

Introduction

- Thoracic epidural placement is an established technique for pain management following injury or surgery of the thorax and abdomen.
- Due to anatomical challenges multiple attempts and false placement of the catheter following a false positive loss of resistance is possible. (1)
- Testing dermatomal sensory levels after local anesthetic injection are standard to confirm epidural catheter position. (2) But may not be possible in patients in whom reliable examination cannot be performed.
- Even radiological evaluation can be time consuming and not cost effective.
- In such a scenario, ultrasound is a bed side tool that can be utilized to evaluate the adequacy of an epidural catheter after initial placement.
- We present such a case in a patient with multiple rib fractures where evaluation of an uncertain thoracic epidural catheter with a POC ultrasound confirmed misplacement, subsequently leading to a successful replacement.

Case Report

- As the case report is devoid of patient identifiable information, it is exempt from IRB review requirements as per Lifespan policy. The patient's informed consent was obtained for submission.
- An 80-year-old male with a past medical history of mild cognitive decline, right bundle branch block, and hypertension was admitted to the ICU following a fall, temporary loss of consciousness, and multiple right sided rib fractures (ribs # 2, 3, 5, 6, 7).
- Physical examination was unremarkable. Laboratory tests were within normal limits. CT scans of brain, spine, and abdomen/pelvis were negative except for the aforementioned rib injuries.
- The acute pain service was consulted for a thoracic epidural catheter placement to provide rib fracture related pain management.
- A thoracic epidural catheter was successfully placed at the T6-T7 level with the loss of resistance technique and the catheter position was tested using 3 mL of lidocaine-epinephrine (PF) 1.5 % - 1:200,000.

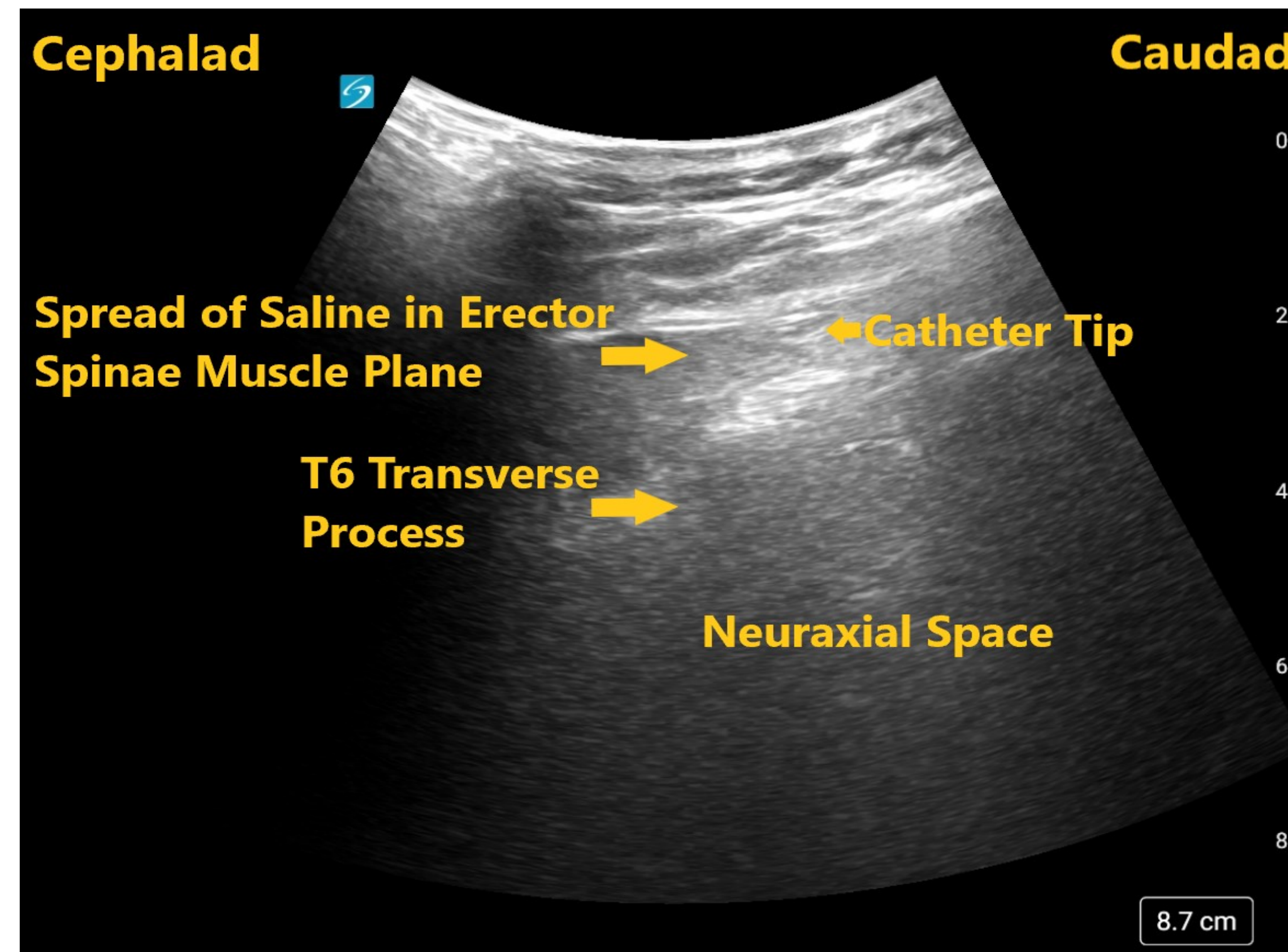


Figure 1. Ultrasound image of epidural catheter erroneously in the erector spinae muscle plane at the T6 level

- The patient experienced adequate pain control after starting a continuous epidural infusion.
- On post catheter placement day 2, the catheter unintentionally got displaced overnight.
- Considering the patient's inability to tolerate pain and systemic opioids, the epidural catheter was replaced immediately at the same level utilizing the same technique. However, this time the patient failed to achieve adequate pain control.
- On exam, the patient was unable to provide reliable feedback for levels of sensory blockade, which ultimately compelled the team to question the integrity of the catheter position.
- Therefore, we utilized POC ultrasound to evaluate the catheter position along a longitudinal view by tracing the catheter tip while injecting normal saline.

- As shown in Figure 1, the tip of the reinforced catheter was found in the erector spinae muscle plane above the T6 transverse process. Subsequently the continuous infusion through the catheter was discontinued, and a new one was successfully placed in the epidural space at T5-T6 using previous technique.
- The patient again achieved good pain control and was successfully utilized for the next seven days before discontinuation.
- There were no additional complications associated with the epidural attempts, and the patient was discharged without any additional disabilities.

Discussion/Conclusion

- Thoracic epidural catheter placement following rib fractures provides superior analgesia along with other systemic benefits such as reduced respiratory complications, preservation and restoration of gastrointestinal functions, earlier mobilization, and reduced opioid consumption. (3)
- Erroneous placement from challenges such as difficult anatomy and false perception while identifying the epidural space can lead to poor pain control and rehabilitation in these patients.
- When subjective assessment of sensory distribution is unreliable, objective assessment with imaging studies might be necessary.
- Compared to modalities such as Xray and CT, ultrasound is quick, cost effective, and performed at bedside thereby avoiding unnecessary delay in care.
- Previous reports have demonstrated success with ultrasound in not only placing an epidural catheter in the first attempt, but also in tracing location. (4, 5)
- In conclusion, ultrasound is an effective POC tool to evaluate the position of a thoracic epidural catheter in case of uncertain placement.
- Future focus in using ultrasound for placing and confirming a thoracic epidural catheter is necessary.

References

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