Current Clinical and Medical Education

Current Clinical and Medical Education
Curr Clin Med Educ 4 (1), 230–239 (2026)
Received 24 Dec 2025 | **Revised** 22 Jan 2026 | **Accepted** 24 Feb 2026 | **Online Available** 12 Mar 2026

Anna Medical College

OPEN ACCESS

ISSN (O) 3023-3593 | (Print: 3023-3585)

ORIGINAL ARTICLE

Ultrasound-Guided Subcostal Transversus Abdominis Plane Block versus Port-Site Infiltration for Postoperative Analgesia following Elective Laparoscopic Cholecystectomy: A Prospective Randomised Controlled Study

K Priyadharshini[1] | R Balasubramaniyam[1*] | K Nandhini[1]

Abstract

Background and Objectives: Laparoscopic cholecystectomy is associated with significant early postoperative pain despite its minimally invasive nature. Port-site infiltration provides limited somatic coverage, whereas the ultrasound-guided subcostal transversus abdominis plane (STA) block targets the thoracolumbar nerves T6–L1 within the fascial plane, offering wider supraumbilical analgesia. This study aimed to compare the analgesic efficacy of ultrasound-guided STA block with port-site infiltration in patients undergoing elective laparoscopic cholecystectomy.

Methods: Fifty ASA I–II patients aged 18–65 years undergoing elective laparoscopic cholecystectomy under general anaesthesia were prospectively randomised into two equal groups. Group P (n = 25) received port-site infiltration and Group S (n = 25) received ultrasound-guided STA block, both using 20 mL of 0.25% bupivacaine administered before extubation. Postoperative pain was assessed by Visual Analogue Scale (VAS, 0–10 cm) at 1, 4, 8, 12, and 24 hours. Secondary outcomes included time to first rescue analgesia, drug-specific rescue analgesic consumption, cumulative 8-hour equivalent morphine dose, recovery unit discharge time, and complications.

Results: Group S demonstrated significantly lower VAS scores than Group P at all postoperative time points ($P < 0.01$, repeated-measures ANOVA). Median fentanyl requirement in recovery was reduced by 40.0% in Group S (0.9 vs. 1.5 μg/kg). Cumulative 8-hour equivalent morphine dose was 45.2% lower in Group S (9.2 vs. 16.8 mg). Codeine rescue requirement was significantly less frequent in Group S (24% vs. 68%; $P < 0.05$). Recovery unit discharge time was shorter in Group S (65 vs. 110 min). No major block-related complications were recorded.

Conclusion: Ultrasound-guided STA block provides superior and sustained postoperative analgesia compared with port-site infiltration following laparoscopic cholecystectomy, with clinically meaningful reductions in opioid consumption and recovery unit stay, and a favourable safety profile.

Key words: subcostal transversus abdominis plane block, port-site infiltration, laparoscopic cholecystectomy, postoperative analgesia, ultrasound-guided regional anaesthesia, opioid-sparing, bupivacaine, Visual Analogue Scale

1 | INTRODUCTION

Laparoscopic cholecystectomy is currently the gold-standard surgical technique for the management of symptomatic cholelithiasis and represents one of the most commonly performed elective abdominal procedures worldwide. Its well-established advantages over open cholecystectomy — including reduced intraoperative blood loss, lower wound infection rates, shorter hospital stay (1)

[1]Government Medical College and Hospital, Department of Anaesthesiology Government Medical College and Hospital, Tirupur, Tirupur, Tirupur.

Address correspondence to: R, Balasubramaniyam, Government Medical College and Hospital, Department of Anaesthesiology Government Medical College and Hospital, Tirupur, Tirupur, Tirupur, *Email: rsbalas@gmail.com*

K Priyadharshini et al., 2026; Published by Anna Medical College, Inc. This Open Access article is distributed under the terms of the Creative Commons License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

, and earlier return to normal activity — have made it the preferred approach in surgical practice. Despite its minimally invasive nature, however, a significant proportion of patients experience moderate to severe pain during the early postoperative period, which remains a primary determinant of patient satisfaction, recovery quality, and time to discharge. (2)

The pain experienced following laparoscopic cholecystectomy is multifactorial in origin. It arises from three principal mechanisms: somatic pain at the anterior abdominal wall from trocar insertion sites; visceral pain at the surgical site of gallbladder dissection and resection; and referred pain to the right shoulder secondary to diaphragmatic irritation caused by residual carbon dioxide following pneumoperitoneum (3, 4) . Of these, somatic pain from abdominal wall incisions constitutes the predominant and most amenable component to regional analgesic intervention. The afferent nociceptive supply to the anterolateral abdominal wall is provided by the thoracolumbar nerves T6 to L1, which travel within the transversus abdominis plane (TAP) — the fascial compartment situated between the internal oblique and transversus abdominis muscles. (5)

