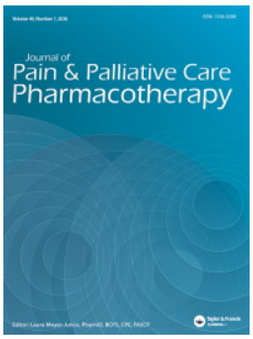

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Journal of Pain & Palliative Care Pharmacotherapy

ISSN: 1536-0288 (Print) 1536-0539 (Online) Journal homepage: www.tandfonline.com/journals/ippc20

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To cite this article: P. Ramakrishnan & A. Mohan (2026) Ultrasound-Guided Erector Spinae Plane Block for Intractable Thoracic Cancer Pain: A Case Series of Five Patients, Journal of Pain & Palliative Care Pharmacotherapy, 40:1, 140-144, DOI: 10.1080/15360288.2025.2598009

To link to this article: https://doi.org/10.1080/15360288.2025.2598009

JOURNAL OF PAIN & PALLIATIVE CARE PHARMACOTHERAPY
2026, VOL. 40, NO. 1, 140–144
https://doi.org/10.1080/15360288.2025.2598009

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CASE REPORT

Ultrasound-Guided Erector Spinae Plane Block for Intractable Thoracic Cancer Pain: A Case Series of Five Patients

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ABSTRACT

Thoracic cancer pain, particularly due to lung malignancies, chest wall infiltration, or pancoast tumors, is often severe and multifactorial. When conventional systemic analgesics alone are inadequate, ultrasound-guided fascial plane blocks, such as the erector spinae plane block (ESPB), may provide rapid significant pain relief, particularly in outpatient settings. We report five cases of advanced thoracic malignancies with severe, refractory pain (Numerical Rating Scale [NRS] 8–10) despite optimized systemic analgesics. ESPB was performed using an in-plane ultrasound-guided technique at levels T4–T8 with a combination of local anesthetic and corticosteroid. All patients achieved significant pain relief (≥5-point reduction in NRS) and improved mobility immediately post-injection, with sustained pain control on reduced oral analgesic doses. During follow-up, one patient required a repeat block after one month, three maintained satisfactory analgesia with oral medications, and one patient was lost to follow-up. No procedural complications were observed. The erector spinae plane block appears to be a technically simple and effective regional analgesic technique for managing intractable thoracic cancer pain. Its rapid onset, opioid-sparing potential, and favorable safety profile make it a valuable adjunct in the palliative care of patients with advanced thoracic malignancy. Larger prospective studies are warranted to define optimal protocols and long-term efficacy.

ARTICLE HISTORY
Received 12 September 2025
Revised 23 October 2025
Accepted 24 November 2025

KEYWORDS
Erector spinae plane block; thoracic cancer; palliative pain; regional anesthesia; case series

Introduction

The erector spinae plane block (ESPB), first described by Forero et al. in 2016, is an ultrasound-guided fascial plane block that has gained popularity due to its simplicity, safety, low learning curve, and wide-ranging analgesic benefits (1). By depositing local anesthetic deep to the erector spinae muscle at the level of the transverse process, ESPB allows longitudinal spread of injectate, potentially extending into the paravertebral and epidural spaces. This mechanism enables blockade of both dorsal and ventral rami of spinal nerves as well as sympathetic fibers, thereby providing somatic and visceral analgesia (2). The block has been widely applied in thoracic and abdominal surgeries and has been proposed as a "Plan A" regional technique due to its versatility and ease of learning (3,4). Emerging literature suggests that ESPB may also be useful in managing non-surgical pain, including post-herpetic neuralgia, myofascial pain, complex regional pain syndrome, persistent post-surgical pain, failed back surgery syndrome, and cancer-related pain syndromes (5–9).

In this report, we present five cases of advanced thoracic malignancies in which ultrasound-guided thoracic ESPB was used for chronic pain management (Table 1). Although ESPB is routinely practiced in our institution for perioperative analgesia, these represent our initial experience with its application for chronic, cancer-related pain. Written informed consent was obtained from all participants. The blocks were performed by a consultant anesthesiologist under ultrasound guidance using an in-plane approach with a high-frequency linear probe (5–13 MHz). The level of injection and drug composition (local anesthetic concentration, volume, and adjuvant) were individualized based on the site of pain and clinical condition. The procedure provided rapid and effective pain relief in all patients; no inadequate or failed

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Table 1. Patient characteristics, ESP block details, and pain outcomes in thoracic malignancy.

