SURGICAL TECHNIQUE

Simultaneous intra-operative repair for inadvertent dural tear under posterior lumbar disk scope

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Objective: To introduce a microsurgical suture technique for repair of dural tear under posterior lumbar disk scope.

Methods: Micro endoscopic discectomy was performed on a 26-year-old male under local anesthesia. During the operation, an irregular tear of about 1.0 cm was inadvertently made in the dura. The cauda equina herniated through the tear with fluctuations and leakage of cerebrospinal fluid. The tear was successfully sutured with a 7/0 microsurgical thread which was held by small disk forceps in a parallel position.

Results: Once the repair had been performed, minor cerebrospinal fluid leakage persisted but there was no herniation of the cauda equina. The original planned operation was completed smoothly under posterior lumbar disk scope.

Conclusion: The microsurgical suture technique for dural tear under posterior lumbar disk scope described here is simple and reliable.

Key words: Discectomy; Dura mater; Microsurgery; Rupture

Introduction

Dural tear is one of the commonest complications of micro endoscopic discectomy (MED). In severe cases, it may even lead to failure of the operation or the necessity to convert the procedure to an open discectomy. We here report a case of intra-operative dural tear during MED successfully treated with a new microsurgical suture technique.

Materials and methods

Patient data and surgical technique

A 26-year-old man had suffered from L5/S1 lumbar disc herniation for 3 years, during which time he had received some conservative treatment, including massage, physical therapy and epidural injections. However, the

symptoms persisted. Accordingly, MED was performed under local anesthesia on 2 March 2010.

During the operation, when the ligamentum flavum was detached by curette because of adhesion, an irregular tear of about 1.0 cm was made in the dura (Fig. 1). The cauda equina herniated through the tear and there was intermittent leakage of cerebrospinal fluid (CSF). The patient was immediately put in the Trendelenburg position. An absorbent sheet of cotton was inserted under the lamina of the upper vertebra to block the epidural space, preventing any obvious CSF outflow from the mouth of the dural tear. Then, a 7/0 microsurgical thread with two suture needles (Fig. 2) was prepared and prebent (Fig. 3). Next, the prebent needle was held by small disk forceps with the plane of the curvature parallel with the teeth of the forceps and the needle tip facing proximally (Fig. 4). The disk forceps with needle was inserted into the work tunnel and threaded through the contralateral side of the tear, then pulled out of the work tunnel (Fig. 5). Next, another needle was held by the disk forceps and inserted into the work tunnel, threaded through the ipsilateral side of the tear (Fig. 6), then pulled out again. By this time, microsurgical thread had been threaded through both sides of the tear. Next, a single knot was made

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Figure 1 Approximately 1 cm dural tear.

outside the portal and, with the ends of both needles held by an assistant or retained by two vascular clamps, the surgeon, using the tip of a nerve hook, pushed the knot all the way down to the dura (Fig. 7). Two additional knots were made in the same way, after which the thread was cut using the forceps. Gentle traction was applied to the repaired dura to make sure the suture was secure and that no cauda equina herniated. The operation was continued and the prolapsed nucleus pulposus successfully removed. Adequate hemostasis was achieved, and the wound

Figure 2 A 7/0 microsurgical thread with two suture needles.

Figure 3 The needles were prebent with a small disk forceps.

washed thoroughly. Next, the pressure cotton dressing under the lamina was removed, and the patient placed back in a level position. Minor CSF leakage was seen, but no herniation of the cauda equina. The wound was closed meticulously in layers.

Postoperative management

The patient was kept in the Trendelenburg position for 5 days postoperatively. Rehydration and antibiotic treatment were given. During the 11-month follow up period, the patient had no evidence of nerve injury. MRI at the last follow-up showed no dural stenosis or CSF cyst formation.

Figure 4 The prebent needle was held by a small disk forceps with the plane of the curvature parallel with the teeth of the forceps and the needle tip facing proximally.

Figure 5 The disk forceps with needle was (a) inserted into the work tunnel to (b, c) first thread the contralateral side of the tear, and then (d) pulled out of the work tunnel.

Figure 6 The ipsilateral side of the tear was threaded.

Discussion

Inadvertent dural injury during MED operation is not uncommon. Most small tears do not need to be repaired because gelatin sponge or epidural fibrin glue can be used to help to seal them. These patients usually have a smooth recovery if placed in the Trendelenburg position for the first few days postoperatively. Larger tears usually prevent the surgeon from continuing with the MED procedure, and necessitate conversion to open surgery and repair.¹⁻⁴ However, by using a microsurgical suture technique with a lumbar endoscope and other simple instruments, we successfully repaired the dural tear described above without abandoning the MED procedure. Compared to conversion to open surgery, the simultaneous

Figure 7 (a) A single knot was made outside the portal and, (b, c) with both needle ends held by an assistant or retained by two vascular clamps, the surgeon, using the tip of a nerve hook, pushed the knot all the way down to the dura.

dural repair technique is more accurate, less invasive, less likely to result in nerve injury, and can achieve a more rapid recovery.

In order to perform this repair successfully, the tear or repair site should be placed in the center of the field. The needle should be held by the proximal 1/3, and the distal part should be further curved so that its tip is facing proximally at a 10–20° angle with the needle holder (disk forceps), all of which makes it easier to engage the needle with the tear edges while elevating the needle with the forceps. Patients in whom the dura has

been repaired should be treated according to the routine for patients with smaller tears without repair. A specifically designed curve-headed disk-forceps-like needle holder would greatly facilitate such dural repair.

Disclosure

No benefits in any form have been, or will be, received from a commercial party related directly or indirectly to the subject of this manuscript.

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