

INPLASY

Efficacy of transversus abdominis plane block in patients undergoing laparoscopic bariatric surgery: An update systematic review and meta-analysis

INPLASY2026100117

doi: 10.37766/inplasy2026.10.0117

Received: 28 October 2026

Published: 28 October 2026

Zhang, XD; Zhu, SY; Tang, MM; Wang, YQ; Xu, YQ; Wang, MY; Luo, JH.

Corresponding author:

Jianghui Luo

luojianghui@qq.com

Author Affiliation:

Department of Anesthesiology,
Sichuan Cancer Hospital and
Institute, Sichuan Cancer Center,
School of Medicine, University of
Electronic Science and Technology
of China, Chengdu, Sichuan.

ADMINISTRATIVE INFORMATION**Support** - No support.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY2026100117

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

INTRODUCTION

Review question / Objective Transversus abdominis plane block (TAPB) is routinely incorporated into enhanced recovery after bariatric surgery pathways, yet its analgesic efficacy in laparoscopic bariatric surgery (LBS) remains uncertain. This systematic review and meta-analysis evaluated the effect of TAPB on postoperative pain and recovery outcomes.

Condition being studied The global prevalence of obesity continues to rise unabated. By 2022, approximately one in eight adults worldwide were living with obesity; adult obesity rates have more than doubled since 1990, while adolescent obesity has quadrupled over the same period. Obesity is now recognized as one of the most pressing public health challenges of current time. Bariatric surgery remains the most effective intervention for sustained weight loss and metabolic improvement in patients with severe obesity. Laparoscopic bariatric surgery (LBS), in particular laparoscopic

sleeve gastrectomy (LSG), and laparoscopic Roux-en-Y gastric bypass (LYGB) has proven effective in achieving substantial weight loss, ameliorating comorbidities, and delivering favorable short- and long-term outcomes. Despite the minimally invasive nature of these procedures, patients frequently experience moderate-to-severe postoperative pain comprising both somatic (incisional) and visceral components, with the latter often predominating during the first 24-48 h. This distinctive pain profiles arises from gastric sleeve spasm, intraluminal hypertension, and peritoneal irritation, rendering conventional opioid-based frequently insufficient. Compounding this challenge, obese patients often with obstructive sleep apnea and heightened opioid sensitivity to opioid-related adverse effects, including respiratory depression and gastrointestinal dysfunction. Consequently, ultrasound-guided truncal fascial plane blocks have emerged as essential components of multimodal, opioid-sparing analgesia within enhanced recovery after bariatric surgery pathways.

Over the past decade, a range of regional techniques, including transversus abdominis plane block (TAPB), erector spinae plane block (ESPB), quadratus lumborum block (QLB), and external oblique intercostal blocks (EOIB), has been evaluated for post-LBS analgesia. A recent network meta-analysis of 23 randomized controlled trials (RCTs) demonstrated that, although these blocks are generally safe and effective, the certainty of evidence for most outcomes was moderate to low, with most interventions supported by only one or two trials[8]. Among these modalities, TAPB has been the most extensively studied. By depositing local anesthetic between the internal oblique and transversus abdominis muscles, the block interrupts the anterior rami of T7-L1 thoracolumbar nerves supplying the anterior abdominal wall. Systematic reviews and meta-analyses of RCTs have shown that TAPB significantly reduces early postoperative pain scores and 24h opioid consumption compared with placebo or systemic analgesia alone[3, 16]. However, its analgesic benefit attenuates markedly beyond 24 h, consistent with the pharmacokinetic profile of single-shot local anesthetics. More fundamentally, because TAPB provides purely somatic coverage, it does not interrupt visceral nociceptive pathways, which constitute a dominant element of post-LSG discomfort[8]. The updated PROSPECT guidelines accordingly endorse ultrasound-guided bilateral TAPB as part of evidence-based multimodal regimens for LBS, while explicitly acknowledging that current approaches inadequately address visceral pain and that the certainty of underlying evidence remains moderate to low. Several unresolved methodological and clinical issues limit the translational value of existing evidence. Previous meta-analyses have included heterogeneous surgical cohorts or compared TAPB against disparate comparators without adequate stratification. Potential sources of clinical heterogeneity, such as variations in local anesthetic dose, fascial approach, and timing of block administration, which have rarely been evaluated. Furthermore, the rapid accumulation of new randomized evidence necessitates an updated, LBS-specific synthesis with rigorous risk-of-bias appraisal and predefined subgroup analyses. This systematic review and meta-analysis was therefore conducted to consolidate contemporary evidence on TAPB efficacy and safety specifically in LBS, investigate clinically relevant effect modifiers, and generate refined, evidence-based recommendations to optimize perioperative analgesia in this challenging population.