Pt No	Age/Sex	Diagnosis & Current Management	Pain Characteristics	ESP Block (Level, Volume & Drug)	Immediate Post-Block NRS[1] & Sensory Level	Follow-up / Duration of Relief
1	58/F	Moderately differentiated SCC[a], left lung, chest wall invasion (rib 3–5); on EBRT[b] + Paclitaxel/Carboplatin	Refractory burning/aching pain T2–T6, NRS 10/10, functional limitation	Left T4, 20 mL 0.2% ropivacaine + 8 mg dexamethasone	NRS[c] 1/10; C7–T8	Comfortable for 1 month on systemic medications
2	61/M	Right lung carcinoma with SCVO[d], skeletal metastasis; post-hypofractionated EBRT; post-CVA[e], hypertensive	Severe sharp stabbing, burning pain radiating to neck/arm; allodynia, NRS 10/10	Right T4, 20 mL 0.2% ropivacaine + 8 mg dexamethasone	NRS 1/10; immediate relief	1 week relief; pre-block status at 1 month; block repeated; later managed with oral medications
3	72/F	Left lung carcinoma with cavitating lesions, rib erosion[c-e], osteoclastic activity; brain metastases	Severe burning pain, left thoracic dermatomes; NRS 10/10	Left T4, 20 mL 0.2% ropivacaine + 8 mg dexamethasone	NRS 1–2/10; C7–T8	Relief >2 wk; resumed oral medications
4	57/M	Metastatic right lung carcinoma; post-palliative EBRT	Persistent right chest pain radiating to back; NRS 8/10	Right T5, 20 mL 0.2% ropivacaine + 40 mg methylprednisolone	NRS 0/10 at 15 min; T2–T9	Pain-free 1 week; oral medications dose reduced by 50%, NRS 4–5/10 at 1 month
5	60/M	Right lung carcinoma with gallbladder involvement; pleural effusion post-ICD[f] & pleurodesis; CAD[g] (post-PTCA[h])	Lower chest and flank pain; NRS 8–9/10	Right T8, 20 mL 0.2% ropivacaine + 40 mg methylprednisolone	NRS 2/10; T3–T12	Rapid relief; NRS 0–2/10 at 24 h; lost to follow-up

[a]SCC: Squamous cell carcinoma.
[b]EBRT: External beam radiotherapy.
[c]NRS: Numeric Rating Scale (0 = no pain, 10 = worst pain).
[d]SCVO: Superior caval vein obstruction.
[e]CVA: Cerebrovascular accident.
[f]ICD: Intercostal drainage.
[g]CAD: Coronary artery disease; PTCA.
[h]Percutaneous Transluminal Coronary Angioplasty.

blocks occurred, and no procedural or systemic adverse effects were observed.

Case reports

Case 1

A 58-year-old female with moderately differentiated squamous cell carcinoma of the left lung, with chest wall invasion and erosion of the 3rd–5th ribs, was receiving palliative external beam radiotherapy and combination chemotherapy with paclitaxel and carboplatin. She presented with severe, refractory pain (NRS 10/10) localized to the T2–T6 dermatomes, unrelieved by WHO Step 3 analgesics, including oral morphine (120 mg/day), gabapentin, paracetamol, and diclofenac.

Since the patient was in significant distress and unable to sit or lie comfortably,hence as a rescue analgesic technique, a left-sided ESPB was planned. Prior to the procedure, intravenous paracetamol, diclofenac, and titrated fentanyl were administered to reduce pain to NRS 3/10 and facilitate positioning.

Under strict aseptic precautions, a high-frequency linear ultrasound probe was placed longitudinally at T4. Following local infiltration, a 22-gauge spinal needle was advanced in-plane in a craniocaudal direction to contact the transverse process. After confirming needle placement with hydrodissection, 20 ml of 0.2% ropivacaine combined with 8 mg dexamethasone was injected into the fascial plane between the transverse process and the erector spinae muscle.

