

Missing Epidural Catheter Fragment: Case Report and Review of Literature

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Abstract

Epidural blocks are very important part of anaesthesia practice for providing anaesthesia/analgesia in various surgical and painful conditions. Breakage of an epidural catheter is a rare complication which disturbs patient, anaesthesiologist as well as operating surgeon. We describe the occurrence of such an event where epidural catheter fragment was found to be missing at the time of removal. We would also highlight the common reasons mentioned in literature that can precipitate such events and recommendations to prevent them.

Keywords: Analgesia; Anaesthesia; Epidural catheter; Breakage; Management.

Introduction

Epidural anaesthesia/analgesia is a widely used technique involving neural blockade of thoracic, lumbar and/or sacral segments. Depending upon indication local anaesthetics can be administered into the epidural space using single injection technique or continuously/intermittently via a catheter. Although epidural catheters are normally used without much complications, still some complications like catheter breakage can occur and add on to the worry of the anaesthesiologist, surgeon as well as of the patient. We here by present a case report of such an event and would also highlight the common reasons mentioned in literature that can precipitate such events and recommendations to prevent them.

Case report

An 80-year-old female, weighing 90 kg had fall at home and suffered left inter-trochanteric femur fracture. It was not associated with any other

injury. She was known case of hypertension for 5 years for which she was on tab telmisartan 40mg OD and tab amlodipine 5 mg OD. She had history of breathlessness (NYHA 3) and palpitations for last 4 months. She had cough with expectoration since 5 days for which she was on injection deriphyllin intravenous (i/v), injection hydrocort 100mg i/v, and Injaugmentin 625 mg. She was hard of hearing. On examination, her blood pressure was 170/100 mmHg, pulse rate 88/min and regular, breath holding time 18 sec. On auscultation, her chest had left basal crepts/rhonchi with decreased air entry on right side.

Her blood investigations were within normal limit. Her ECG showed right bundle branch Block and her chest x-ray showed cardiomegaly with hyperinflated lung fields with infiltration in left lower zones. Her 2-D echocardiography revealed sclerotic aortic valve, mild aortic regurgitation, mild mitral regurgitation, age related grade 1 left ventricular diastolic dysfunction, no regional wall motion abnormality and ejection fraction of 45%. Informed written high risk consent was taken from patient in view of old age, obesity, cardiac status and

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chest infection. Considering the patient's condition and purposed surgery i.e. left proximal femur nailing, combined spinal epidural anaesthesia was planned.

In the operating room, ASA standard monitoring was applied. Her preoperative vitals were BP - 182/75 mmHg, HR - 82/min regular, Spo2 - 89%- 91% RR - 18/min. IV line was started and emergency drugs were kept ready. Under all aseptic precautions, 18 gauze, 80 mm Tuohy needle (PORTEX Epidural Minipack System 1) was used to access the epidural space in L3-L4 intervertebral space with loss of resistance technique in the sitting position. The epidural space was encountered at 6 cm from skin through a paramedian approach, and 20-gauze radio-opaque close-ended multihole epidural catheter was advanced and fixed at 11cm after administering test dose. Spinal anaesthesia was given using 25G Quincke's needle with 0.5% heavy bupivacaine 2ml and 25µg Fentanyl at L2-L3 interspace. An aseptic dressing was done and adequate motor block and sensory level upto T8 was achieved. Intraoperatively, her vitals were maintained within 20% of baseline throughout the procedure. Epidural top up was given using 0.5% ropivacaine 6ml after 2 hrs. The surgery lasted for 3 hrs. Total fluid given was one litre crystalloids and one unit of PRBC was transfused. The estimated blood loss was 450ml. On completion of surgery, the patient was shifted to Post Anaesthesia Care Unit (PACU). Patient's vitals remained stable and hence she was shifted to ward later.

Next day, resistance was encountered while trying to administer top up. We were unable to give top up, so removal of epidural catheter was planned. On removal of dressing, the epidural catheter was found to be lying outside the skin. On inspection of the catheter, tip of the catheter along with some part (8 cm) was found to be missing (Fig 2). The distal part of the catheter was found to be stretched along its length (Fig 3). The surgical team and the patient were informed of the event. On examination there was no feature of any local infection, sepsis, or any neurological deficit.

Digital X-ray of thoracolumbar spine both in anteroposterior and lateral position was done. It was not possible to detect the missing fragment. Computed tomography (CT) scan of dorsolumbar spine with sagittal and coronal reconstruction could not detect missing catheter fragment.

