

Impacted Epidural Catheter, a Predicament Worth a Thought

Case Report

Shreyash Agrawal, Meena Kumari

Department of Anaesthesia, Atal Bihari Vajpayee Institute of Medical Sciences and Dr Ram Manohar Lohia Hospital, New Delhi, India.

ABSTRACT

Introduction: Epidural catheter placement in epidural space is widely used for providing regional anaesthesia/analgesia for various surgical procedures. Among the known complications, breakage/retention of epidural fragments is even though extremely rare, a well-established entity. Even with the best radiological tests, visualization of the fragment is often difficult and might prompt a surgical intervention.

Case Presentation: In a patient in their 60s, an 18G radiopaque epidural catheter was inserted through an 18G Tuohy needle using a combined spinal-epidural set into the epidural space at L3-L4 interspace in the sitting position. Resistance was encountered and the catheter was removed with gentle traction along with the Tuohy needle, it was found to be sheared off at the 8cm mark. The operating surgeon and the patient were informed and immediately an X-Ray followed by a computed tomography (CT) scan was done. A part of the epidural catheter was visualized near the L1 lamina-spinous junction, which was removed by surgical intervention.

Conclusion: An impacted epidural fragment presents a quandary to the anesthesiologist and the surgeons. The best way to evade such a situation is to follow the traditional guiding principles for the insertion and removal of an epidural catheter. However, if such a situation arises - patients and surgeons should be informed. Surgical intervention may be indicated in symptomatic patients or to avoid future complications.

Key Words: Catheter breakage, Combined spinal-epidural, Computed Tomography, Epidural catheter, Surgical intervention.

Received: 13 December 2023, **Accepted:** 22 January 2024

Corresponding Author: Dr. Shreyash Agrawal, PG Resident, Department of Anaesthesia, Atal Bihari Vajpayee Institute of Medical Sciences and Dr Ram Manohar Lohia Hospital, New Delhi, India, **Tel.:** +91-8604-996689, **E-mail:** shreyashagrawal97@gmail.com

ISSN: 2090-925X, Vol.17, No.1, 2025

INTRODUCTION

Eugene Aburel administered the first successful epidural anesthesia via silk catheter nine decades ago^[1]. Now, epidural catheter placement in epidural space is widely used for providing regional anesthesia/analgesia for various surgical procedures^[2]. However, it does come with the risk of certain complications like breakage, migration, infections, hematoma and radiculopathy on insertion of the catheter^[3].

A total of 15 reports were published between 1957 and 2008 reporting a total of 30 cases^[3]. The rare impaction of an epidural catheter poses a major clinical conundrum to all anaesthesiologists and surgeons due to the lack of established guidelines to manage this complication - to decide whether to leave or remove the impacted catheter fragments^[2].

We report this case where an 8cm fragment was sheared while withdrawing the catheter needle assembly, to add the clinical observations to the ongoing discussion of a sheared/impacted epidural catheter. Written informed consent has been obtained from the patient for the publication of this case report.

CASE PRESENTATION

A patient in their 60s with uterovaginal prolapse was posted for an elective hysterectomy under combined spinal/epidural (CSE) anesthesia. On the day of the surgery, the patient was taken into the operation theatre (OT), fasting status was confirmed and all American Society of Anesthesiologists (ASA) standard monitors were connected. Using an 18 gauge cannula, IV access was secured while the patient was explained the procedure once again. After cleaning and draping, L3-L4 space was identified in the sitting position using tuffier's line, an Epsocan Catheter set for CSE was prepared.

Using the loss-of-resistance technique, epidural space was located using Pencan 18G Tuohy's Needle at a depth of 4.1cm. Using a Pencan 25G pencil tip spinal needle, dural puncture was achieved and confirmed with free flow of CSF, 3.0ml of the drug was injected after aspiration (2.8ml of 0.5% Bupivacaine heavy +10 microgram fentanyl). A radio-opaque polyamide epidural catheter was then progressed through the Tuohy's needle, a resistance was felt during the progression of the catheter at around the 14cm mark. It was decided to abandon the attempt and the needle-catheter assembly was pulled out gently; on

inspection, the catheter was noticed to be sharply cut at the 8cm mark.