A variety of analgesic strategies have been investigated to optimise postoperative pain control after laparoscopic cholecystectomy. These include systemic analgesia with non-steroidal anti-inflammatory drugs (NSAIDs) and opioids, intravenous patient-controlled analgesia, thoracic epidural analgesia (6) , intraperitoneal local anaesthetic instillation, low-pressure pneumoperitoneum, and regional nerve block techniques. Among these, port-site infiltration with local anaesthetic has historically been the most widely adopted technique due to its simplicity and ease of performance. However, its analgesic coverage is limited to the superficial layers at trocar entry points, providing only partial somatic blockade without addressing the deeper fascial plane where the thoracolumbar nerve trunks course. (6, 7)

The transversus abdominis plane block, first described by McDonnell et al., offers a more comprehensive approach by depositing local anaesthetic directly into the neurovascular fascial plane, thereby achieving segmental blockade of the thoracolumbar nerves supplying the anterior abdominal wall. The subcostal transversus abdominis plane (STA) block, a subsequently described refinement of this technique, involves injection of local anaesthetic into the TAP lateral to the linea semilunaris, immediately inferior and parallel to the costal margin. This approach produces reliable unilateral supraumbilical analgesia that is particularly appropriate for upper abdominal surgery, including laparoscopic cholecystectomy. With the advent of real-time ultrasound guidance, the STA block can now be performed with high precision, improved safety, and consistent injectate spread within the target fascial plane. (8)

Despite growing evidence supporting the analgesic efficacy of ultrasound-guided TAP block variants, direct comparative data between STA block and conventional port-site infiltration in the context of laparoscopic cholecystectomy remain limited. The present study was therefore designed to compare the analgesic efficacy of ultrasound-guided subcostal TAP block with port-site infiltration of local anaesthetic in patients undergoing elective laparoscopic cholecystectomy under general anaesthesia, with respect to postoperative pain scores, rescue analgesic consumption, time to first rescue analgesia, and time to discharge from the recovery unit. (9)

2 | MATERIALS AND METHODS

2.1 | Ethical Approval and Study Registration

This prospective randomised controlled study was conducted at the Institute of Anaesthesiology, Government Rajaji Hospital, Madurai Medical College, Madurai, following approval by the Institutional Ethics Committee (IEC), Government Rajaji Hospital, Madurai Medical College. Written informed consent was obtained from all participants prior to enrolment. The study was conducted in collaboration with the Department of General Surgery over a period of two years.

2.2 | Study Design and Participants

Fifty patients scheduled for elective laparoscopic cholecystectomy under general anaesthesia were enrolled and randomised into two equal groups of 25 each by a computer-generated random number sequence. Allocation was concealed until the point of intervention. Group P received port-site infiltra-

tion with 20 mL of 0.25% bupivacaine, and Group S received ultrasound-guided subcostal transversus abdominis plane (STA) block with 20 mL of 0.25% bupivacaine. Both interventions were performed immediately before extubation at the conclusion of surgery.

2.3 | Inclusion and Exclusion Criteria

Patients were eligible for inclusion if they met all of the following criteria: scheduled for elective laparoscopic cholecystectomy under general anaesthesia; aged 18–65 years; of either sex; and classified as American Society of Anesthesiologists (ASA) physical status I or II.

Patients were excluded if any of the following applied: history of bleeding disorder or current anticoagulant therapy; refusal to participate; presence of local infection at the anticipated injection site; documented neuromuscular disorder; respiratory compromise; known allergy to local anaesthetic agents; psychiatric illness; preoperative chronic opioid dependence; or body mass index (BMI) exceeding 35 kg/m^2.

2.4 | Anaesthetic Technique

All patients received a standardised general anaesthetic. Intravenous access was established and standard monitoring applied, including continuous electrocardiography, non-invasive blood pressure, and pulse oximetry. Anaesthesia was induced with propofol (2.2–2.4 mg/kg), fentanyl (3.0–3.1 μg/kg), and atracurium (0.65–0.70 mg/kg) for neuromuscular blockade and tracheal intubation. Intraoperative multimodal analgesia was provided with intravenous paracetamol and diclofenac. Maintenance of anaesthesia and haemodynamic management were standardised across both groups. At the conclusion of surgery, prior to extubation, patients received their allocated analgesic intervention as per group assignment.