METHODS

Participant or population Adult patients (aged ≥ 18 years) scheduled for LBS.

Intervention Ultrasound-guided or laparoscopic-guided TAPB.

Comparator Control (no block, placebo, or alternative regional block).

Study designs to be included Only original, full-text, peer-reviewed RCTs published in English were included.

Eligibility criteria No restrictions were placed on publication year; only studies published in English were considered. Following deduplication, two independent reviewers screened titles and abstracts. Studies deemed potentially eligible then underwent full-text assessment against the predefined inclusion criteria. Disagreements were resolved through consensus or, when necessary, arbitration by a third reviewer.

Inclusion criteria were limited to RCTs comparing TAPB with control arm (no block, placebo, or alternative regional technique) in adults undergoing LBS performed under general anesthesia.

Information sources We conducted the systematic search on 12 October 2026 across PubMed, Web of science, and the Cochrane Library.

Main outcome(s) The primary outcomes were postoperative pain scores at rest or during movement at 24h and 48h, measured using either a visual analogue score (VAS) or a numerical rating scale (NRS).

Additional outcome(s) Secondary outcomes included postoperative opioid consumption (morphine equivalent) during the first 24h; time to first analgesic request; time to ambulate; time to first oral intake; time to first flatus; postoperative complications, specifically postoperative nausea and vomiting (PONV), pruritus, and hypotension; length of hospital stay (LOS), and patient satisfaction scores (PSS).

Quality assessment / Risk of bias analysis Two independent reviewers assessed the risk of bias for each outcome in each included study using the Cochrane Risk of Bias 2 (RoB-2) tool, which evaluates the following five domains: (i) bias arising from the randomization process; (ii) bias due to deviations from intended interventions; (iii) bias due to the missing outcome data; (iv) bias in

measurement of the outcomes; (v) bias in selection of the reported result. An overall risk-of-bias judgment for each outcome was derived from the domain-level assessment. The certainty of evidence for each outcome was graded using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach, which evaluates the following parameters: (i) risk of bias of included studies; (ii) indirectness, inconsistency, and imprecision of the effect estimate; and (iii) other considerations, including risk of publication bias. The certainty of evidence outcome was rated as high, moderate, low, or very low.

Strategy of data synthesis Data were analyzed using Review Manager (RevMan) version 5.4.1 (The Cochrane Collaboration). For continuous outcomes, we pooled standardized mean difference (SMD) with 95% confidence interval (CI) using the inverse variance method; for studies reporting medians with interquartile range (IQR), we converted to means and standard deviation (SD) using the method described by Hozo et al. For dichotomous outcomes, we calculated relative risk (RR) with 95% CI using the Mantel-Haenszel method. All analyses were performed using a random-effects model with the DerSimonian-Laird estimator. Statistical significance was set at $P < 0.05$. Funnel plots were generated to assess publication bias and small-study effects for outcomes with data from at least 10 included studies.

Subgroup analysis Prespecified subgroup analyses were performed to explore whether the analgesic efficacy of TAPB versus control was modified by: (i) perioperative multimodal analgesia incorporating NSAIDs; (ii) perioperative antiemetic prophylaxis, consistent with current PROSPECT recommendations for LBS; and (iii) BMI category.

Sensitivity analysis When substantial heterogeneity ($I^2 > 50\%$) was observed for a primary outcome, leave-one-out sensitivity analyses were conducted to identify potential sources.

Country(ies) involved China.

Keywords Transversus abdominis plane block, Obesity, Laparoscopic bariatric surgery, Laparoscopic sleeve gastrectomy, Regional block.

Contributions of each author

Author 1 - Xudong Zhang
Email: zhangxudong1234@126.com
Author 2 - Shuying Zhu
Email: syzhu_sichuanhosp@126.com
Author 3 - Miaomiao Tang
Email: 331808578@qq.com

Author 4 - Yanqing Wang
Email: wangyanqing@scszllyy.org.cn
Author 5 - Yiquan Xu
Email: xuyqqing@163.com
Author 6 - Mingyan Wang
Email: anqiuzyy@126.com
Author 7 - Jianghui Luo
Email: luojianghui@qq.com