

Management of Retained Epidural Catheter Fragment in a Polytrauma Patient: A Case Report

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Learning Point of the Article:

Retained epidural catheter fragments require thorough clinical assessment, accurate radiological localization, and multidisciplinary evaluation. Correlation of imaging findings with the anatomical position of the fragments facilitates informed decision-making and individualized management.

Abstract

Introduction: Epidural catheterization is a commonly performed procedure for perioperative analgesia in orthopedic surgery. Catheter fracture is an uncommon but potentially challenging complication that may present a management dilemma when a retained fragment is identified. Although retained fragments have traditionally been considered biologically inert, delayed complications, such as radicular pain, migration, and fibrosis have been reported. However, consensus regarding optimal management remains lacking.

Case Report: We report a case of an epidural catheter fracture during insertion, with a retained fragment confirmed by comparison with the original catheter. Localization was done using computed tomography at the L3-L4 level, extending from the interspinous region towards the posterior epidural space. The patient remained neurologically intact throughout the course of treatment. During a subsequent planned orthopedic procedure, retrieval of the retained catheter fragment was performed through a limited posterior approach. The fragment was successfully removed under direct visualization without dural breach or cerebrospinal fluid leak. The post-operative course was uneventful, and the patient remained asymptomatic at follow-up.

Discussion: Management of retained epidural catheter fragments remains debated. While conservative observation has been reported in asymptomatic patients, delayed complications, including migration, fibrosis, and neurological symptoms have also been described. Careful radiological localization and correlation with clinical features are important when formulating a management strategy. This case highlights the role of individualized decision-making and multidisciplinary planning in the management of retained epidural catheter fragments.

Keywords: Retained epidural catheter, spine surgery, polytrauma, epidural catheter fracture.

Introduction

Epidural catheterization is a common practice for perioperative analgesia in orthopedic, obstetric, and general surgical practice. Although considered a safe procedure, infrequent complications of epidural catheter kinking, knotting, migration, and fracture

have been reported. Epidural catheter breakage is an uncommon incident with an estimated incidence of approximately 0.002% [1]. Despite its low frequency, retention of a catheter fragment within the paraspinal tissues or spinal canal may result in a challenging clinical dilemma.

Author's Photo Gallery



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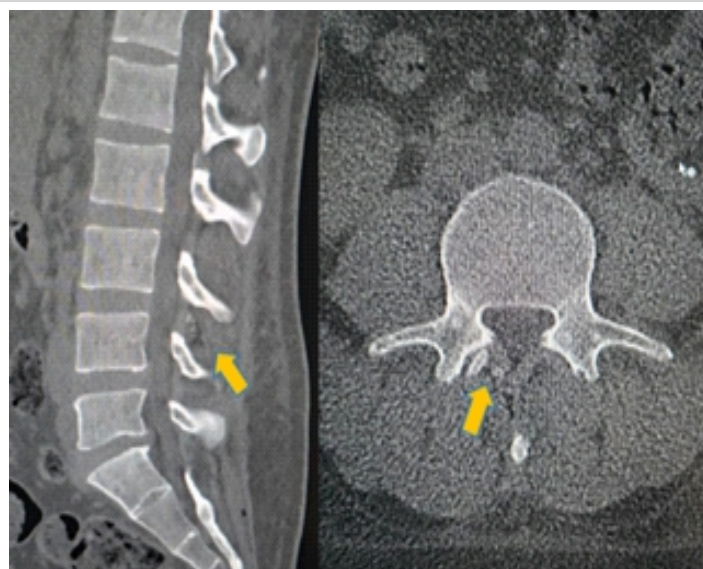


Figure 1: Sagittal and axial cuts of a computed tomography scan of the lumbar spine describing the retained epidural fragment at the L3-L4 level.

Retained epidural catheter fragments have traditionally been regarded as biologically inert foreign bodies, and conservative management has been proposed for asymptomatic adult patients [2,3]. Several reports have documented uneventful outcomes following observation alone [4]. However, delayed complications, including radiculopathy, nerve root compression, fragment migration, and epidural fibrosis have also been described, necessitating subsequent surgical intervention [5,6]. When a retained fragment lies within or adjacent to the spinal canal, adherence to the dura and surrounding structures due to granulation tissue may pose a challenge to delayed retrieval in selected cases [7]. Published literature describes successful outcomes with both conservative observation and surgical retrieval, highlighting the absence of a universally accepted treatment strategy.

Given the rarity of these complications, consensus regarding optimal management remains limited. Decisions are typically influenced by fragment location, neurological status, radiological findings, patient factors, and feasibility of safe retrieval [3,8]. Kasiamnham further highlighted the ongoing controversy surrounding retained epidural catheter fragments, noting that both conservative and surgical retrieval have been advocated depending on clinical and fragment location [9]. We present a case of a retained epidural catheter fragment in a polytrauma patient managed surgically and review the present literature with emphasis on management decisions.

