

Unexpected Epidural Spread of Local Anesthetic Following ESP Block Due to Anatomical Variation

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Introduction

Background: Erector Spinae Plane (ESP) blocks are favored for their safety and technical simplicity, targeting the paraspinal fascial plane distant from the neuraxis.

The Problem: Anatomical variations, specifically from prior spine surgery or degeneration, can disrupt fascial planes.

Objective: We report a case of unexpected epidural spread following bilateral L3–4 ESP blocks in a patient with complex lumbar anatomy.

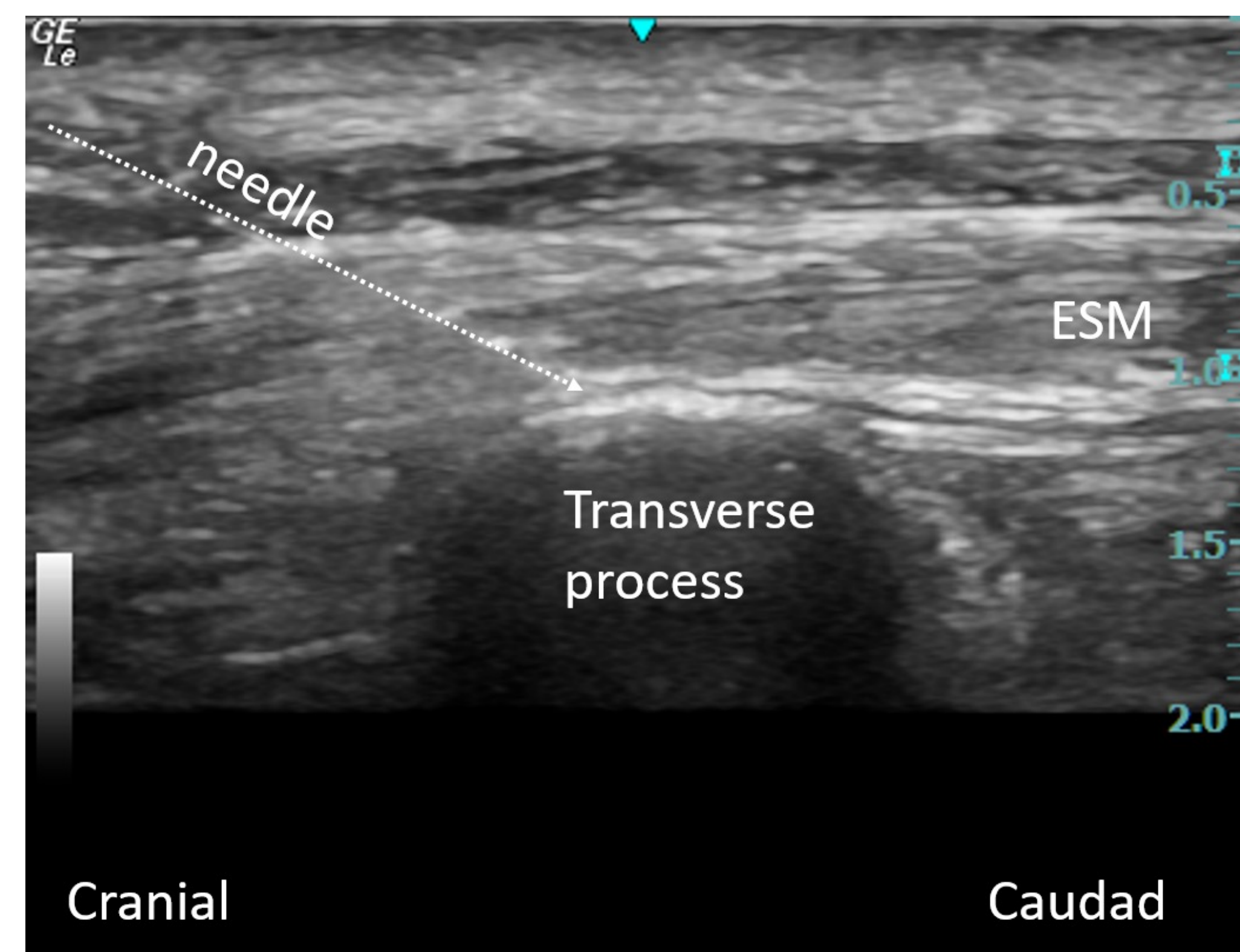


Figure 1: Ultrasound-Guided L3-4 ESP Block Ultrasound image showing the in-plane needle approach for the Erector Spinae Plane (ESP) block. The needle tip targets the fascial plane deep to the Erector Spinae Muscle (ESM) and superficial to the tip of the L4 Transverse Process. Despite correct sonographic appearance and negative aspiration, anatomical disruption allowed for neuraxial migration.

<https://www.anaesthesiasociety.com/content/images/size/w1920/2023/05/Screenshot-2023-05-16-22.19.35.png>

Case Presentation

Patient Profile:

- 48-year-old female scheduled for L2-3 lateral fusion.
- **History:** Chronic L2-3 degeneration and prior L3-S1 fusion.

Procedure:

- Bilateral L3-4 ESP blocks performed under general anesthesia using ultrasound guidance.
- **Injectate:** 30mL 0.25% bupivacaine, 5mg dexamethasone, 20mg methylprednisolone per side.
- **Safety:** Multiple negative aspirations confirmed prior to injection.

Clinical Course:

- **Immediate:** Patient developed decreased amplitude and increased latency of Motor Evoked Potentials (MEPs) prior to incision. Surgery was aborted. Patient woken up and brought to PACU.
- **PACU Assessment:** Bilateral motor blockade and sensory numbness up to **T8 level**.
- **Resolution:** Full return of motor strength and sensation by the following day; no long-term deficits. The patient returned the following week and underwent successful surgery

Imaging Findings

- **Post-Event MRI:** Revealed a chronic 5.9 cm lumbar fluid collection but no cord compression.
