



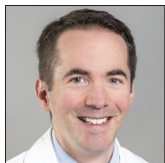
Case Report

Dural leakage due to ipsilateral needle placement for spinal level localization in unilateral decompression surgery: A case report

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ABSTRACT

Background: A spinal dural defect caused by needle placement for spinal level localization is an uncommon complication of cerebrospinal fluid leak with the potential for the development of intracranial hypertension.

Case Description: Our 48-year-old patient underwent unilateral fenestration and sequestrectomy for intractable L5 radiculopathy due to disc herniation at the level L4–5 on the right side. The spinal level was identified with fluoroscopy after placement of a 24-gauge Sprotte spinal needle on the right side. Intraoperatively, a sub-millimeter spinal dural defect was visualized on the ipsilateral side.

Conclusion: Caution is needed when needle placement is used to localize the spinal level for unilateral surgery.

Keywords: Dural puncture, Intracranial hypotension, Lumbar spinal surgery, Postdural puncture headache, Sealing

INTRODUCTION

State-of-the-art lumbar microdiscectomy is superior with respect to pain intensity when compared to conservative treatment in patients with refractory long-lasting sciatica.^[1,15] To ensure a good outcome, correct localization of the spinal level before incision is of utmost importance.^[14] A wide variety of options exist, but there is little consensus regarding which is most effective.^[13] Frequently, the spinal level is affirmed through a needle inserted and visualized under direct fluoroscopy.^[7,13] Rarely, when the needle is inserted too deeply, it can perforate the dural sac, causing cerebrospinal fluid (CSF) leakage. Even a sub-millimeter dural defect can be sufficient to cause the development of intracranial hypotension (IH), with potentially life-threatening sequelae.^[2,3] Thus, measures to prevent inadvertent durotomies are crucial. Here, we emphasize their importance by illustrating the clinical course of a 48-year-old man undergoing microdiscectomy, in whom intraoperative dural leakage resulted from a 24-gauge Sprotte spinal needle being placed too deeply on the ipsilateral side of the spinal decompression. We discuss the importance of contralateral needle placement in unilateral spinal surgery, along with state-of-the-art intraoperative anesthesiological and surgical measures in the prevention of CSF leakage and potential IH development.

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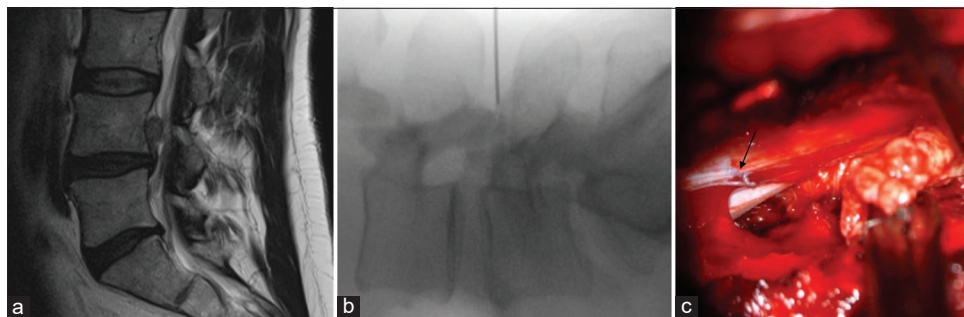


Figure 1: The site of dural puncture by a spinal needle placed in the wrong location during level identification. (a) T2-weighted magnetic resonance imaging showing cranially migrated disc herniation at the level L4–L5. (b) Location of the spinal needle at the level L4–L5, with a relatively deep position between the spinal process. (c) Intraoperative images reveal the single interrupted stitch at the dura (arrow), with depiction of the L5 nerve and underlying disc herniation.

The patient provided written informed consent for this case report.

CASE REPORT

A 48-year-old otherwise healthy trucker (BMI 26.3 kg/m²) presented with intractable L5 radiculopathy on the right side refractory to conservative therapies. Lumbar magnetic resonance imaging revealed a right-sided cranially migrated lumbar intervertebral disc herniation at the level L4–L5, compressing the L5 nerve root [Figure 1a]. After being informed of his options, the patient gave consent to proceed with microdiscectomy. Under general anesthesia, the patient was positioned prone, with the spine flexed to optimally open the interlaminar space. The L4–5 interspace was localized using a 24-gauge (length 90 mm) Sprotte tip needle inserted on the right side [Figure 1b].

Following right-sided microsurgical fenestration and flavectomy, a dural puncture was identified adjacent to the outgoing L5 nerve root on the right side. The sub-millimeter defect was sealed with a simple interrupted 5–0 monofilament suture. Subsequently, a sequestrectomy was performed [Figure 1c], completely releasing the dural sac and spinal nerve. Intraoperative positive end-expiratory pressure (PEEP) did not reveal any spinal fluid leakage at the site of durotomy. The postoperative course and wound healing were uneventful, with no recurrent disc herniation, sciatica, or orthostatic headache at 1-year follow-up.

DISCUSSION

Sub-millimeter spinal dural defects can be sufficient to induce IH, with potentially life-threatening sequelae.^[2,3] Although incorrect placement of a spinal needle for identification of the proper level is an extremely uncommon cause of dural leakage, it has been described following spinal anesthesia (SA), with postdural puncture headache affecting as many as 35% of patients.^[9,19] To prevent CSF leakage in spinal surgeries using SA,

the latter is generally performed rostral to the level of surgery. Presumably, bony removal for fenestration or hemilaminectomy, along with removal of (hypertrophied) ligamentum flavum, decreases the tamponade effect on the dura, thus increasing the risk of ongoing CSF leakage postoperatively.^[11,18] In this setting, a simple measure such as needle placement on the contralateral side may minimize the risk of IH development in the case of unilateral decompression. Nonetheless, when a dural puncture is discovered, proper sealing is of utmost importance, in particular when the tamponade effect is missing. Unlike in spontaneous CSF leakage, a postoperative epidural blood patch is often not efficient.^[6] There is no consensus as to treatment options in the case of persistent IH symptoms for patients undergoing microdiscectomy,^[5] and procedures for dural repair vary considerably.^[10]

Primary closure by dural suturing can be technically difficult in minimally invasive spinal surgeries.^[17] Although in the case of a narrow surgical field the surgeon might be tempted to use a fat or muscle graft, their sealing effect is often marginal.^[4] Similarly, the use of fibrin glue for dural repair did not significantly decrease the incidence of a persistent CSF leak in one study.^[8] Although the dural defect was minimal in the case we present here, a simple interrupted 5–0 monofilament suture was used for watertight primary closure, as this method tends to prevent further CSF leakage.^[12] Furthermore, intraoperative anesthesiological procedures such as increasing positive-pressure ventilation over the short-term further allow control of proper watertight sealing.^[16]

CONCLUSION

Avoidance of IH is critical. If inserted too deeply, a contralateral needle placed in a unilateral spinal decompression is advised, as it might compensate for IH development through the tamponade effect afforded by the posterior spinal canal. In the case of CSF leakage, proper intraoperative surgical and anesthesiological measures are crucial, even if leakage is in the sub-millimeter range.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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