Case Report

A 31-year-old male polytrauma patient presented to the emergency department with a history of a road traffic accident. Clinical and radiographic evaluation revealed a right-sided

closed fracture of the neck of the femur with an ipsilateral midshaft femur fracture, a left closed fracture of the midshaft humerus with radial nerve palsy, and a left closed distal one-third femoral shaft fracture.

Initially, the patient was planned for closed reduction and internal fixation of the right neck of femur and ipsilateral midshaft femur fracture with a proximal femoral nail anti-rotation. For perioperative analgesia, epidural catheter placement was attempted at the L3-L4 level, under aseptic precautions using an 18-gauge Tuohy needle. During the catheter insertion, resistance was encountered, and during repositioning, the catheter fractured, leaving a retained segment. Upon comparison with the original catheter, a segment of 15 cm in length had been retained. The epidural procedure was abandoned, and the surgery was subsequently performed under general anesthesia. Post-operatively, the patient remained neurologically intact, with no sensory deficit, motor weakness, or bowel and bladder dysfunction. Plain radiographs and ultrasonography scans failed to localize the retained catheter fragment. Therefore, a computed tomography (CT) scan was obtained as it provided precise localization of the retained fragment relative to bony landmarks and was more cost-effective in our setting. It demonstrated a linear retained catheter fragment at the L3-L4 level extending from the interspinous region toward the posterior epidural space (Fig. 1).

On post-operative day 3, the patient underwent planned

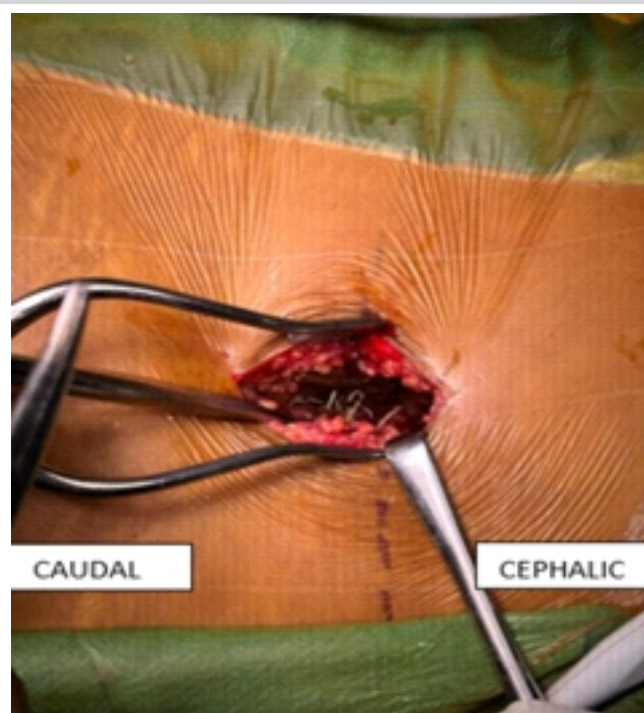


Figure 2: Intraoperative exposure of epidural catheter segment.

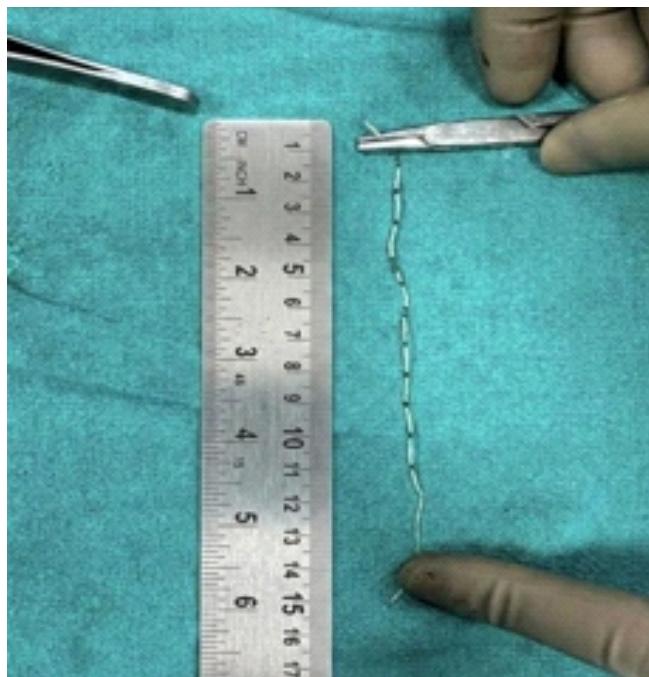


Figure 3: Retrieved epidural catheter segment following complete removal.

fixation of the left distal femoral shaft fracture with a distal femoral nail. Following multidisciplinary discussion and review of the imaging findings, retrieval of the retained epidural fragment was planned during the same operative session. A posterior midline spinal approach was utilized. A 4 cm incision was made over the L3-L4 interspace corresponding to the site of catheter insertion. Following careful dissection through the subcutaneous tissues and paraspinal musculature, the retained catheter fragment was identified under direct visualization (Fig. 2). Intraoperatively, the catheter was found extending between the interspinous region and posterior epidural space. The retained segment was retrieved in its entirety, measuring approximately 15 cm in length (Fig. 3). There was no dural breach, cerebrospinal fluid leak, or neural element injury identified. Hemostasis was achieved and the wound closed in layers.

