



## **Case Report – Accidental Epidural Catheter Breakage and Its Management**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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**Case Report**

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## **ABSTRACT**

**Aim:** Epidural anaesthesia which is preferred in most of the prolonged and painful procedures can be dreadful when the catheter breaks inside. In this case report we report accidental breakage of epidural catheter and its successful management.

**Presentation of Case:** 47 year old male patient was posted for arthroscopic Anterior cruciate ligament (ACL) and Posterior Cruciate Ligament (PCL) repair under spinal and epidural anesthesia. Epidural catheter got sheared while securing it. It was managed by surgical removal to avoid further complications.

**Discussion:** There are different causes for epidural catheter breakage including technical error and manufacture error. Catheter should be checked for any manufacturing defect or kinking. If there is resistant while inserting the catheter careful removal of catheter along with the needle should be performed to avoid breakage of catheter.

**Conclusion:** Epidural catheter breakage can be disastrous for any anaesthesiologist, so it is important to be vigilant while securing epidural catheter. If accidentally epidural catheter is retained it should be discussed with the patient and surgeons, and it is either removed since it is a foreign body or if left in situ. Serial follow-up for any neurological symptoms should be done.

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## 1. INTRODUCTION

Epidural catheter placement in epidural space is a usual practice to provide analgesia or anesthesia for surgical procedures and for post operative pain management [1]. Since there is no procedure without any complications, epidural catheter placement can be associated with hematoma formation, epidural abscess, radiculopathy, catheter migration, kinking, breakage and knotting of the catheter [2]. Usually epidural catheter can be removed without any complications rarely catheter can break during removal. Even catheter breakage can occur during insertion [3]. We hereby report a case of epidural catheter breakage while inserting the catheter which was successfully removed by surgery, along with review of literature for prevention and management of accidental epidural catheter breakage.

## 2. CASE REPORT

A 47 year-old male, a sports coach by profession, was admitted with a diagnosis of Anterior cruciate ligament tear and posterior ligament tear and chip fracture of lateral femoral condyle right side. He was posted for arthroscopic ACL reconstruction and PCL reconstruction of right knee and open reduction & internal fixation of lateral femoral condyle fracture under combined spinal and epidural anesthesia.

After confirming nil by mouth status and written informed consent, the patient was taken for surgery. Under all aseptic precautions and local infiltration of skin with 2ml of 2% lignocaine, an 18 gauge, 80 mm Tuohy needle (MEDITECH Epidural Minipack System-Fig.1) was inserted to access the epidural space in L2-L3 intervertebral space with loss of resistance technique in the sitting position. The epidural space was encountered 5 cm from skin through a midline approach, and an 18-gauge close-ended multihole epidural catheter advanced up to 12 cm after which a resistance was felt. Hence, the both catheter and needle were simultaneously removed using minimal force but the catheter sheared off, it was found that the catheter was broken from almost 7 cm mark. Immediately, operating surgeons were informed about the event. Patient and patient's relatives were informed about the incident immediately and

counselled about the complications associated with the same.

X-ray of thoracolumbar spine both in anteroposterior and lateral position was done but no catheter was seen at insertion site or any other vertebral level. It was not possible to detect the retained fragment as the MEDITECH Epidural catheter which was used is not radiopaque. Spine surgeon was informed about the incident immediately.

Since the part of the catheter which broke was large (almost 7 cm, Fig. 3) and may cause complications in future like infection and neurological complications, foreign body removal was planned by spine surgeons immediately after discussing with patient and patient's relative and the whole operating team.

A exploratory laminectomy under general anesthesia in prone position was planned. 5 cm incision was taken at lumbar(L2-L3 space). The surgeons gently dissected through layer by layer and a catheter was found lying in paraspinal muscles. A total length of 7 cm of epidural catheter was retrieved (Fig. 2).