2.5 | Interventional Techniques

2.5.1 | Ultrasound-Guided Subcostal TAP Block (Group S)

The block was performed under real-time ultrasound guidance with the patient in the supine position. A high-frequency linear ultrasound probe was placed in the midline of the abdomen, 2 cm below the xiphisternum, and moved laterally along the right subcostal margin. The transversus abdominis muscle was identified deep to, and extending laterally beyond, the rectus abdominis muscle. A 100 mm, 22-gauge block needle was then advanced in-plane under continuous ultrasound visualisation to a position just inferior to the right costal margin, with the needle tip placed within the neurovascular fascial plane between the rectus abdominis muscle and the transversus abdominis muscle. Following careful aspiration to exclude intravascular placement, 20 mL of 0.25% bupivacaine was deposited incrementally within the plane under direct visualisation of spread.

2.5.2 | Port-Site Infiltration (Group P)

Port-site infiltration was performed by the operating surgeon before closure of all trocar sites, immediately prior to extubation. A total of 20 mL of 0.25% bupivacaine was infiltrated across all port sites in a standardised manner, targeting the subcutaneous tissue and fascial layers at each trocar entry point.

2.5.3 | Postoperative Monitoring and Outcome Assessment

All patients were transferred to the post-anaesthesia care unit (PACU) following extubation. Haemodynamic parameters — heart rate (HR), non-invasive blood pressure (NIBP), respiratory rate (RR), and peripheral oxygen saturation (SpO_2) — were recorded at 5, 10, 20, and 30 minutes in the PACU, and subsequently at 1, 4, 8, 12, and 24 hours postoperatively in the surgical ward.

Postoperative pain intensity was assessed using the Visual Analogue Scale (VAS), a 10 cm horizontal scale on which 0 represented no pain and 10 represented the worst imaginable (excruciating) pain, at the same time points. Rescue analgesia was administered when the VAS score was 4 or above, or on

patient request. The following predefined outcomes were recorded:

- VAS pain score at 1, 4, 8, 12, and 24 h postoperatively
- Time to first rescue analgesic requirement
- Drug-specific rescue analgesic consumption (morphine, tramadol, and codeine)
- Total analgesic dose required up to 24 h postoperatively
- Time to discharge from the recovery unit
- Any complications attributable to either technique

2.6 | Statistical Analysis

Sample size was calculated to detect a clinically meaningful difference in postoperative VAS scores between the two groups. Continuous variables including age, weight, BMI, haemodynamic parameters, drug doses, and VAS scores are presented as mean ± standard deviation (SD). Intergroup comparisons of continuous variables were performed using the independent samples Student's t-test. Categorical variables including sex distribution and incidence of adverse effects are expressed as frequencies and percentages, and were compared using the chi-square test or Fisher's exact test as appropriate. Serial postoperative VAS scores were analysed using repeated-measures analysis of variance (ANOVA). A P value of less than 0.05 was considered statistically significant for all comparisons. All statistical analyses were performed using standard statistical software.

3 | RESULTS

Study Population and Baseline Characteristics

Fifty patients undergoing elective laparoscopic cholecystectomy under general anaesthesia were enrolled and equally allocated to two groups of 25 each. Group P received port-site infiltration with 20 mL of 0.25% bupivacaine, and Group S received ultrasound-guided subcostal transversus abdominis plane (STA) block with 20 mL of 0.25% bupivacaine. All 50 patients completed the study per protocol, with no withdrawals, crossovers, or protocol deviations recorded.The two groups were well matched at baseline. No statistically significant intergroup differences were identified for age, body mass index, body weight, intraoperative propofol, fentanyl, atracurium, paracetamol or diclofenac doses, induction time, duration of surgery, or local anaesthetic dose and volume administered (Table 1 ; all P = NS). Comparable perioperative drug exposure and surgical duration in both arms ensured that any postoperative differences observed between groups could be attributed to the analgesic technique rather than to demographic or perioperative confounding.

