Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a meta-analysis of randomized clinical trials
Siddiqui T, MacDonald A, Chong P S, Jenkins J T

CRD summary
The authors concluded that early laparoscopic cholecystectomy for acute cholecystitis permitted significantly shorter hospital stay at the cost of a significantly longer operation time, with no significant difference in conversion or complication rates. This was a generally well-conducted review and the authors' conclusions were likely to be reliable.

Authors' objectives
To compare the impact of early versus delayed laparoscopic cholecystectomy on conversions to open procedures, hospital stay, short-term complications and surgery-related morbidity in patients with acute cholecystitis.

Searching
MEDLINE, EMBASE, The Cochrane Library databases and Google Scholar were searched between 1987 and 2006 for articles in any language. Search terms were reported. The search was not restricted by publication status.

Study selection
Studies eligible for inclusion were randomised controlled trials (RCT) comparing the impact of early (within seven days of symptom onset) versus late (more than six weeks after admission) laparoscopic cholecystectomy on morbidity, conversion rate, mortality, hospital stay, operation time and other adverse events. Studies were excluded if they were quasi-randomised or if they had an inadequate description of follow-up or allocation concealment. Included studies were of patients with cholecystitis undergoing early (symptoms for less than seven days and surgery performed at less than 24 hours to less than 72 hours) or delayed (use of antibiotics and surgery performed at six to 12 weeks) cholecystectomy. Outcomes reported in included studies were operation time, conversion rate, complication rate, blood loss, total hospital stay, post-operative stay and mortality. Included studies were carried out in Hong Kong, New Delhi and Gothenburg.

Two reviewers independently selected the studies for review.

Assessment of study quality
Methodological quality was assessed using the Method for Evaluating Research Guideline Evidence (MERGE) criteria assessing allocation concealment, blinding of patients and assessors, use of standardised outcome measures, control of confounding factors, loss to follow up and intention-to-treat analyses. Studies were awarded an overall code of A (low risk of bias) to C (high risk of bias). The authors did not state how the validity assessment was performed.

Data extraction
Dichotomous data were calculated as odds ratios (OR) and continuous data were calculated as weighted mean differences (WMD) with 95% confidence intervals (CI). Data were extracted independently by two reviewers using a predetermined collection proforma.

Methods of synthesis
The studies were combined in both random- and fixed-effects meta-analysis. Pooled odds ratios (OR) with corresponding 95% confidence intervals (CI) were calculated for dichotomous variables. Continuous data were combined using weighted mean differences (WMD) using Hedges g. Heterogeneity was assessed using the Q statistic. Funnel plots were used to test for publication bias.

Results of the review
Four RCTs were included for review (n=388). All of the studies were categorised as A (low risk of bias). Only one used an intention-to-treat analysis.
Delayed laparoscopic cholecystectomy was associated with significantly shorter operation times compared to early surgery (three studies n=217; WMD 0.412, 95% CI: 0.149, 0.675, p=0.002).

Early laparoscopic cholecystectomy was associated with a significantly shorter overall hospital stay compared to delayed surgery (three studies, n=230; WMD 0.905, 95%: CI 0.630, 1.179, p=0.0005), but delayed surgery was associated with a significantly shorter post-operative stay (WMD 0.393, 95% CI: 0.128, 0.659, p=0.004). There were no significant differences between delayed and early surgery groups in complication rates, conversion rates or specific complications such as bile leaks or bile duct injuries. There was no incidence of mortality in any of the studies.

There was no evidence of statistical heterogeneity or publication bias.

Authors’ conclusions
Early laparoscopic cholecystectomy permitted a significantly shorter hospital stay at the cost of a significantly longer operation time, with no significant difference in conversion or complication rates.

CRD commentary
The review addressed a clear question with well-defined inclusion criteria for intervention, outcomes and study design. Inclusion criteria for patients were not stated explicitly. Several relevant databases were searched for articles in any language and at any publication status, thereby minimising the risk of language and publication bias. Publication bias was assessed and ruled out. Appropriate steps were taken in the study selection and data extraction processes to minimise the risk of reviewer error and bias. A validity assessment was carried out using an established scale and all studies were categorised as high quality. However, it was unclear whether appropriate steps were taken in the validity assessment process to minimise reviewer error and bias. The decision to combine the studies in a meta-analysis was appropriate and heterogeneity was assessed. This is a generally well-conducted review and the authors' conclusions were likely to be reliable.

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

Research: The authors stated that larger RCTs were needed to investigate rare occurrences.

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