (RCTs) that compared traditional laparoscopic cholecystectomy and laparoendoscopic single site cholecystectomy were eligible for inclusion in the review. Studies were required to report at least one of the outcomes: operating time, intraoperative blood loss, postoperative hospital stay, incidence of perioperative complications, pain score (measured by visual analogue scale), cosmetic score (measured by various scales) or physical quality of life score (measured by SF-8 or SF-12). For duplicate publications either the highest or most recent publication was included. Studies were excluded if they were published repeatedly by different journals or if patients had either other surgery at the time of cholecystectomy or had previous upper abdominal surgery.

In the included studies, mean age of participants ranged from 40 to 54 years and most participants were women, where reported. All studies except one used four port traditional laparoscopic cholecystectomy.

Two authors independently selected studies for the review.

Assessment of study quality
Studies were assessed for quality using the five-point Jadad scale of randomisation, blinding and description of withdrawals or drop-outs. Low quality studies had a score of 2 or less and high quality scores had scores of more than 2.

Two reviewers independently assessed studies for quality. Disagreements were resolved by consensus.

Data extraction
Data were extracted on the outcomes to enable calculation of odds ratios (ORs) for dichotomous data and mean differences for continuous data, with corresponding 95% confidence intervals (CIs).

Two reviewers independently extracted data. Disagreements were resolved by consensus.

Methods of synthesis
Pooled summary odds ratios and standardised mean differences (SMDs), with corresponding 95% confidence intervals, were calculated using a fixed-effect model. Heterogeneity was assessed by the $\chi^2$ test ($p \leq 0.10$ was the cutoff for statistical significance) and quantified by the $I^2$ value ($I^2 \geq 50\%$ was considered evidence of heterogeneity). Summary effect measures were calculated using the random-effects model where significant heterogeneity was identified ($p < 0.05$) or where outcomes were evaluated by different scales. Subgroup analyses assessed cosmetic score, visual analogue scale pain score and physical quality of life score at different times after surgery.

Results of the review
Seven RCTs (611 patients, range 40 to 197) were included in the review. All studies had adequate randomisation procedures and clearly reported withdrawals and drop-outs. One study was double blind, four studies were single blind and two studies did not report on blinding. Three of the studies were undertaken in multiple centres. All studies were considered of high quality.

**Cosmetic score:** Compared to traditional laparoscopy, laparoendoscopic single site cholecystectomy was associated with a significantly improved cosmetic score at one week (SMD 0.48, 95% CI 0.24 to 0.73; two RCTs; I²=0%), two weeks (SMD 0.87, 95% CI 0.61 to 1.13; two RCTs; I²=0%) and one month after surgery (SMD 0.88, 95% CI 0.62 to 1.14; two RCTs; I²=0%).

**Physical quality of life score:** Compared to traditional laparoscopy, laparoendoscopic single site cholecystectomy was associated with a significantly reduced physical quality of life score at day three (SMD -0.28, 95% CI -0.52 to -0.04; two RCTs; I²=0%), one week (SMD -0.31, 95% CI -0.55 to -0.06; two RCTs; I²=0%) and two weeks after surgery (SMD -0.30, 95% CI -0.55 to -0.05; two RCTs; I²=0%). At other time cutoff points (one day, five days and one month postoperatively) there was no evidence of significant differences between groups.

**Other outcomes:** There was no evidence of a significant difference between types of cholecystectomy for the visual analogue scale pain score at either 12 hours after surgery (two RCTs; I²=90%) or 24 hours after surgery (four RCTs; I²=92%). There was no evidence of a significant difference between groups for the perioperative complication rate (five RCTs; I²=0%), intraoperative blood loss (two RCTs; I²=0%), postoperative hospital stay (three RCTs; I²=0%) and operating time (five RCTs; I²=92%).

The authors noted that they were not able to identify clinical heterogeneity between trials in analyses that indicated substantial heterogeneity.

**Authors’ conclusions**
Laparoendoscopic single site cholecystectomy was associated with a higher cosmetic score and a lower physical quality of life score than traditional laparoscopic cholecystectomy and had similar operating time, perioperative complications, intraoperative blood loss, hospital stay and pain score.

**CRD commentary**
The review addressed a clear research question supported by appropriate inclusion criteria. A limited number of relevant sources was searched to identify studies in English so it was possible that some studies were missed. Appropriate methods were used to select studies for the review, extract data and assess studies for quality. A valid tool was used for quality assessment and the included studies were considered of high quality but the studies generally had small sample sizes and for some outcomes only two studies contributed data.

Synthesis of the study results and assessment of heterogeneity were appropriate. Substantial statistical heterogeneity was reported for some analyses and this was not explained by clinical heterogeneity between trials. There were discrepancies between the text and the labels on the forest plots where results were reported as statistically significant. There was evidence of selective outcome reporting in the authors’ conclusions; the physical quality of life score was significantly different between groups for three time periods but no evidence of significant differences was found in three other time periods.

Potential for missing relevant studies and a limited evidence base mean the authors’ conclusions should be treated with caution and reliability is uncertain.

**Implications of the review for practice and research**
The authors did not state any implications for practice and further research.

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