Table 1. Baseline demographic and perioperative characteristics of study participants

Variable	Group P (n = 25)	Group S (n = 25)	P value
Age (years), mean ± SD	48 ± 3	52 ± 3	NS
BMI (kg/m^2), mean ± SD	28 ± 2	30 ± 2	NS
Weight (kg), mean ± SD	76 ± 4	82 ± 5	NS
Propofol (mg/kg), mean ± SD	2.4 ± 0.2	2.2 ± 0.2	NS
Fentanyl (μg/kg), mean ± SD	3.1 ± 0.2	3.0 ± 0.2	NS
Atracurium (mg/kg), mean ± SD	0.70 ± 0.04	0.65 ± 0.04	NS
Paracetamol (mg/kg), mean ± SD	21 ± 2	16 ± 1.5	NS
Diclofenac (mg/kg), mean ± SD	0.65 ± 0.10	0.58 ± 0.10	NS
Induction time (min), mean ± SD	12 ± 1	16 ± 2	NS
Duration of surgery (min), mean ± SD	76 ± 5	68 ± 5	NS
Local anaesthetic dose (mg/kg), mean ± SD	1.2 ± 0.1	1.1 ± 0.1	NS
Local anaesthetic volume (mL), mean ± SD	21 ± 1	22 ± 1	NS

BMI, body mass index; NS, not significant (P > 0.05). Data are presented as mean ± standard deviation unless otherwise stated.

Postoperative Pain Scores

Postoperative pain intensity was assessed using the Visual Analogue Scale (VAS, 0–10 cm) at 1, 4, 8, 12, and 24 h after surgery. On repeated-measures analysis, Group S demonstrated consistently and significantly lower VAS scores than Group P across all time points ($P < 0.01$). The largest absolute inter-group difference was observed at 1 h postoperatively (VAS: 3.1 vs. 4.4), and this advantage was sustained through 24 h (VAS: 0.7 vs. 1.2), indicating a more prolonged and effective analgesic profile with STA block. Both groups followed a progressive declining pain trajectory over the observation period (Table 2Figure 1).

Table 2. Mean postoperative VAS pain scores at each time point in both groups

Time postoperative	Group P Mean VAS	Group S Mean VAS	Absolute difference	Trend
1 h	4.4	3.1	1.3	Lower in Group S
4 h	2.9	1.6	1.3	Lower in Group S
8 h	2.3	1.3	1.0	Lower in Group S
12 h	1.8	1.0	0.8	Lower in Group S
24 h	1.2	0.7	0.5	Lower in Group S

VAS, Visual Analogue Scale (0–10 cm). Overall group effect: $P < 0.01$, repeated-measures analysis of variance.

