
Sheared Epidural Catheter: A Factory Defect

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Abstract

Breakage of an epidural catheter is an uncommon complication of epidural analgesia and anaesthesia. The visualisation of the broken segment is not easy despite modern radiological imaging techniques. The management of this complication is also still debatable hence this article aims at highlighting the importance of proper inspection of the catheter to forestall the case of searching for a segment that was not present at onset.

INTRODUCTION

Epidural anaesthesia is an important component of the anaesthetic armamentarium. It allows regularisation of surgical blocks, labour and postoperative analgesia, and relief of oncologic pain.[1] It involves leaving a tiny catheter, made of nylon, polyethylene and polyamide, in the epidural space. An ideal catheter should be radio-opaque, flexible and disposable and have stretching capacity but ironically, radio-opaque catheters are of lower tensile strength.[2] The procedure is usually safe and relatively simple in the trained hands but one of the complications known to be dreadful to the anaesthetist is the shearing or breakage of the catheter.[3,4] This complication occurs mostly during removal of the catheter and occasionally at insertion. Many mechanisms leading to this breakage has been highlighted e.g. length of the catheter in epidural space being longer than required, compression between the epidural needle and bony surface, degenerative effects of structural alterations caused by degenerative osteo- arthritis, impairment in catheter flexibility, withdrawal of catheter by patient, injury of catheter by the Tuohy needle etc.

The management of this complication is also still controversial with regards to removing the inert, non-biodegradable material surgically or to leave it and follow up the patients concerned.[5]

The localization of the broken segment with improved imaging technique may occasionally not be possible;[6] Hence this report aims to highlight the need for proper inspection of the catheter before insertion.

CASE REPORT

A 65-year-old woman was scheduled to have total abdominal hysterectomy (TAH) due to cervical intraepithelial neoplasia type II. She was counselled for combined-spinal epidural. While in the operating theatre, in the process of checking for the patency of the epidural catheter, it was discovered that the catheter was not complete. It was 2cm short on counting to the 10cm marking on the catheter (Fig. 1). The pack was abandoned and the procedure was carried out using another pack with a complete catheter.

Figure 1



DISCUSSION

Epidural anaesthesia and analgesia is increasingly being used in Nigeria.[6] Before now, the procedure was not common either because the epidural pack is not readily available or that it is expensive and reserved only for those that can afford it. But with the introduction of different brands from different manufacturers, the pack is becoming readily available and at affordable price. Additionally, medical consumables were manufactured to specific standards in the past unlike what exist presently where

standards have been eroded.

Shearing of an epidural catheter is a rare but serious adverse event, whose management is of concern to the anaesthetists. Different mechanisms that may lead to this breakage have been described. Most of the breakages have been observed during the removal of the catheter and occasionally at insertion. Üşar et al demonstrated a damage to the catheter and loss of 2cm length at insertion.[7] Also, Carneiro et al showed a loss of 2.5cm of catheter during insertion.[8] In the report of Manuel et al, they demonstrated the loss of 7cm of catheter during removal.[5] Many ways of preventing this complications have been highlighted among which are (a) During insertion: (1) Only 4–5 cm of catheter length is sufficient in the epidural space. Excessive insertion should be avoided to prevent coiling, knotting, and entrapment of catheter. (2) On encountering resistance, the catheter should never be withdrawn through the needle. Both should be removed as a single unit. (3) Catheters should be checked for manufacturers’ defects and the sharp bevel tip should be ruled out. (4) Avoid applying sutures to the epidural catheter, unless absolutely necessary. (b) During catheter removal: (1) If resistance or stretching of the catheter occurs while attempting withdrawal, it is recommended to place patients in the same position as they were at the time of insertion. (2) A flexed lateral decubitus position is reported to be more effective than the sitting position, with withdrawal forces being as much as 2.5 times greater in the sitting position. (3) In the event of a difficult catheter removal, it has been suggested that the efforts at removal be discontinued for 15–30 min to allow for tissue relaxation, or that a tongue depressor be tied to the distal end in the hope that this will provide gentle traction. (4) Epidural catheter saline injection with simultaneously slow but firm traction applied in cases of difficult catheter removal. (5) Removal of the catheter by the anaesthesiologist or trained personnel is recommended.

The optimal management of retained epidural catheter is debatable. Occasionally, the broken segment may not be visualized by radiological investigations which further compound the problem.[3,9] There are differing opinions on whether or not to embark on the surgical removal of the entrapped piece but the general consensus tends towards leaving the entrapped piece as long as there are no associated neurological symptoms or complications.[10] Indications for surgical removal of the entrapped catheter are presence of neurological symptoms, patient’s age, the site, and the length of the retained catheter.[1,5] The report of Pincirolì et al

showed where the broken piece was surgically removed following its localization.[11] Another report of a loss of a 2cm catheter showed it being left untouched either because of its small size or lack of symptoms nor neurological signs from patient.[7]

Localisation of the sheared catheter is not always possible even with modern radiological imaging techniques either because of the size or their location.[3,9] This further compound the problem of the anaesthetist as it becomes occasionally confusing whether the catheter was complete or not before insertion especially if the procedure was smooth both at insertion and removal and devoid of any difficulty. In some situation, like in the report of Üşar et al, localisation was possible with only an X ray unlike that of Drake et al where CT scan could not even pick the broken part.[7,9] Localisation has also been made possible with Computed Tomography (CT) scan and Magnetic Resonance Imaging (MRI) as in the report by Pant et al.[4] Occasionally, localisation may still be difficult with these modern radiological imaging techniques.

There have been different reports on the continued existence of the broken part in the patient's body. Pinciroli et al reported a case of a broken segment of the catheter being discovered accidentally, and removed 12 years after the incident.[11] There have also been reports of the broken part causing radicular pain after seven months.[12] In a study, the patient insisted on removing the entrapped segment despite not having any symptoms due to the concerns for future infection and development of scar or granulation tissue in the epidural space.[5]

Some studies have advised the checking of the epidural catheter for manufacturer's error which can make the catheter to be easily broken during insertion or removal.[13]

Anaesthetists, most often, check for patency for the catheter but not actually paying attention to the completeness of the catheter as it is assumed to be complete. This report underscores the importance of proper checking of epidural catheter for completeness bearing in mind the medicolegal issues involved, the uncertainty in the localisation of the broken parts, and the controversy surrounding the management of this rare complication.

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