

Paraparesis after Lumbar Drain Placement and Catheter Tear: A Rare Case Report

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Abstract

Lumbar spinal drain placement is being done with increasing frequency either to reduce intracranial pressure or facilitate view of surgical field in neurosurgical procedures. Complications due to fracture of catheter and/or retained catheter are rare and underreported but are of concern. The management of such a complication, surgical or conservative, depends on location of retained fragment of catheter, patient condition, or resulting complications due to catheter shearing. In this case, the position of the retained catheter fragment does not explain the subsequent paraparesis, which resolved with conservative management. Since there are no guidelines to handle such cases, it is important to individualize patient management. Proper positioning, technique and expertise, and some changes in Tuohy needle tip are required to reduce complications due to broken spinal drains. This case report emphasizes on the measures that can be taken to prevent shearing of spinal catheter.

Keywords

- ▶ paraparesis
- ▶ lumbar drain
- ▶ retained catheter
- ▶ conservative management

Introduction

Lumbar drain placement is indicated for many medical and surgical conditions. It may be used to reduce intracranial pressure (ICP) or to facilitate visibility of the surgical field. Complications due to drain placement include infection, mechanical injury to neural structures, shearing of catheter, or retained fragment that may or may not be associated with neurological deficit. We present a case of lumbar drain placement in a young female for management of occipital pseudomeningocele who developed paraparesis following shearing of catheter with retained fragment. This report illustrates a case of neurological deficit following lumbar drain placement that responded to conservative management and further emphasizes the use of correct technique to prevent such complication.

Case Report

A 22-year-old woman, American Society of Anesthesiologists (ASA) grade II, weighing 52 kg, underwent craniotomy for a left cerebellar hemangioblastoma with obstructive hydrocephalus, and postoperatively the patient was discharged in

stable condition with no signs of hydrocephalus. One month later, she was readmitted with pseudomeningocele in the occipital region for which a lumbar drain placement was planned.

On admission, the patient was drowsy but arousable and moved all four limbs. Written informed consent was obtained. In the operation room, standard monitoring was attached and sedation was given after securing an intravenous access. Under strict asepsis, with the patient in left lateral position, L₃₋₄ area was infiltrated with 2% lignocaine. Lumbar puncture was done with a 14 G Tuohy needle in first attempt and free flow of cerebrospinal fluid (CSF) was confirmed. However, resistance was encountered when the catheter with guidewire was threaded through the Tuohy needle. Slight resistance was encountered during removal of guidewire. As there was no CSF flow from the catheter, the Tuohy needle with catheter was removed en masse. Examination of the catheter revealed that a small fragment had sheared off. Decision was made for conservative management of retained fragment. A lumbar drain was then placed in the L₂₋₃ space for CSF drainage without any difficulty.

Twelve hours post lumbar drain placement, the patient developed bilateral lower limb numbness and weakness.



Neurological examination revealed mild sensory weakness and motor weakness with power of grade 1/5 in both lower limbs. A neurophysician was consulted, and 1 g methylprednisolone was administered intravenously. An urgent magnetic resonance imaging (MRI) revealed a residual tumor in the posterior fossa and myelitis involving the dorsal (D₃₋₈) cord (→Fig. 1) and conus (→Fig. 2). The catheter fragment could not be visualized. CSF biochemistry was normal.

Thereafter, lumbar drain was removed on same day, and methylprednisolone was continued for next 5 days during which the patient improved neurologically. Subsequently a ventriculoperitoneal shunt was placed to reduce the ICP. She was discharged after 12 days in stable condition with bilateral lower limb motor power of 4/5 and advice for regular follow-up.