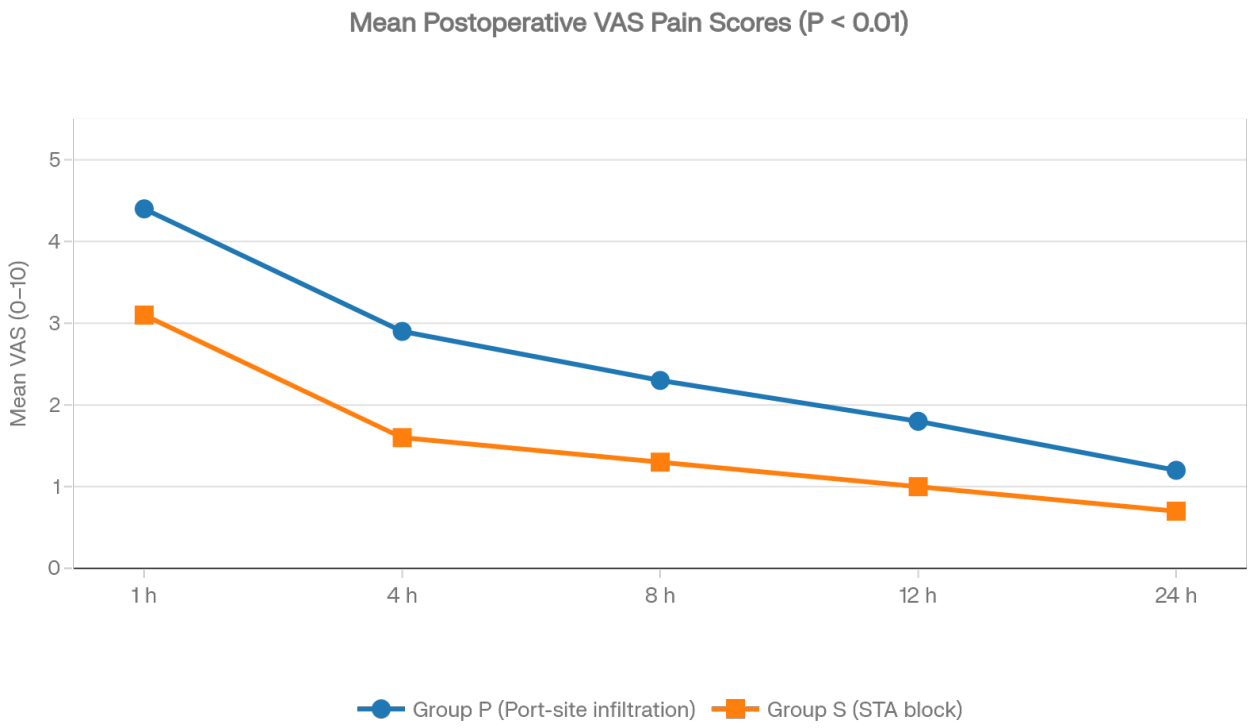

Fig. 1: Mean postoperative Visual Analogue Scale (VAS) pain scores in Group P (port-site infiltration) and Group S (subcostal TAP block) recorded at 1, 4, 8, 12, and 24 hours after surgery

Group S demonstrated consistently lower VAS scores than Group P at all time points. The greatest between-group separation occurred during the early postoperative period. Overall group effect: $P < 0.01$, repeated-measures ANOVA.

Immediate Postoperative Opioid Requirement and Recovery Room Outcomes

Reduced pain intensity in Group S was accompanied

by a significantly lower opioid requirement during the recovery room stay. Although the proportion of patients requiring fentanyl in recovery was comparable between the two groups (P = NS), the median fentanyl dose administered was significantly lower in Group S (0.9 μg/kg vs. 1.5 μg/kg; absolute reduction 0.6 μg/kg; relative reduction 40.0%). Recovery unit discharge was also markedly faster in Group S, with the median time to discharge reduced from 110 min in Group P to 65 min in Group S (absolute reduction 45 min; relative reduction 40.9%), without any associated increase in induction time or operative duration (Table 3Figure 2).

Table 3. Postoperative opioid requirement and recovery unit discharge outcomes

Outcome	Group P (n = 25)	Group S (n = 25)	Absolute reduction	Relative reduction	Result
Patients requiring fentanyl in recovery, n	Comparable	Comparable	—	—	NS
Median fentanyl dose in recovery (μg/kg)	1.5	0.9	0.6 μg/kg	40.0%	Lower in Group S
Median recovery unit discharge time (min)	110	65	45 min	40.9%	Lower in Group S

NS, not significant (P > 0.05).

Each panel presents one outcome on its own scale to permit unambiguous intergroup comparison. Group S demonstrated lower values than Group P across all three measures, reflecting reduced early opioid burden and faster recovery unit discharge.

Cumulative Postoperative Opioid Burden at 8 Hours

Total postoperative opioid exposure during the first 8 h was quantified as an equivalent morphine dose using the following predefined conversion factors: 100 μg intravenous fentanyl = 7 mg intravenous morphine; 60 mg oral codeine = 6 mg intravenous morphine; 100 mg oral tramadol = 10 mg intravenous morphine. The median 8-h equivalent morphine dose was substantially lower in Group S than in Group P (9.2 mg vs. 16.8 mg; absolute reduction 7.6 mg; relative reduction 45.2%), demonstrating that the analgesic benefit of STA block extended across multiple drug classes throughout the early postoperative period (Table 4).

Drug-Specific Rescue Analgesic Requirement

Rescue analgesic consumption was examined by drug class during the early postoperative period (Table 5; Figure 3). The proportion of patients requiring morphine (12% vs. 4%; P = NS) and tramadol (36% vs. 28%; P = NS) did not differ significantly between the groups, nor did the mean doses of these agents. In contrast, codeine rescue was required by a significantly greater proportion of patients in Group P than in Group S (68% vs. 24%; P < 0.05), and the mean codeine dose administered was also significantly higher in Group P (0.77 $\pm$ 0.16 mg/kg vs. 0.22 $\pm$ 0.10 mg/kg; P < 0.05). This pattern indicates that the opioid-sparing effect of STA block persisted into the ward phase, reducing the need for step-up oral opioid rescue analgesia following recovery unit discharge.Table 5Figure 3

No significant intergroup difference was observed for morphine or tramadol use. Codeine rescue was required significantly less frequently in Group S than in Group P (24% vs. 68%; P < 0.05). Asterisk () denotes statistical significance. *