Three days later, the patient underwent open reduction and internal fixation of the left midshaft humerus with radial nerve exploration. The recovery from the surgery was uneventful and no neurological symptoms attributable to the retained catheter or its retrieval were observed. The patient was discharged in a stable condition and remained asymptomatic at follow-up after 1, 6, and 12 weeks and at 6 months, with no back pain, radicular symptoms, sensory or motor deficits, or bowel and bladder dysfunction.

Discussion

Epidural catheter fracture is a rare complication of neuraxial analgesia, with a limited prevalence [1]. Most reported cases

occur during catheter insertion or removal when resistance is encountered. Proposed mechanisms include entrapment within the ligamentum flavum, interspinous ligaments, laminae, or paraspinal tissues, as well as knotting or looping of the catheter within the epidural space [2,8].

The management of retained epidural fragments remains controversial. Kasiannham [9] reviewed the available evidence and emphasized that the decision to remove a retained epidural catheter fragment should be individualized, with surgical intervention generally reserved for patients with neurological symptoms, infection, or radiological evidence suggesting a high-risk location, while asymptomatic patients may be suitable for observation. Mitra and Fleischmann [2] noted that conservative management may be appropriate in asymptomatic adult patients because epidural catheter materials are generally considered biologically inert. Similarly, Abujayeh et al. [4] reported successful non-operative management without neurological sequelae.

However, delayed complications, including radicular pain, nerve root compression, migration, and dural adhesions, have been described. Tarukado et al. [7] described fragment migration and dense adhesions that complicated delayed retrieval. Gompels et al. [1] and Hippalgaonkar et al. [5] suggested that removal may be considered when imaging demonstrates a retained fragment within or extending into the spinal canal. Subith et al. [10] reported successful retrieval of an epidural catheter following accurate pre-operative localization.

In the present case, the patient remained neurologically intact, and CT localized the retained fragment to L3-L4, extending through the interspinous space into the posterior epidural space. Given its deep location, the potential for delayed adhesion or migration, and the option for retrieval during planned orthopedic fixation, the fragment was removed during the same operation without dural injury or neurological deficit. It highlights the importance of radiological localization, multidisciplinary assessment and individual decision-making based on fragment location, patient factors and feasibility of safe retrieval.

Conclusion

Retained epidural catheter fragments represent a rare complication of neuraxial analgesia for which no universally accepted guidelines exist. The available literature supports both conservative observation and surgical retrieval in selected circumstances. Careful clinical assessment, accurate radiological localization and multidisciplinary evaluation remain essential when determining the most appropriate management strategy.

Clinical Message

Retained epidural catheter fragments present a unique management challenge. Detailed clinical evaluation, accurate radiological localization, and an understanding of the fragment's anatomical relationship to surrounding structures are essential for planning appropriate management.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

- Gompels B, Rusby T, Slater N. Fractured epidural catheter with retained fragment in the epidural space-a case study and proposed management algorithm. *BJA Open* 2022;4:100095.
- Mitra R, Fleischmann K. Management of the sheared epidural catheter: Is surgical extraction really necessary? *J Clin Anesth* 2007;19:310-4.
- Fragneto RY. The broken epidural catheter: An anesthesiologist's dilemma. *J Clin Anesth* 2007;19:243-4.
- Reena, Vikram A. Fracture of epidural catheter: a case report and review of literature. *Saudi J Anaesth*. 2017;11(1):108-110. doi:10.4103/1658-354X.197359.
- Hippalgaonkar AV, Kudalkar AG, Gaikwad SM, Modak S, Gupta HB, Tendolkar BA. Successful management of a broken epidural catheter !!! *Saudi J Anaesth* 2017;11:228-31
- Ugboma S, Au-Truong X, Kranzler LI, Rifai SH, Joseph NJ, Salem MR. The breaking of an intrathecally-placed epidural catheter during extraction. *J Clin Anesth* 2002;14:62-4.
- Tarukado K, Oda T, Tono O, Suetsugu H, Doi T. A retained epidural catheter fragment treated by surgery. *Asian Spine J* 2015;9:461-4.
- Sharma J, Murmu S, Samagh N, Grewal A. Management of an epidural catheter rent: An anesthesiologist's dilemma. *Indian J Pain* 2024;38:S534.
- Kasiamnham R. The broken epidural catheter: To remove or not to remove? *Br J Hosp Med (Lond)* 2012;73:710-1.
- Subith S, Dussa KR, Kokate S, Mukadam M, Zafar S, Choudhari A. When the unexpected happens: The intriguing retrieval of a broken epidural catheter. *J Orthop Case Rep* 2024;14:136-9.

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