

CASE REPORT

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Broken epidural catheter: individualize your management

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Abstract

Background Epidural anaesthesia is one of the most used neuraxial anaesthesia techniques. It has been utilized as the principal anaesthesia modality involving lower limb surgery. Breakage of epidural catheters is an unusual occurrence whose subsequent therapy lacks uniformity due to the absence of a consensus and defined standards.

Case presentation A 39-year-old male with no comorbidities was scheduled for right lower limb reconstruction surgery due to non-union of the tibia. Combined spinal-epidural anaesthesia was planned. During epidural catheter insertion, there was difficulty threading the catheter, and upon its removal, a long segment of catheter (8 cm) was left inside the body. Following informed consent from the patient, the retained fragment was surgically extracted in the same sitting under general anaesthesia.

Conclusions Even when faced with such a circumstance, it is best to explore surgically and remove a long segment broken catheter to allay patient anxiety.

Keywords Regional anaesthesia, Epidural anaesthesia, Epidural catheter, Tuohy's needle

Background

Epidural anaesthesia provides effective analgesia both intra- and postoperatively for lower limb surgeries. However, like any other procedure, it has also got unique complications. Shearing and breaking of the epidural catheter are one such complication whose subsequent management lacks uniformity. Given that the retained catheter fragment is not typically associated with a foreign body reaction, it is commonly seen that it is left in place in the majority of cases. Herein, we describe a case of long broken and retained epidural catheter segment (approximately 8 cm) which was removed through a surgical approach.

Case presentation

A 39-year-old male, American Society of Anesthesiology physical status I, was posted for surgery for non-union of right tibia under neuraxial anaesthesia (combined spinal-epidural) after thorough preoperative evaluation. Epidural catheter placement was carried out with the patient in sitting position at L2–3 intervertebral space, using midline approach with 18-G Tuohy's needle under all aseptic precautions. Loss of resistance was perceived (needle depth 6 cm), following which the catheter was threaded into the epidural needle. However, there was difficulty in threading the desired length of the catheter. Therefore, it was speculated that the needle was not in the epidural space. Hence, the decision was taken to remove the catheter, but as the catheter was being pulled off along with the needle (as a single unit), it broke with approximately 8 cm of fragment retained in the patient's back. The surgeon, the patient, and his relatives were informed immediately, and they were counselled about further management options and plans. After thorough discussion, it was decided to remove the broken fragment surgically as the patient and relatives wanted a

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definitive treatment owing to their inability to come for regular follow-up. Written informed consent was taken, and surgery was planned in prone position under general anaesthesia. C-arm (fluoroscopy) was used to localize the broken fragment. The thin catheter being deep down into the tissues of a muscular, well-built patient further compounded the problem of its localization even with radio-diagnostics.

The interspinous area at L2–3 was surgically exposed; the broken part was found to be present between the L2 and L3 interspinous space, and it was found heading into the paraspinous space (Fig. 1). Fortunately, the spinal duramater was found intact. The fragment was successfully retrieved at the first attempt by simple traction, and there was no cerebral spinal fluid leak post catheter removal (Fig. 2). Following a 1-month interval, the patient remained devoid of any discernible medical concerns.

Discussion

Following the evolution of epidural catheters and safer techniques for the insertion and removal, the occurrence of catheter breakage has significantly diminished, reaching a rate of approximately 0.002% (Gompels et al. 2022). Catheter entrapment within the spinal canal and procedural errors are among the factors implicated in the

occurrence of epidural catheter breakage. In our case, factors which could have led to its breakage are bad technique—excessive force in pulling off catheter through a needle (as a single unit) leading to catheter shearing and catheter getting caught and entrapped in the paraspinous area.