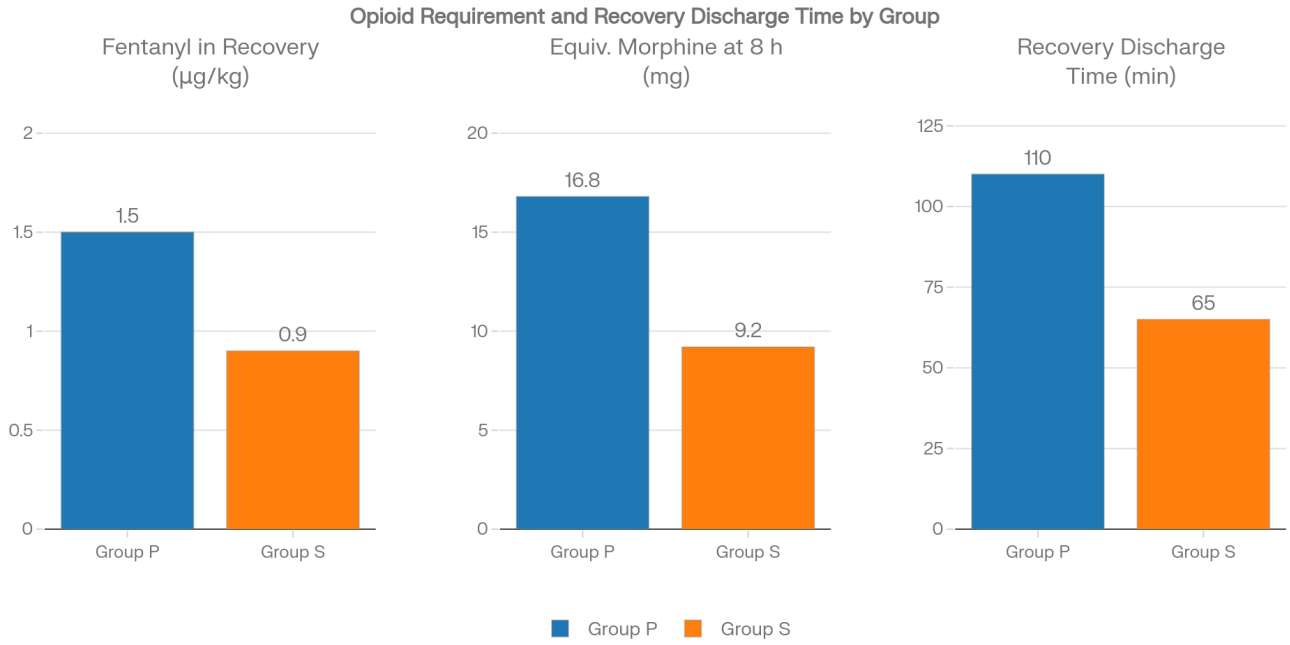

Fig. 2: Median fentanyl requirement in recovery (μg/kg), equivalent morphine dose at 8 hours (mg), and recovery unit discharge time (min) in Group P (port-site infiltration) and Group S (subcostal TAP block)

Table 4. Cumulative equivalent morphine dose during the first 8 postoperative hours

Variable	Group P	Group S	Absolute reduction	Relative reduction
Median equivalent morphine dose, 0–8 h (mg)	16.8	9.2	7.6 mg	45.2%

Equivalent morphine dose calculated using standard opioid conversion factors. Group S vs. Group P: lower cumulative opioid burden.

Table 5. Drug-specific rescue analgesic requirement during the early postoperative period

Analgesic agent	Group P (n = 25)	Group S (n = 25)	P value
Morphine required, n (%)	3 (12%)	1 (4%)	NS
Mean morphine dose (mg/kg), mean ± SD	3.0 ± 0.03	1.0 ± 0.9	NS
Tramadol required, n (%)	9 (36%)	7 (28%)	NS
Mean tramadol dose (mg/kg), mean ± SD	0.54 ± 0.21	0.27 ± 0.10	NS
Codeine required, n (%)	17 (68%)	6 (24%)	**< 0.05**
Mean codeine dose (mg/kg), mean ± SD	0.77 ± 0.16	0.22 ± 0.10	**< 0.05**

NS, not significant. Bold values indicate statistically significant intergroup differences. Data are presented as n (%) or mean ± standard deviation.

Time to First Rescue Analgesia and Total Analgesic Requirement

Time to first rescue analgesia was longer in Group S than in Group P, consistent with the lower early pain scores and reduced opioid requirement observed in this group across the postoperative period. Total postoperative analgesic requirement was correspondingly lower in Group S, corroborating the cumulative opioid burden data and further confirming the sustained analgesic superiority of ultrasound-guided STA block over port-site infiltration.