After spine surgery ACL and PCL repair along with open reduction and internal fixation of right femur was performed. Patient was reversed and extubated and sent to the post operative care unit for observation. Patient did not have any neurological complications postoperatively. Patient was discharged after 1 week.

## 3. DISCUSSION

There are only very few cases reported for epidural catheter breakage and it occurs mainly during epidural catheter removal. Breakage occurring during insertion is very rare as was the case of ours.

The materials used for epidural catheter has evolved from ureteral catheter, silk, nylon, polyethylene, polyvinyl chloride to polyurethane, polytetrafluoroethylene. Ideally epidural catheter should be flexible, radio opaque, should have stretching capacity and disposable [4].

Ates Y, et al compared and studied tensile strength of polyurethane catheter with

radiopaque nylon catheters in their study, which demonstrated that polyurethane catheter has high tensile strength [5].

Breakage of catheters was common before 1980, Selwyn Crawford observed 27,000 patients and recorded 12 epidural catheter breakage.

There are various causes for shearing or breakage of epidural catheters like, (1) more than required length being inserted which will increase the chance of entanglement, 4-5 cm of the catheter is adequate [6], (2) excessive force used

while advancing the catheter or while removing it against resistance, (3) when needle is advanced over the catheter, (4) if catheter is withdrawn without moving the needle or when the catheter gets damaged between the needle and the bony surface, (5) damage caused by spinal needle in case of CSE, (6) manufacturing defect in the catheter. Catheter should be checked for any manufacturing defect /kinking before hand, and sharp needle end also should be ruled out [6]. Applying sutures to the catheter to fix it should be avoided as much as possible as it can predispose the catheter for breakage [7].



**Fig. 1. MEDITECH Epidural Minipack Set which was used**



**Fig. 2. The broken catheter found during surgical exploration**



**Fig. 3. Broken epidural catheter retrieved after surgical exploration which is about 7.5cm**

It is observed that epidural catheter can be removed easily in lateral position than sitting , and injecting saline increases the turgor of catheter so that it can be removed easily.

Even though epidural catheters are made, radiopaque visualization under radio imaging has become a difficult task may be because of the smaller thickness of the catheter. In our case we could not visualize the catheter or catheter tip under C- arm guidance ,since meditech epidural catheter did not have radiopaque tip which complicated things further.

Neurological complications of a broken catheter are rare. If a small fragment is broken which is undetectable and not causing any neurological symptoms then it can be safely left in place , but periodic follow up should be done [8].

If the epidural catheter breaks during removal, the documentation of the incident is very important and it should be conveyed to the

surgical team and also the patient. The patient must be informed about the complications and also treatment options. Though a broken catheter causing neurological sequelae is rare, many reports still advocate surgical removal. Other treatment options are leaving the catheter in situ, taking regular follow-up of the patient and consultation of neurosurgeons and educating the patient regarding neurological symptoms [9].

According to literature, regarding the puncture site, most cases reported epidural insertion between L<sub>2</sub> and L<sub>5</sub> spaces, probably because the frequency of lumbar epidural is much greater. Material used for catheters may also play a part; nylon or polyurethane catheters are more tougher than Teflon or polyethylene catheters and 19-gauge catheters have a tendency to break at a fixed site near the tip [10].

#### **4. CONCLUSION**

Epidural catheter breakage can become a catastrophe for anaesthesiologists. To avoid such situations following proper guidelines for insertion and removal of epidural catheter becomes necessary. Even after following proper steps if epidural catheter breaks then, event should be documented, patient should be informed about the incident and counselled about the effects following epidural breakage. Need for the regular follow up should be explained. It can be managed conservatively if asymptomatic. Surgery should be done in symptomatic patients. In our study we operated since the catheter was 7 cm long and it was not visible in radiographic images.

#### **DISCLAIMER**

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

#### **ETHICAL APPROVAL**

As per international standard or university standard ethical approval has been collected and preserved by the authors.

## CONSENT

Written & Oral informed consent was obtained from the patient before writing this manuscript.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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