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Case Report

Unrecognized dural tear during percutaneous endoscopic lumbar surgery confirmed with myelography ☆

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ABSTRACT

Iatrogenic dural tear is usually recognized during the surgery. We describe a rare case of unrecognized dural tear caused by percutaneous endoscopic lumbar surgery at another hospital clearly confirmed with dynamic myelography. Although magnetic resonance imaging of the lumbar spine showed no obvious fluid collection suggesting dural tear, dynamic myelography revealed leakage of intradural subarachnoid contrast medium along root sleeve into the intervertebral disc space. In the setting of endoscopic spine surgery, incidental dural tear might be overlooked due to the narrow and fluid-filled surgical field. Dynamic myelography is useful to evaluate the precise condition caused by unrecognized dural tear.

Introduction

With the advancement of minimally invasive spine surgery, endoscopic lumbar spine surgery is now widely performed for lumbar disc herniation. Because the surgical working area is limited, unintentional complications could sometimes occur during the procedure. Dural tear is one of the most common complications accounting for 0%-8.6% in endoscopic spine surgery [1]. As spine surgeons are highly aware of this complication, incidental dural tear is usually noticed intraoperatively and will be treated with primary suturing or patching with autologous tissue such as muscle and fat or bioabsorbable. Postoperatively, magnetic resonance imaging (MRI) might help to detect cerebrospinal fluid leakage (CSF) caused by dural tears [2]. However, in some cases, when dural tears are small or fistula formation is suspected, it is challenging to detect the conditions only with MRI [3]. Here, we report a rare case of unrecognized dural tear during endoscopic spine surgery that was successfully confirmed with dynamic myelography.

☆ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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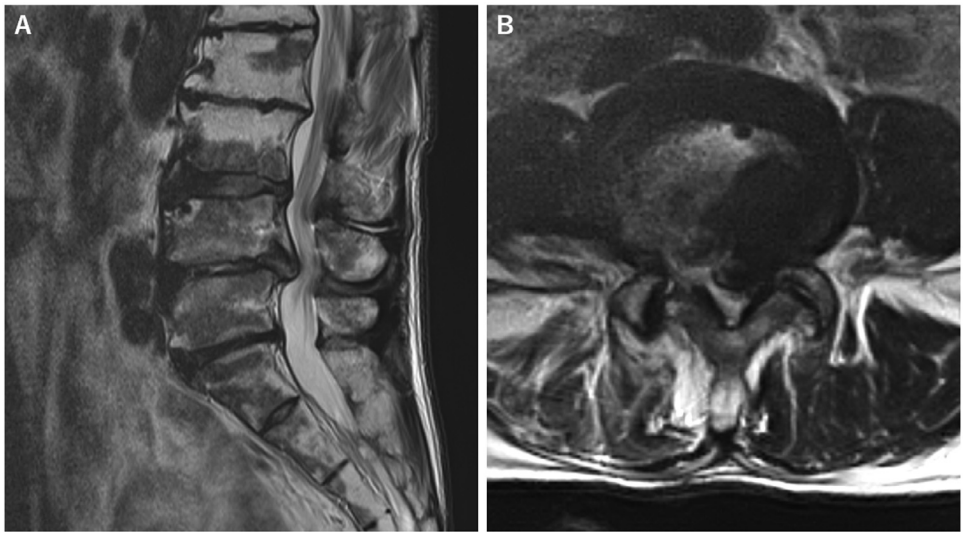

Fig. 1 – T2-weighted MRI of the lumbar spine on admission. (A) Sagittal image showed extruded disc but no obvious spinal longitudinal extradural fluid collection. (B) Axial image at L4/5 level revealed right anterolateral hyperintense at the site of previous endoscopic surgery.

