INPLASY

Protocol for systematic review and meta-analysis: Timing of Laparoscopic Cholecystectomy in Patients with Mild to Moderate Acute Biliary Pancreatitis: A Systematic Review and Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - No financial support was received for this systematic review.

Review Stage at time of this submission - This systematic review has completed full literature screening, data extraction and meta-analysis synthesis. Prospective registration was not conducted at the beginning due to unfamiliarity with systematic review registration specifications. All pre-defined research objectives, inclusion criteria, outcome indicators and statistical analysis methods were strictly implemented without post-hoc modification of primary endpoints.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2026600134

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 June 2026 and was last updated on 28 June 2026.

INTRODUCTION

Review question / Objective Population: Patients diagnosed with mild-to-moderate acute biliary pancreatitis. Intervention: Early laparoscopic cholecystectomy (ELC). Comparator: Delayed laparoscopic cholecystectomy (DLC). Outcomes: Gallstone-related events, recurrent pancreatitis, readmission, perioperative complications, conversion rate, operative time, hospital stay, all-cause mortality. Study design: Randomized controlled trials only.

Condition being studied Mild-to-moderate acute biliary pancreatitis (MABP) caused by gallstones, according to the revised Atlanta classification of acute pancreatitis. The research focuses on the optimal timing of laparoscopic cholecystectomy in this patient population.

METHODS

Search strategy We comprehensively searched the following electronic databases from their inception to December 2025: PubMed, MEDLINE, Embase, Cochrane Library, and Web of Science.

Participant or population We included randomized controlled trials (RCTs) comparing clinical outcomes between early and delayed cholecystectomy in patients with mild-to-moderate gallstone-induced pancreatitis.

Intervention Early laparoscopic cholecystectomy (ELC): laparoscopic cholecystectomy performed during the index hospitalization or within 72 hours/ 4 weeks after the onset of mild-to-moderate acute biliary pancreatitis, as defined in each original RCT.

Comparator Delayed laparoscopic cholecystectomy (DLC): laparoscopic cholecystectomy postponed after clinical remission of pancreatitis, generally more than 2–6 weeks after discharge without cholecystectomy during the initial admission.

Study designs to be included Only randomized controlled trials (RCTs) comparing ELC and DLC for mild-to-moderate acute biliary pancreatitis are eligible. Non-randomized studies, retrospective cohorts, case-control studies, case reports, reviews and conference abstracts will be excluded.

Eligibility criteria Inclusion criteria
Adult patients diagnosed with mild or moderate acute biliary pancreatitis per revised Atlanta classification;
RCT comparing early laparoscopic cholecystectomy vs delayed laparoscopic cholecystectomy;
Full-text English articles with extractable quantitative data for all predefined outcomes;
Clear reporting of at least one primary or secondary clinical endpoint.
Exclusion criteria
Severe pancreatitis, non-gallstone pancreatitis patients;
Studies involving open cholecystectomy or combined complex abdominal operations;
Retrospective, observational studies, reviews, abstracts, expert opinions;
Incomplete raw data that cannot be pooled for meta-analysis;
Duplicate publications of identical trial datasets.

Information sources Electronic databases: PubMed, MEDLINE, Embase, Cochrane Library, Web of Science, searched from database inception to December 2025. Manual screening of reference lists of all included RCTs, relevant systematic reviews and meta-analyses for supplementary records.

Main outcome(s) Main primary outcomes 1. Incidence of gallstone-related composite events (including recurrent biliary pancreatitis, acute cholecystitis, cholangitis, biliary colic, obstructive jaundice), presented as risk ratio (RR) with 95% confidence interval (CI). 2. Recurrent acute biliary pancreatitis rate, presented as RR with 95% CI. 3. Hospital readmission rate related to biliary tract disease, presented as RR with 95% CI. Additional secondary outcomes 1. Perioperative surgical complications (RR, 95% CI). 2. Intraoperative conversion rate to open cholecystectomy (RR, 95% CI). 3. Operative time (minutes, mean difference MD, 95% CI). 4. Total length of hospital stay (days, MD, 95% CI). 5. All-cause postoperative mortality (RR, 95% CI).

Quality assessment / Risk of bias analysis The risk of bias of the included studies was assessed using the Cochrane Risk of Bias Tool. The assessment domains covered Randomization process, Deviations from intended interventions, Missing outcome data, Measurement of the outcome, and Selection of the reported result.

Strategy of data synthesis Meta-analysis conducted via RevMan 5.4 software. Dichotomous outcomes pooled using risk ratio (RR) with 95% CIs; continuous outcomes pooled using mean difference (MD) with 95% CIs. Heterogeneity judged by I^2 statistic: I^2 <50% adopts fixed-effects model; I^2 ≥50% adopts random-effects model. Missing median/IQR data converted to mean and SD using validated published formulas. Funnel plots for qualitative publication bias assessment.

Subgroup analysis No predefined subgroup analyses will be performed in this meta-analysis due to the limited number of included randomized controlled trials and inconsistent definitions of early laparoscopic cholecystectomy across studies. Heterogeneity between studies will only be discussed descriptively in the discussion section without quantitative subgroup exploration.

Sensitivity analysis No sensitivity analyses were planned or conducted in this meta-analysis. Heterogeneity across trials was only interpreted narratively in the discussion section without quantitative robustness testing by omitting single studies sequentially.

Country(ies) involved Author affiliations: China (corresponding and all authors of this meta-analysis).

Keywords Gallstones; Pancreatitis; Laparoscopic cholecystectomy; Meta-analysis.

Contributions of each author
Author 1 - zhiqing li - Methodology; Formal analysis; Data curation; Writing – original draft; Writing – review & editing.
Author 2 - jixia sun - Methodology; Formal analysis; Writing – original draft.
Author 3 - dalong zhao - Methodology; Data curation.
Author 4 - jinajian han - Conceptualization; Writing – review & editing.