Complications

No major block-related adverse events were observed in either group throughout the study period. Specifically, no cases of local anaesthetic systemic toxicity, vascular puncture, visceral injury, pneumothorax, or postoperative neurological deficit were recorded. Ultrasound-guided STA block was well tolerated in all 25 patients assigned to Group S. It is acknowledged that the present study was not sta-

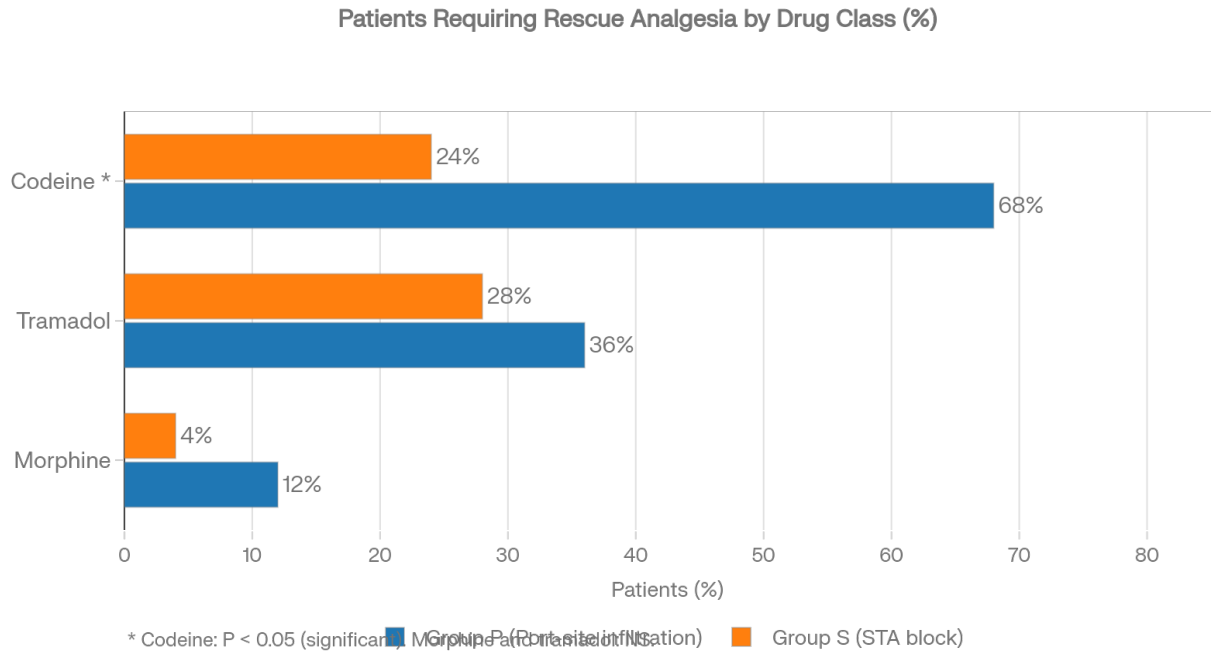

Fig. 3: Proportion of patients in Group P (port-site infiltration) and Group S (subcostal TAP block) requiring morphine, tramadol, and codeine as rescue analgesia during the early postoperative period

tistically powered to detect rare adverse events, and the safety profile should be interpreted within this limitation.

4 | DISCUSSION

The present study evaluated the analgesic efficacy of ultrasound-guided subcostal transversus abdominis plane (STA) block compared with port-site infiltration in patients undergoing elective laparoscopic cholecystectomy under general anaesthesia. The principal finding was that STA block provided superior postoperative analgesia, as evidenced by significantly lower Visual Analogue Scale pain scores across all time points up to 24 h ($P < 0.01$), reduced rescue opioid consumption, and earlier discharge from the recovery unit.

Laparoscopic cholecystectomy, despite being a minimally invasive procedure, is associated with a multifactorial pain experience encompassing somatic, visceral, and referred components. Port-site infiltration targets only the parietal peritoneum and subcutaneous tissue at trocar entry points, limiting the extent of somatic block achieved. In contrast, the STA block deposits local anaesthetic in the fascial plane deep to the transversus abdominis muscle along the subcostal margin, achieving a wider spread of sensory blockade that encompasses the upper abdominal dermatomes, providing more comprehensive coverage of the laparoscopic port sites and the gallbladder fossa region. This anatomical advantage likely underlies the consistently lower pain scores observed in Group S throughout the postoperative period.

