INPLASY

Laparoscopic-Guided Transversus Abdominis Plane Block Versus Port-Site Infiltration for Postoperative Analgesia After Laparoscopic Cholecystectomy: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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ADMINISTRATIVE INFORMATION

Support - No funding was received for this study.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 September 2026 and was last updated on 13 September 2026.

INTRODUCTION

Review question / Objective To compare laparoscopic-guided transversus abdominis plane block (LTAP) with port-site infiltration (PSI) for pain management after laparoscopic cholecystectomy (LC), focusing on early postoperative pain, rescue analgesia requirements, and recovery outcomes.

Condition being studied Acute postoperative pain following LC and its potential effects on analgesic requirements and early recovery.

METHODS

Participant or population Adult patients scheduled for elective LC. Studies involving children, open cholecystectomy, or combined complex surgical procedures were excluded.

Intervention LTAP using local anesthetic injection under laparoscopic guidance. Eligible techniques included those described as laparoscopic-assisted or laparoscopy-guided TAP block, provided that the intervention met the review's definition of LTAP.

Comparator PSI with local anesthetic administered to laparoscopic trocar sites. Intraperitoneal local anesthetic administration and other regional blocks were not eligible comparators.

Study designs to be included Randomized controlled trials.

Eligibility criteria Inclusion criteria:

(1) Randomized controlled trials (RCTs).
(2) Adults undergoing elective LC.
(3) A direct comparison between LTAP and PSI.
(4) Reporting at least one relevant outcome: postoperative pain scores, proportion of patients requiring rescue analgesia, postoperative nausea and vomiting, operative time, or length of hospital stay.

(5) Availability of data that could be extracted or converted for quantitative analysis.

Exclusion criteria:

(1) Pediatric populations or surgical procedures outside the scope of elective LC.
(2) Ultrasound-guided, landmark-guided, or other non-laparoscopic TAP techniques.
(3) LTAP combined with another local analgesic intervention when its independent effect could not be evaluated.
(4) Control interventions other than PSI.
(5) Nonrandomized studies, case reports, reviews, commentaries, or conference abstracts.
(6) Unavailable full texts or insufficient outcome data.
(7) Overlapping publications from the same trial; the report containing the most complete data was selected.

Information sources PubMed/MEDLINE, Embase, CENTRAL, and Web of Science were searched from inception to August 6, 2026. ClinicalTrials.gov was examined for ongoing or unpublished trials, and Google Scholar was searched for relevant studies and grey literature, with the first 200 results ranked by relevance screened.

Main outcome(s)
Postoperative pain score at 6 hours.
Postoperative pain score at 12 hours.
Postoperative pain score at 24 hours.
Proportion of patients requiring rescue analgesia.
Incidence of postoperative nausea and vomiting (PONV).
Operative time.
Length of hospital stay.

Quality assessment / Risk of bias analysis Risk of bias was evaluated independently by two reviewers using the Cochrane Risk of Bias tool, version 1.0. The assessment addressed randomization, allocation concealment, blinding of participants and personnel, blinding of outcome assessors, incomplete outcome data, selective reporting, and other potential biases.

Strategy of data synthesis Meta-analyses were undertaken in Review Manager 5.4. Continuous outcomes were pooled as mean differences (MDs), while binary outcomes were summarized as risk ratios (RRs), both with 95% confidence intervals (CIs). Where necessary, reported medians and interquartile ranges were converted to estimated means and standard deviations using published methods.

Random-effects models were applied throughout because differences in block techniques, anesthetic regimens, and perioperative care were anticipated. Heterogeneity was assessed using Cochran's Q test and I^2; I^2 >50% or P <0.10 indicated substantial heterogeneity. A two-sided P <0.05 defined statistical significance.
Trial sequential analysis (TSA) was performed using version 0.9.5.10 Beta to evaluate cumulative evidence against the required information size and sequential monitoring boundaries. Analyses used a two-sided α of 0.05 and 80% statistical power, with adjustment for heterogeneity.

Subgroup analysis Exploratory subgroup analyses investigated variation in treatment effects according to LTAP injection volume and study sample size. These analyses were intended to explore heterogeneity rather than establish the superiority of a particular injection regimen.

Sensitivity analysis The influence of individual trials was examined through leave-one-out analyses, recalculating pooled estimates after removing each study in turn. Both effect direction and statistical significance were assessed.

Country(ies) involved China.

Keywords Laparoscopic cholecystectomy; Laparoscopic-guided transversus abdominis plane block; Port-site infiltration; Postoperative analgesia; Systematic review; Meta-analysis.

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