It is relatively unusual for anaesthesiologists to encounter situations where the epidural catheter has broken and retained in situ; therefore, further management is based on personal discretion and preferences rather than on any specific protocol. Mitra et al., Deepanjali et al., and Hippalgaonkar, A. V. et al. offered guidelines for removing a trapped and broken catheter fragment (Mitra and Fleischmann 2007; Pant et al. 2007; Hippalgaonkar et al. 2017). Extra precaution should be exercised while removing a stuck epidural catheter. Pre-procedure examination of catheters for defects and avoiding excessive length of insertions in the epidural space should help. When faced with the situation of a catheter which has become stuck, it has been proposed to wait for 15 to 30 min, to allow tissue relaxation or provide gentle traction to the distal end using a tongue blade (Bonwel et al. 2000). Morris et al. suggested that the patient's position during removal of an epidural catheter can be determined by the patient's position during insertion and sitting position being more successful than other common positions for catheter

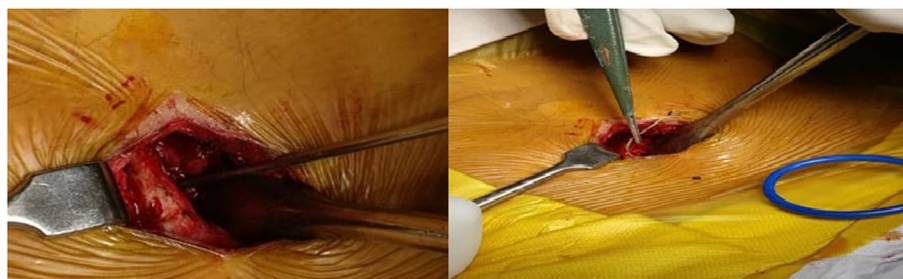


Fig. 1 Surgical removal of epidural catheter from paraspinous area

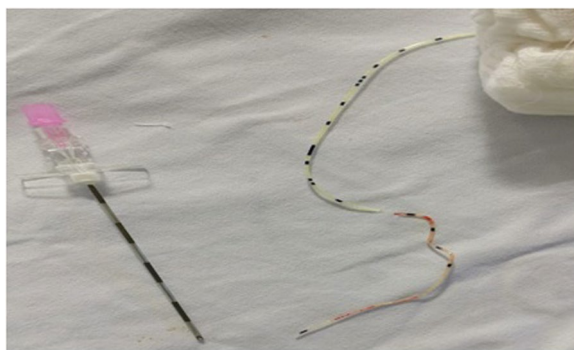


Fig. 2 Retrieved broken epidural catheter

removal (Morris et al. 1996). For the removal of an epidural catheter, Gadalla et al. also advocated the successful use of saline injection through the catheter (Gadalla 1992). In other reported methods, the broken distal fragment was picked with an artery forceps and was gently removed via a surgical cut down.

In our case scenario, surgical exploration to retrieve a broken fragment of the epidural catheter was warranted for following reasons: (a) unusually long length of the broken segment (8 cm); (b) unpredictable behaviour of foreign body inside the spinal canal; (c) possibility of a catheter in the spinal canal causing a duramater puncture, spinal cord irritation, and complications; (d)

an apprehensive patient; and (e) inability of the patient to come for regular follow-up.

Conclusion

An ideal situation where breakage, displacement, and entrapment of epidural catheters are best avoided, which, of course, is not possible at all times. Hence, we recommend appropriate imaging, surgical consultation, and individualized management in such condition.

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Prior publication

None.

Authors' contributions

All authors have read and approved the manuscript. SK, literature search and manuscript preparation; SM, initial observation, data collection, interpretation, literature search, and manuscript preparation; VK, manuscript editing; and KG, literature search and manuscript editing.

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Availability of data and materials

All references are available on NCBI data base.

Declarations

Ethics approval and consent to participate

Case report does not require ethical committee approval and registration number as per institutional guidelines. However, patient consent was obtained for publication of clinical information and images in order to enhance medical knowledge.

Consent for publication

Written informed consent was obtained from the patient for publication of clinical information and images in order to enhance medical knowledge.

Competing interests

The authors declare that they have no competing interests.

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