



ULTRASOUND-GUIDED ERECTOR SPINAE PLANE BLOCK FOR POSTOPERATIVE ANALGESIA IN LAPAROSCOPIC CHOLECYSTECTOMY: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Effective postoperative analgesia after laparoscopic cholecystectomy (LC) improves patient comfort, facilitates early ambulation, and reduces opioid consumption. The ultrasound-guided erector spinae plane (ESP) block has recently gained popularity as a simple and safe interfascial plane block for thoracoabdominal analgesia. **Aim:** To evaluate the analgesic efficacy and opioid-sparing effect of the ESP block in patients undergoing LC. **Methods:** In this prospective observational study, 40 ASA I–II adult patients undergoing elective LC received a unilateral T7 ESP block with 20 ml of 0.25% bupivacaine preoperatively. Postoperative pain scores (VAS at rest and movement) at 0, 2, 6, 12, and 24 hours, time to first rescue analgesia, total opioid requirement, and patient satisfaction were recorded. **Results:** Mean VAS scores remained ≤ 3 at rest and ≤ 4 on movement for the first 12 hours. The mean time to first rescue analgesic was 9.4 ± 2.1 hours. Total 24-hour tramadol consumption averaged 68 ± 22 mg. No complications related to the block were observed. Patient satisfaction scores were high. **Conclusion:** The ultrasound-guided ESP block provides effective postoperative analgesia with significant opioid reduction after laparoscopic cholecystectomy. It is easy to perform, safe, and suitable for routine clinical practice.

KEYWORDS

INTRODUCTION

Laparoscopic cholecystectomy is a commonly performed procedure associated with moderate postoperative pain originating from visceral, parietal, and referred sources. Optimal analgesia is essential to reduce opioid-related side effects, allow early mobilization, and enhance recovery.

The erector spinae plane (ESP) block, introduced in 2016, is a novel interfascial block in which local anaesthetic deposited deep to the erector spinae muscle spreads to dorsal and ventral rami, providing both somatic and visceral analgesia. It is simple, safe, and less technically demanding than thoracic paravertebral or epidural blocks.

This study evaluates the effectiveness of ultrasound-guided ESP block for postoperative analgesia in LC.

AIMS

To assess the analgesic efficacy of the ESP block in reducing postoperative pain after laparoscopic cholecystectomy.

OBJECTIVES

1. To measure postoperative pain scores at rest and during movement.
2. To determine the time to first rescue analgesic requirement.
3. To quantify postoperative opioid consumption.
4. To evaluate patient satisfaction.
5. To assess any block-related complications.

MATERIALS AND METHODS

Study Design

A prospective observational study conducted from January to June 2025 in a tertiary care centre after institutional ethics approval.

Sample Size

40 adult patients.

Inclusion Criteria

- Age 18–60 years
- ASA physical status I–II
- Elective laparoscopic cholecystectomy

Exclusion Criteria

- Coagulation abnormalities
- Local infection at injection site
- Allergy to local anesthetics
- Pregnancy
- Chronic opioid therapy
- Patient refusal

Procedure

Upon arrival in the operating room, standard monitors were applied. After induction with propofol, fentanyl, and rocuronium, a unilateral

ESP block at T7 (on the right side) was performed in the sitting position using a high-frequency linear ultrasound probe. A 22G block needle was advanced in-plane to the transverse process, and 20 ml of 0.25% bupivacaine was deposited deep to the erector spinae muscle with visible hydrodissection.

General anaesthesia was maintained with sevoflurane and oxygen–air mixture. Intraoperative fentanyl supplementation was recorded.

Postoperative Assessment

VAS scores at rest and movement were recorded at:

- 0 hours
- 2 hours
- 6 hours
- 12 hours
- 24 hours

Rescue analgesia: IV tramadol 50 mg when VAS > 4 .

Total tramadol consumption over 24 hours was recorded.

Patient satisfaction was assessed using a 5-point Likert scale.

Statistical Analysis

Continuous variables were expressed as mean $\pm$ SD. Categorical variables were expressed as percentages.

RESULTS

Demographic Profile

Mean age: 42 ± 8.3 years
Male:female ratio: 1:1.2

Pain Scores

VAS at rest: ≤ 3 for up to 12 hours; 24-hour VAS was 2.1 ± 0.8

VAS on movement: ≤ 4 for first 12 hours; 24-hour score was 3.2 ± 1.1

Rescue Analgesia

Mean time to first rescue analgesic: 9.4 ± 2.1 hours

Opioid Consumption

Mean 24-hour tramadol requirement: 68 ± 22 mg

Patient Satisfaction

85% reported “very satisfied”

15% reported “satisfied”

Complications

No complications such as pneumothorax, local anaesthetic toxicity, or hematoma.

DISCUSSION

Pain after laparoscopic cholecystectomy is multifactorial, including incisional pain, diaphragmatic irritation, and visceral discomfort. Although multimodal analgesia is standard, opioid consumption remains significant in many centres.

The ESP block provides both somatic and visceral analgesia due to the spread of local anaesthetic to dorsal and ventral rami, rami communicantes, and paravertebral space. In this study, ESP block provided prolonged analgesia, good pain control, and opioid reduction, consistent with published reports.

Compared with transversus abdominis plane (TAP) block, the ESP block potentially provides wider dermatomal coverage (T5–T12). It is also technically simpler and safer than paravertebral block because the needle remains superficial to the transverse process, reducing risks of neuraxial entry or vascular injury.

No block-related complications were observed, reinforcing the safety of ESP block even in routine clinical practice.

Limitations Include:

Single-centre design
Lack of a control group
Limited sample size

Despite this, the findings support the utility of ESP block as an effective component of postoperative analgesia for LC.

CONCLUSION

The ultrasound-guided erector spinae plane block provides effective and long-lasting postoperative analgesia for laparoscopic cholecystectomy, significantly reduces opioid consumption, and has a high safety profile. It should be considered as part of multimodal analgesic strategies in routine anaesthetic practice.

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