- **Prior Review (May 2024):** Confirmed a multiloculated CSF-signal collection at L4-5, superficial to the spinal canal.
- **Mechanism:** This collection likely served as a conduit, allowing local anesthetic to track from the fascial plane into the epidural space despite correct needle placement.

Discussion

- **Mechanism of Failure:** While ESP blocks typically rely on craniocaudal spread within the paraspinal fascia, this patient's history of **L3-S1 fusion** created a "path of least resistance."
- **The "Silent" Conduit:** The multiloculated fluid collection identified on prior MRI likely connected the paraspinal space to the epidural space, bypassing the protective ligamentum flavum.
- **Clinical Implication:** Negative aspiration is insufficient in complex spines. In patients with prior fusion or severe degeneration, the fascial integrity cannot be assumed.



Conclusions

While ESP blocks are generally considered safe due to their distance from the neuraxial space, fascial disruption in post-surgical spines may alter this safety margin.

Unexplained loss of neuromonitoring signals in this population should trigger immediate consideration of neuraxial spread. Pre-procedural review of MRI for anatomical variants should be considered to risk-stratify these patients

Key Questions for Practice:

1. **Screening:** Should pre-procedural MRI be reviewed to identify "at-risk" anatomy (e.g., fluid collections, disrupted fascia)?
2. **Technique Adjustment:** In patients with fusion, should we alter block levels, reduce volumes, or switch to alternative regional techniques?

Figure 2: Pre-Procedural MRI Findings Sagittal T2-weighted MRI of the lumbar spine demonstrating a multiloculated CSF-signal collection (fluid collection, blue arrows) at the L4-5 level, located superficial to the spinal canal. In the presence of prior L3-S1 fusion, this collection likely acted as a low-resistance conduit, facilitating the unexpected spread of local anesthetic from the erector spinae plane directly into the epidural space.

References

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