

Successful Surgical Retrieval of Fractured Epidural Catheter in Primigravida: A Rare Case Scenario

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1. Introduction

Epidural catheter placement is a widely utilized method for administering anesthesia during various surgical procedures. Similar to other medical interventions, epidural insertion carries potential complications, including but not limited to breakage, migration, kinking, abscess formation, radiculopathy, and hematoma development. Nevertheless, the occurrence of a broken epidural catheter is infrequent, with a reported incidence of 0.0015% [1].

While the insertion of an epidural catheter is generally considered safe, certain factors identified in the literature are associated with an increased risk of such incidents. These factors include inserting the catheter beyond a specified length and removing the catheter over the Tuohy needle, as well as persistent pulling when encountering resistance during the catheter removal process [2].

2. Case

A 23-year-old primigravida was admitted with labor pains, and as per the standard protocol, an 18-gauge epidural catheter was inserted. The catheter tip was advanced approximately 11cm inside. Subsequently, an emergency cesarean section was performed due to the non-descent of the fetal head. During the removal of the catheter, it was discovered that the catheter was fractured.

Following the procedure, a CT scan revealed an 8cm fragment of the catheter with the tip located at the L3/4 interspace. Neurosurgery was consulted, and the patient's family was initially counseled for a trial of conservative management. However, considering the associated risks and complications, both the anesthesia team and the family agreed to opt for surgical exploration and removal

of the retained fragment. The family was thoroughly informed about the procedure and relevant complications.

For the surgical intervention, the patient was positioned prone, and a 3cm skin incision was made at the site of the epidural catheter insertion (L3/4 interspace). After administering local anesthesia, the trajectory was followed, tissues were dissected, the catheter was identified in the subcutaneous plane, freed from adjacent tissues, and pulled out in one continuous motion. The complete fragment was successfully retrieved, and the wound was closed in layers. The patient experienced a smooth recovery with no neurological sequelae and was discharged home the following day (Figure 1).

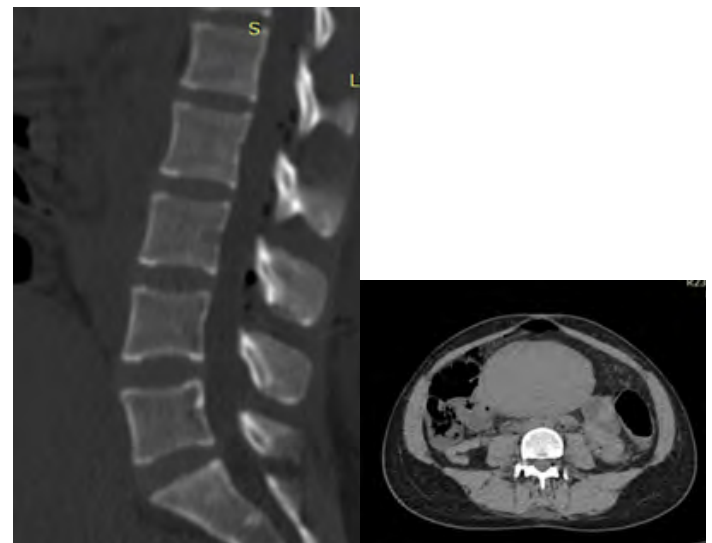


Figure 1: a) CT scan lumbosacral spine sagittal view showing catheter tip at L3/4 interspace

b) Axial CT showing the same

3. Discussion

The placement of an epidural catheter is a routine anesthesia procedure generally associated with a very low rate of complications. However, rare complications, such as breakage, fracture, knotting, and retention, can occur during or after insertion or removal [2]. Breakage of an epidural catheter may happen during either of these processes. Common causes during removal include the undue application of force, resulting in traction and shearing, insertion of a long fragment into the canal, kinking and twisting along its course between the skin and the epidural space, knotting due to resistance acquired between bony landmarks and nerve roots, manufacturing faults, and excessive threading [3].

It has been observed that radiological imaging may not effectively identify the catheter tip, despite its radio-opacity, possibly due to the increased density of adjacent tissue. However, CT scans have proven to be more successful in delineating the catheter tip in the majority of cases. MRI can identify stenosis caused by the prolonged retention of the catheter [3,4]. Notably, most knotted catheters are inserted at the lumbar level, particularly in obstetric patients. The knot typically develops along the last 3 cm of the catheter, and lengths exceeding 5 cm have been associated with an increased incidence of knotting, leading to catheter breakage. In the described case, the catheter was inserted 11 cm inside through the skin [1,5].

Regarding the management of retained catheter fragments, there is no universal consensus. It has been suggested that retained fragments are sterile and inert, with the least incidence of neurological complications [6]. However, removal may be considered in patients at risk of complications such as migration, CSF leak, fibrosis, granulation tissue formation, inflammation, infection, and radiculitis. Patients may also develop foraminal stenosis due to reactive scar tissue formation. Due to the potential risks associated with a retained fragment of the epidural catheter, a mutual decision regarding removal was made in our patient [7].

To prevent rupture, if traction or stretching is felt during removal, and there is pain, flushing the catheter with preservative-free saline is recommended to assess if the catheter is knotted.

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