Pain relief was immediate (NRS 1/10), with sensory blockade from T1–T8. The patient remained comfortable for two weeks, after which pain gradually recurred (NRS 5/10). She declined repeat intervention and continued multimodal oral analgesics.

Case 2

A 61-year-old male with carcinoma of the right lung, skeletal metastases, and superior vena cava obstruction, with a history of hypertension and prior cerebrovascular accident, presented with severe upper thoracic pain radiating to the neck and right arm. The pain was sharp, stabbing, and burning, associated with allodynia and hyperalgesia. Despite Step 3 analgesics (oral morphine 180 mg/day,

gabapentin, diclofenac, chlorzoxazone, and paracetamol), pain relief was inadequate(NRS10/10). He could only rest in a stooped sitting posture.

A right-sided ultrasound guided ESPB was performed at T4 with the patient seated and 20 ml of 0.2% ropivacaine with 8 mg dexamethasone was injected. Pain relief was noted within 30 min, and he could recline comfortably. He remained on oral analgesics (morphine 60 mg/day, gabapentin, paracetamol). Upon recurrence after one month, the block was repeated, providing sustained analgesia over a three-month follow-up.

Case 3

A 72-year-old female with moderately differentiated squamous cell carcinoma of the left lung and chest wall invasion presented with intense, sharp, burning pain (NRS 9/10) despite palliative radiotherapy and WHO Step 3 analgesics, including oral morphine (100 mg/day), paracetamol, gabapentin, diclofenac, and a 5% lignocaine patch (350 mg). Imaging revealed cavitary lesions with osteoclastic activity and erosion of the fourth rib.

An ultrasound-guided ESP block at T4 was performed with 20 ml of 0.2% ropivacaine and 8 mg of dexamethasone. The procedure was uneventful, resulting in immediate pain relief (NRS 1/10) and sustained comfort at one month on reduced oral analgesics.

Case 4

A 57-year-old male with metastatic non-small cell adenocarcinoma of the right lung, previously treated with palliative radiotherapy, on Morphine (60 mg/day), Fentanyl(25ug patch), paracetamol and duloxetine presented with persistent right-sided chest pain radiating to the back (NRS 8/10).

A right-sided ESP block was performed at T5 under ultrasound guidance with a total of 20 ml of 0.2% ropivacaine with 40 mg methylprednisolone. Post-block, the patient experienced marked pain relief (NRS 2/10), with sensory blockade spanning T2–T9. He remained comfortable over the next 24 h and was discharged on tapering oral analgesics. At one-month follow-up, pain had slightly increased but remained significantly improved relative to baseline and was maintained on oral analgesics.

Case 5

A 60-year-old male with carcinoma of the right lung and gallbladder involvement, complicated by coronary artery disease (post-PTCA) and reduced left ventricular ejection fraction, presented with severe right lower chest and flank pain (NRS 9/10). He had a right-sided pleural effusion previously managed with intercostal drainage and pleurodesis and was receiving palliative chemotherapy. Despite optimized systemic analgesics, including oral morphine (100 mg/day), paracetamol, and pregabalin (75 mg twice daily), his pain remained refractory.

An ultrasound-guided ESP block was performed at T8, with 20 ml of 0.2% ropivacaine and 40 mg of methylprednisolone. Pain relief was rapid (NRS 2/10), and he remained comfortable till discharge. He was subsequently lost to follow-up.

Discussion

Pain is a prevalent and often debilitating symptom in patients with advanced or metastatic cancer, affecting over two-thirds of individuals during the course of the disease. In thoracic malignancies, such as lung cancer—which often present at advanced stages—pain arises from multiple mechanisms, including direct tumor invasion, nerve compression, chest wall involvement, skeletal metastases, and conditions such as Pancoast tumors. This complex pain frequently results in functional decline, emotional distress, and reduced quality of life for both patients and caregivers (10,11).

Although the WHO analgesic ladder remains central to pharmacologic pain management, nearly 20% of patients experience inadequate relief or adverse effects with escalating opioid doses. In such scenarios, interventional approaches—including neuraxial and paravertebral blocks, intercostal nerve blocks, and neurolytic procedures—have been utilized. However, high procedural risk and technical complexity may limit their use, particularly in frail or high-risk patients (6,11,12).