The patient and the surgeons were informed immediately about the event and the patient was explained about the prognosis of it. The hysterectomy was deferred due to lack of any emergent indications and the patient was taken for X-Rays followed by abdominal computed tomography (CT). CT revealed an impacted fragment (Figure 1), but the exact positioning could not be delineated due to the presence of radio-intense structures (the vertebral column) in the field.

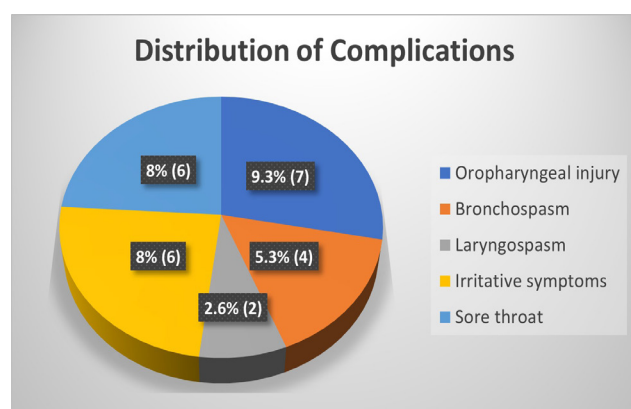


Fig. 1: CT image showing impacted epidural catheter fragment in sagittal view.

A neurology and neurosurgery consult was done, and a full evaluation from both teams revealed the absence of any neurological deficits. A discussion with the neurosurgery team along with the patient's family was held and the pros and cons were informed to the family. A decision to plan the extraction of the impacted catheter was taken unanimously and the patient was posted for the extraction the next day.

The patient was prepared for extraction under sedation and local anesthesia, but on exploration, the catheter could not be located and a decision to convert it into general anesthesia (GA) followed by exploration in a prone position was taken on the OT table. The incision was increased in size to about 5cm and further dissection through the subperiosteal plane revealed an entangled fragment of the polyamide epidural catheter (Figure 2) near the L1 lamina-spinous process junction. The epidural catheter of total length 8cm was successfully retrieved without any damage to other structures, hemostasis was achieved and closure was done in layers. The patient was shifted to a post-operative ward for monitoring, and discharged 2 days later without any neurological complications. Further follow-ups over the next month revealed no significant findings and the patient was posted for a hysterectomy under GA a few weeks later.

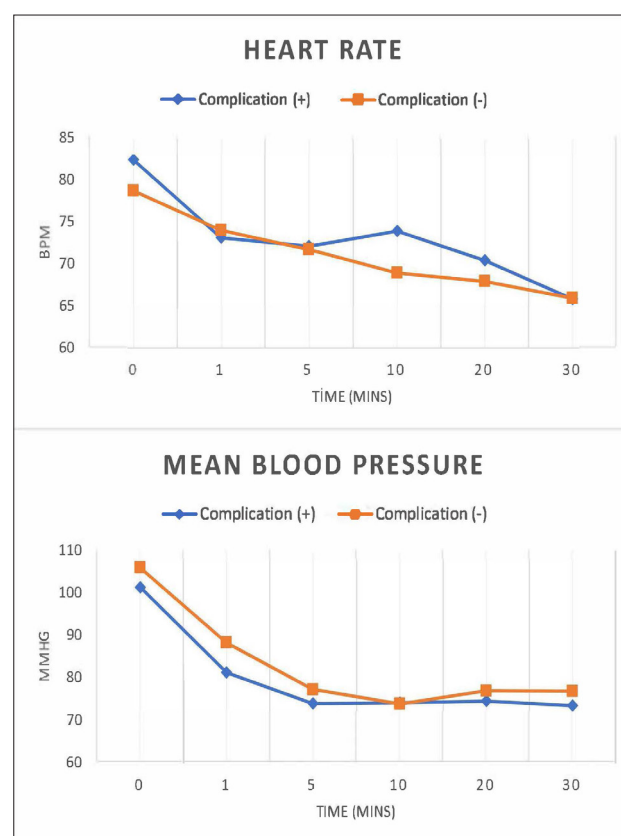


Fig. 2: Intraoperative image of the impacted epidural catheter.