The patient was counselled about the possible complications related to the retained epidural catheter fragment. She was kept on a regular follow up with an advice to report in case of any abnormal

signs and symptoms. The patient remained stable in postoperative period and discharged in satisfactory condition. Our patient has not reported any adverse symptoms so far till the writing of this article approximately 12 months.

Discussion

Epidural analgesia is an important part of many enhanced recovery after surgery (ERAS) protocols for patients undergoing major intra-abdominal, intra-thoracic and lower limb procedures. Epidural anaesthesia is relatively slower in onset and may be helpful when caring for haemodynamically fragile patients. Literature review shows only few case reports of breakage of epidural catheter, most of which occur during catheter removal and some during insertion but missing at the time of removal makes this case a unique. Breakage of the epidural catheter is usually a benign issue except for a few instances.

All patients with retained epidural catheter fragment should undergo proper imaging studies to know its exact location.¹ It is also necessary for documentation purposes. Radio opaque epidural catheters are easier to locate radiologically than non-radio opaque ones, but paradoxically, they have a lower tensile strength than standard clear catheters. Radio-opaque fragment may also be impossible to locate radiologically because of the radio dense surrounding structures.¹ CT scanning is more sensitive than plain radiography and MRI in detecting the high attenuation catheter fragment within the epidural space.¹ In our case X Ray and CT did not help to locate the fragment since they are helpful only when there is a reactive mass around the catheter fragment and it usually takes approximately 3 weeks to form the same.

Retained epidural catheter pieces are generally considered to be inert and should not produce a foreign body reaction. However literature research has shown certain complications pertaining to retained catheter like formation of a reactive epidural mass around the catheter fragment resulting in lumbar spinal stenosis,² low back ache due to foramina stenosis³ and delayed onset of subdural hematoma.⁴ However, there are 3 situations where a policy of non-interference or reassurance does not apply:-

1. Where infection or symptoms supervene, a careful history and physical examination should help determine the spinal level involved.

2. If the catheter fragment gets migrated intrathecally and allowing persistent CSF leakage.
3. If the proximal end of the segment is located at or just beneath the skin such that it can be retrieved simple through a superficial incision made under local anaesthesia.

In most cases, the current practice is to leave them alone unless symptomatic because surgical removal can produce more harm than good. Surgery is reserved for symptomatic cases only.

Usual Causes of Broken Epidural Catheter

At the time of insertion	At the time of removal
1. When excessive length of the catheter has been inserted. ⁵ Therefore, no more than 4-5 cm of catheter should be advanced into the epidural space.	1. When excessive force is applied to remove an entrapped catheter. Minimal force should be applied to remove a catheter.
2. When excessive force is used to advance the catheter against resistance or when catheter is withdrawn without moving the Tuohy needle or when Tuohy needle is advanced over the catheter. Therefore, on encountering resistance, the catheter should never be withdrawn through the needle. Both should be removed as a single unit.	2. If resistance is encountered, a number of simple manoeuvres may help to enable removal of catheter without stretching or tearing which includes:- a) Maximal flexion of back in lateral decubitus position. ⁸ b) Returning the patient to the position used at time of insertion. c) Allowing tissues to soften for 15-30 minutes before reattempting. ⁸
3. When the catheter gets damaged due to getting pinched between the tip of needle and a bony surface.	
4. In two level CSE, the catheter may get sheared off by spinal needle. ⁶	
5. Weak catheter due to manufacturing defect. ⁷ The needle should be checked for barbs on bevel and the catheter for manufacturing defects before insertion. Catheters of high tensile strength should be obtained from a reputable, reliable manufacturer.	

In our case, we couldn't ascertain any of the mentioned causes for breakage. Most probably it

broke due to excessive stretching of the catheter either at the time of shifting/nursing care or positioning of the patient in the ward. So in addition to recommendations mentioned above, epidural catheter should be taken care of while moving/shifting the patients especially in obese patients.

Conclusion

Missing epidural catheter fragment puts the anaesthesiologist in a dilemma. To avoid such an event, it is imperative to stick to the usual guidelines for epidural insertion and removal as well as during shifting/positioning of the patient. The event of a missing epidural catheter fragment tip must be addressed and communicated both to the surgeon and the patient.

Conflicts of interest: nil.

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