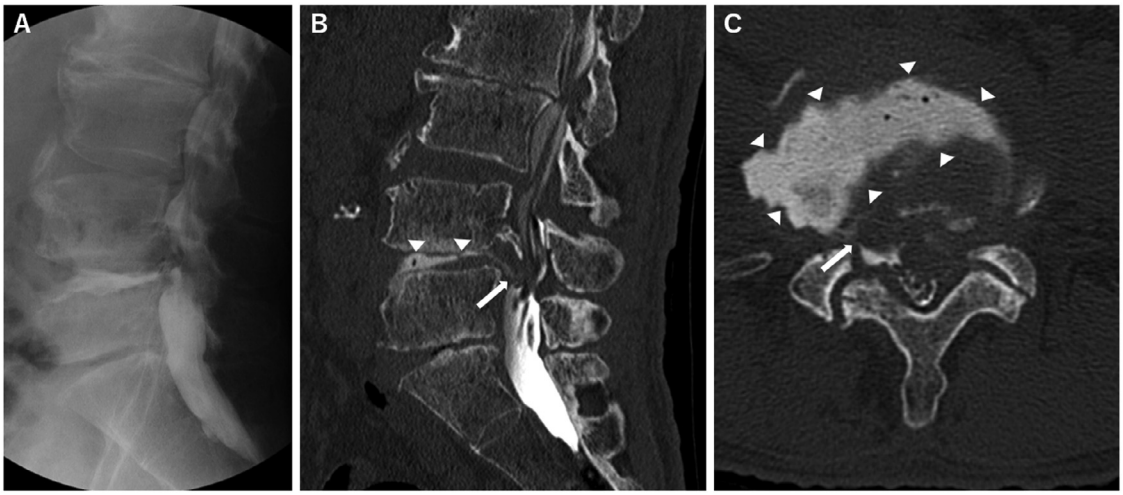

Fig. 2 – Dynamic myelography after decubitus and prone position. (A) Contrast medium spread to L4/5 disc. (B, C) Computed tomography after myelography revealed leakage of contrast medium from the subarachnoid space to the disc space (white arrow heads). White arrows showed fistula point.

Case report

A 56-year-old man was referred to our hospital for persistent numbness and pain on right lower extremity. He had undergone percutaneous endoscopic discectomy for lumbar disc herniation 1 month ago at another hospital. Preoperative MRI demonstrated right-sided L4/5 paracentral disc extrusion, and full-endoscopic interlaminar lumbar discectomy was performed for right L5 radiculopathy. According to the operation record of previous hospital, neural decompression was confirmed under endoscopic visualization without intraoperative complications including recognized dural tear. However, the patient complained persistent symptoms even after the surgery. MRI of the lumbar spine at our hospital showed T2-weighted hyperintense around the site of previous surgery (Fig. 1). Dynamic myelography revealed leakage of intradural subarachnoid contrast medium along right L5 root sleeve into the intervertebral disc space (Fig. 2). Based on these findings, incidental dural tear communicating with disc space was suspected. Because the lesion was ventral side and estimated relatively small, we chose conservative treatment by bed rest and pain management. The patient recovered from the symptoms and has spent uneventful time for more than 5 years.

Discussion

Dural tear is one of the most important complications in lumbar spine surgery. The prevalence is 2.7% in endoscopic surgery and 1%-17% in open microsurgical technique [1]. The common mechanisms are direct laceration, nerve root retraction and implantation of instruments. Iatrogenic dural tear is usually detected during surgical intervention. However, in the setting of endoscopic surgery, dural tear may be overlooked because the environment is basically filled with irrigation fluid. Moreover, positive pressure of the irrigation fluid could prevent the nerve root from being exposed, which makes it harder to detect the dural tear. Delayed diagnosis and treatment could result in unfavorable outcome such as fistula formation, arachnoiditis, meningitis, and pseudomeningocele [1,4]. Therefore, early recognition and proper treatment are very important.

Postoperatively, MRI and dynamic myelography are the useful tool to diagnose. T2-weighted MRI could detect extrathecal fluid collection and pseudomeningoceles, but if the CSF leakage is small, MRI may not be enough to evaluate the pathological condition. Previous study about CSF leak localization have reported the usefulness of dynamic myelography for identifying the exact site of CSF leakage [2].

As in our case, dynamic myelography is effective to clarify the unrecognized dural tear and visualize the fistula point. Computed tomography scan performed after the myelography could more clearly demonstrate the pathological condition caused by such unrecognized dural tear.

Conclusion

Surgeons must consider the possibility of undetected dural tear especially in percutaneous endoscopic spine surgery. If the patient complains persistent or recurrent symptoms as well as headache and nausea, dural tear should be suspected, and careful work-up should be performed immediately. Dynamic myelography is an important diagnostic modality to evaluate the detailed condition especially when MRI is inadequate.

Patient consent

Written informed consent for publication was obtained from patient.

REFERENCES

[1] Müller SJ, Burkhardt BW, Oertel JM. Management of dural tears in endoscopic lumbar spinal surgery: a review of the literature. World Neurosurg 2018;119:494–9.
[2] Farb RI, Nicholson PJ, Peng PW, Massicotte EM, Lay C, Krings T, terBrugge KG. Spontaneous intracranial hypotension: a systematic imaging approach for CSF leak localization and management based on MRI and digital subtraction myelography. AJNR Am J Neuroradiol 2019;40:745–53.
[3] Ahn Y, Lee HY, Lee SH, Lee JH. Dural tears in percutaneous endoscopic lumbar discectomy. Eur Spine J 2011;20:58–64.
[4] Saxler G, Kramer J, Barden B, Kurt A, Pfortner J, Bernsmann K. The long-term clinical sequelae of incidental durotomy in lumbar disc surgery. Spine (Phila Pa 1976) 2005;30:2298–302.