DISCUSSION

Over the last few decades, very few cases have been reported and the incidence stands at 1 in 60000 (0.002%)^[4]. However, the rare occurrence still presents a quandary amongst anaesthesiologists on whether to leave it or remove it. In all cases with a retained fragment, imaging studies (including X-Rays, CT, Ultrasonography, MRI) are recommended to pinpoint the location and document it and for comparison in cases where follow-up studies are needed^[5].

The presence of a radio-opaque line on the epidural catheter acts as a guide, but even with most advanced radiological tests - most time the reliability of the positioning remains doubtful due to the airiness of the epidural catheter in comparison to the radio-dense structures around like vertebrae^[3]. In our case, we could visualize a 1-2cm fragment around the L1 vertebra in the sagittal section and some axial sections.

In cases of breakage and impaction of epidural catheter fragment, the presence of the retained fragment must be documented and conveyed to the surgical team as well as the patient. Reassuring the patient about the rarity of the incidence and low risk of neurological sequelae is equally important as is informing them about the further course of management^[6].

Certain neurological outcomes like impingement causing deficits, leaking of CSF through the catheter^[7], prodding catheter pieces acting as an entry source of infection, or progression to radiculopathy and spinal stenosis are clear indications for surgical intervention^[8]. However, in cases where no immediate neurological deficit is noticed like in our case, it presents a dilemma for the doctor and patient on whether to go for a surgical extraction or leave it as is. Surgical intervention was done in cases reported by Hippalgaonkar AV. *et al.*,^[5] while the cases reported by Sardana DK. *et al.*,^[9] and Palaria U. *et al.*,^[10] were managed conservatively.

In our case, a discussion with the patient's family was held along with the neurosurgery team, the risk of future complications and the need for regular follow-up was explained; along with the option of electively removing the retained fragment. A unanimous decision was made keeping in mind the patient's comfort and convenience and the fragment was decided to be removed.

CONCLUSION

Despite the use of best practices and paramount care following the guidelines for insertion and removal of the catheter; shearing of an epidural catheter still is a rare but real complication. The presence of a retained fragment must be communicated to the patient, and treating physicians since the development of complications can range from immediate to months or years; ensuing an endless cycle of follow-ups and radiological tests. Thus an attempt to remove the impacted foreign body (retained portion of catheter) could be simply cautious and provident. However, the lack of standardized guidelines to deal with such a complication leaves us with a predicament worth a thought.

LIST OF ABBREVIATIONS

CT: Computed Tomography; **CSE:** Combined Spinal/Epidural; **OT:** Operation Theatre; **ASA:** American Society of Anesthesiologists; **GA:** General Anaesthesia; **CSF:** CerebroSpinal Fluid.

CONFLICT OF INTERESTS

There are no conflicts of interest.

REFERENCES

1. Aburel E. L'anesthésie locale continue (prolongée) en obstétrique. Bull Soc Obstet Gynecol Paris. 1931;20:35–9.
2. Pant D, Jain P, Kanthed P, Sood J. Epidural catheter breakage: A dilemma. Indian J Anaesth. 2007;51: 434–437.
3. Hobaika AB. Breakage of epidural catheters: Etiology, prevention, and management. Rev Bras Anesthesiol. 2008;58(3):227–233.
4. Collier C. Epidural catheter breakage: a possible mechanism. Int J Obstet Anesth. 2000;9(2):87-93.
5. 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.
6. Ugboma S, Au-Truong X, Kranzler LI, Rifai SH, Joseph NJ, Salem MR. The breaking of an intrathecally-placed epidural catheter during extraction. Anesth Analg. 2002;95:1087–9.
7. Blanchard N, Clabeau JJ, Ossart M, Dekens J, Legars D, Tchaoussoff J. Radicular pain due to a retained fragment of epidural catheter. Anesthesiology. 1997;87:1567–9.
8. Mitra R, Fleischmann K. Management of the sheared epidural catheter: Is surgical extraction really necessary? J Clin Anesth. 2007;19:310–4.
9. Sardana DK, Panaych K, Samra T. Broken Epidural Catheter: An Anesthesiologist's Dilemma. J Case Rep. 2017;7:116-118.
10. Palaria U, Das A, Jakhund C. Broken epidural catheter: What next to do? Indian J Clin Anaesth. 2018;5(2):289-291.