The ESP block is a superficial fascial plane block that is relatively straightforward to perform, with minimal hemodynamic disturbance and a low complication rate (3–5). Adverse events are rare because the injection site is anatomically distant from the pleura, major vessels, and spinal

cord. Potential complications—such as infection at the needle site, local anesthetic toxicity or allergy, vascular or pleural puncture, pneumothorax, and block failure—are exceedingly uncommon. A systematic review of 1,904 ESP blocks reported no complications, reinforcing the favorable safety profile of this technique, corroborated by other authors (13,14). In our series, all five patients who were administered the block tolerated it well, highlighting ESPB as a safe and effective intervention for severe thoracic cancer pain.

Forero et al. first described ESPB in two patients with neuropathic thoracic pain, demonstrating rapid pain relief, broad dermatomal spread, high patient satisfaction, and improved quality of life (1). Sirohiya et al. reported similar outcomes in three patients with advanced thoracic malignancies, including pancoast tumors, using a combination of local anesthetic and corticosteroid, achieving sustained pain reduction (8).

Radiological and cadaveric studies support ESPB's ability to block dorsal and ventral rami, with spread across multiple vertebral levels. Maurya et al. noted that, for optimal analgesia, the injection site should ideally correspond to the spinal nerve level innervating the painful area, ensuring targeted drug delivery (9). Proposed mechanisms for sustained analgesia include local anesthetic effects on terminal spinal nerve branches and the anti-inflammatory properties of corticosteroids, which may suppress ectopic neural firing and modulate afferent pain pathways. Additional mechanisms may involve hydrodissection-mediated separation of fascial adhesions, reducing mechanical irritation, and direct action on fascial nociceptors (2,5,7).

Although thoracic cancer pain can be highly heterogeneous, ESPB consistently provides effective analgesia, offering broad coverage for varied cancer-related pain syndromes. Capuano et al. emphasized that ESPB provides both somatic and visceral analgesia with a low complication rate, making it an attractive, minimally invasive alternative to conventional interventional techniques, particularly in outpatient and palliative care settings. However, most evidence for ESPB in cancer pain is limited to case reports and small series, with few randomized trials, highlighting the need for well-designed prospective studies to define optimal protocols and establish long-term efficacy (7,12,14).

In our series of five patients with intractable thoracic cancer pain, including two with rib erosion, one with superior vena cava obstruction, and one with combined chest and upper abdominal pain, ESPB provided rapid analgesia, typically within 30 min. All patients experienced substantial pain reduction (VAS scores from 9–10/10 to 0–2/10) and improved function, including restoration of limb movement and increased mobility. Aggarwal et al.similarly reported a series of four patients, two with post-thoracic surgery pain and two with rib metastases who received ESPB with local anesthetic and steroid, achieving analgesia lasting two weeks to one month (15).

Our experience reinforces the potential of ESPB as a safe, opioid-sparing, and minimally invasive intervention for complex thoracic cancer pain. The block offers multimodal benefits, including rapid analgesia, improved function, and enhanced quality of life, with minimal procedural risk. While these findings are encouraging, they are based on a small cohort; larger prospective studies are needed to determine optimal dosing strategies, adjuncts, and long-term efficacy.

Conclusion

The ESP block represents a technically simple, well-tolerated intervention that can provide substantial relief in difficult thoracic pain, particularly in palliative care settings. When introduced early in appropriately selected patients, it may contribute to improved quality of life, better tolerability of systemic analgesics, and potential reduction in their required dosages.

Acknowledgments

We gratefully acknowledge Swami Rama Himalayan University for providing institutional support and access to clinical resources that made this case report possible. We also extend our sincere thanks to Mr. Anukul Mandal, our anaesthesia technician, for his valuable assistance.

Authors' contribution

Dr. Priya Ramakrishnan: Literature review, patient care, manuscript drafting;

Dr. Abhin Mohan: Data collection, patient care.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Ethical considerations

Written informed consent was obtained from all patients for the procedure and for publication of this case series.

Funding

The author(s) reported there is no funding associated with the work featured in this article.

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