The opioid-sparing effect of STA block demonstrated in this study carries significant clinical relevance. The median fentanyl requirement in recovery was reduced by 40.0% in Group S, and the cumulative 8-h equivalent morphine dose was reduced by 45.2%. Minimising postoperative opioid exposure is increasingly recognised as a key objective in perioperative care, given the well-established associations between opioid use and adverse effects including nausea, vomiting, sedation, respiratory depression, and delayed recovery. The significant reduction in codeine rescue analgesia requirement in Group S further confirms that the analgesic benefit extended beyond the immediate recovery period and into the ward phase.

The notably shorter recovery unit discharge time in Group S (65 min vs. 110 min; reduction 40.9%)

reflects the downstream benefit of effective regional analgesia on early postoperative recovery metrics. Reduced pain and lower opioid burden collectively facilitate earlier mobilisation and discharge readiness, with potential implications for day-surgery pathways and healthcare resource utilisation.

No major complications attributable to STA block were recorded in this study, supporting the safety of the ultrasound-guided technique in this patient population. The use of real-time ultrasound guidance minimises the risk of inadvertent vascular or visceral injury and is now considered the standard of care for fascial plane blocks.

5 | CONCLUSION,

The ultrasound-guided STA block offers a superior analgesic profile compared with port-site infiltration following laparoscopic cholecystectomy, with meaningful reductions in pain scores, opioid consumption, and recovery room stay, and a favourable safety profile.

Declarations

Ethics approval and consent to participate

This prospective randomised controlled study was conducted at the Institute of Anaesthesiology, Government Rajaji Hospital, Madurai Medical College, Madurai, after approval from the Institutional Ethics Committee (IEC), Government Rajaji Hospital, Madurai Medical College. Written informed consent was obtained from all participants before enrolment.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

No external funding was received for this study.

Authors' contributions

All authors contributed to the conception and design of the study. Data collection, analysis, and interpretation were performed by the authors, and all authors read and approved the final manuscript.

AcknowledgementsThe authors acknowledge the support of the Institute of Anaesthesiology and the Department of General Surgery, Government Rajaji Hospital, Madurai Medical College, Madurai, in conducting this study. The study was conducted in collaboration with the Department of General Surgery over a period of two years

REFERENCES

1. Tsai HC, Yoshida T, Chuang TY. Transversus abdominis plane block: An updated review of anatomy and techniques. Biomed Res Int. 2017;.
2. Soliz JM, Lipski I, Hancher-Hodges S. Subcostal transverse abdominis plane block for acute pain management: A review. Anesth Pain Med. 2017;7(5).
3. Kim AJ, Yong RJ, Urman RD. The role of transversus abdominis plane blocks in enhanced recovery after surgery pathways for open and laparoscopic colorectal surgery. J Laparoendosc Adv Surg Tech A. 2017;27(9).
4. Shady NW, Sallam HF, Ali SS. Effect of intraperitoneal and incisional port site lidocaine on pain relief after gynecological laparoscopic surgery: A randomized controlled study. Middle East. Fertil Soc J. 2018;23(1):63–67.
5. Suseela I, Anandan K, Aravind A. Comparison of ultrasound-guided bilateral subcostal transversus abdominis plane block and port-site infiltration with bupivacaine in laparoscopic cholecystectomy. Indian J Anaesth. 2018;62(7):497–501.
6. Baral B, Poudel PR. Comparison of analgesic efficacy of ultrasound-guided subcostal transversus abdominis plane block with port site infiltration following laparoscopic cholecystectomy. J Nepal Health Res Counc. 2019;16(41):457–461.
7. Reddy A, Bhandary A, Shetty SR. Comparative study between an ultrasound-guided transversus abdominis plane block and an ultrasound-guided

caudal block for postoperative analgesia in children undergoing lower abdominal surgeries - A prospective randomised study. S Afr J Anaesth Analg. 2021;27(5):223–227.

8. Wang W, Wang L, Gao Y. A meta-analysis of randomized controlled trials concerning the efficacy of transversus abdominis plane block for pain control after laparoscopic cholecystectomy. Front Surg. 2021;8.

9. Aamir MA, Sahebally SM, Heneghan H. Transversus abdominis plane block in laparoscopic bariatric surgery: A systematic review and meta-analysis of randomized controlled trials. Obes Surg. 2021;31(1):133–142.

How to cite this article: Priyadharshini K., Balasubramaniyam R., Nandhini K. Ultrasound-Guided Subcostal Transversus Abdominis Plane Block versus Port-Site Infiltration for Postoperative Analgesia following Elective Laparoscopic Cholecystectomy: A Prospective Randomised Controlled Study. Current Clinical and Medical Education. 2026;230−239.