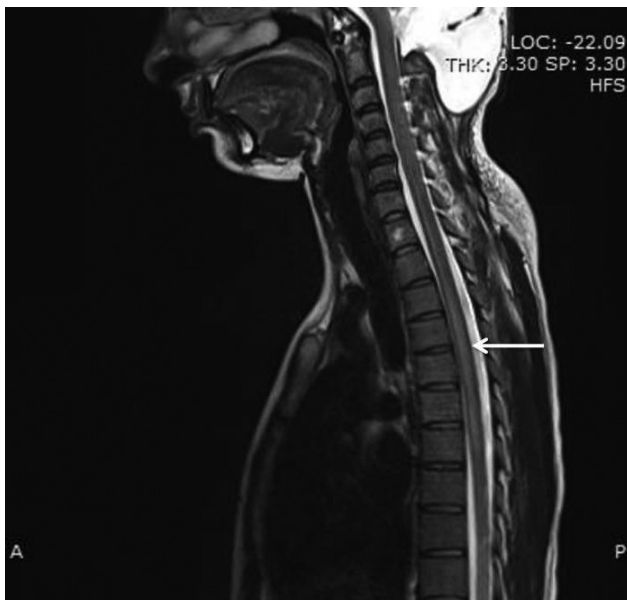


Fig. 1 MRI spine showing edema in dorsal (D₃₋₈) cord. MRI, magnetic resonance imaging.



Fig. 2 NMRI spine showing edema in conus. MRI, magnetic resonance imaging.

Discussion

Indications for lumbar drain placement include prior to clipping of aneurysm and resection of skull base tumors for improving surgical field view, for treatment of CSF fistula and hydrocephalus and for spinal cord protection during thoracoabdominal aortic aneurysm repair.¹ Infection, intracranial hypotension, intradural hematomas, and breakage or shearing of catheter and retention of catheter fragment are some known complications of lumbar drain placement.^{2,3}

Catheter shearing and retained intrathecal fragment are either underreported or rare with an incidence rate of 0 to 3.3%.^{4,5} Most cases of retained intrathecal catheter fragments are associated with difficulty while inserting or advancing the catheter into the subarachnoid space. A catheter may be broken by excessive force or stretching, sheared by the sharp edge of Tuohy needle or due to incorrect use of the guidewire. Decreased durability of a catheter owing to damage caused by the needle edge during insertion can also cause problems during its removal.⁶

Decision for management of retained intrathecal fragment must be individualized according to scheduled surgery, patient's comorbidities, infection risk, catheter location or migration, fragment size, patient's wishes, and presence of neurological symptoms.^{5,7} Forsythe et al reviewed published cases on retained intrathecal catheters; several patients were treated conservatively with observation for 0 to 6 months, and others required fragment removal surgically due to complications. When managed conservatively, periodic patient follow-up with imaging is essential because of possible fragment migration.⁵

Ugboma et al advised appropriate imaging, a neurosurgical consultation, and aggressive surgical exploration and extraction of the retained catheter, even in asymptomatic patients.⁸ Lee et al reported a case of intrathecal catheter shearing and fragmentation during insertion, while rotating the catheter through a Tuohy needle for lumbar CSF drainage and subsequent surgical removal of the fragment. Known complications of retained intrathecal lumbar catheter include radicular symptoms, tension pseudomeningocele, abscess leading to granuloma, and subarachnoid hemorrhage.⁹ Guppy et al reported a case of subarachnoid hemorrhage following migration of a retained lumbar drain that sheared off during removal. The authors recommended either early removal of easily accessible catheters or close monitoring with serial imaging.¹⁰

We used an External CSF Drainage System (G. Surgiwear Ltd., Shahjahanpur, India) that contains a 14G Tuohy needle (9 cm) and 30-cm lumbar drainage catheter (0.7 mm internal diameter, 1.5 mm outer diameter). The intrathecal siliconized catheter is larger and softer than an epidural catheter to minimize damage to the spinal cord or nerve roots,⁴ but it can make the advancement of the catheter through the Tuohy needle (which has a sharp-edged tip) difficult.

In this case, we are not certain whether the neurological deficit resulted from the retained catheter. The cord edema as evidenced by MRI might have contributed to the paraparesis that could have been caused due to direct trauma by Tuohy

needle. Dorsal myelitis could have been caused by reactive changes due to indwelling catheter.

Based on this case, we would like to propose the following suggestions for lumbar drain insertion:

- Rotation and manipulation of Tuohy needle should not be done once catheter has been passed through it.
- Catheter should not be withdrawn once it has exited the tip of the needle.
- Use of guidewire should be minimized or avoided.
- Both the needle and catheter should be removed en bloc.
- Remove catheter with minimal force; if resistance felt, the patient should be placed in more flexed position to facilitate catheter removal.
- Improvement in set and needle tip by manufacturing company.

A retained intrathecal catheter may have varied presentations ranging from an asymptomatic patient to serious neurological sequelae. Since clear guidelines for the management of these complications are lacking, it would be prudent to take all the measures to avoid such iatrogenic complication.

Conflict of Interest

No.

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