CASE REPORT

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Acute Spinal Epidural Hematoma Following Unilateral Laminectomy for Bilateral Decompression

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We present a case of acute spinal epidural hematoma(EDH) following unilateral laminectomy for bilateral decompression(ULBD). A 45-year-old male presented with severe multi-level spinal stenosis underwent ULBD on the left side at the L2-3 and L3-4 level. Five hours after operation, paraparesis developed along with severe bilateral buttock pain. The CT scan showed an acute spinal EDH at the L2-3 level. The acute spinal EDH was successfully decompressed after emergency decompressive surgery with performing an additional laminectomy on the contralateral side at the L2-3 level. Although ULBD is an effective minimally invasive surgical technique for treating spinal stenosis, the possibility of acute spinal EDH should be kept in mind, as happened in our case.

KEY WORDS : Epidural hematoma · Laminectomy · Lumbar · Stenosis.

Introduction

Lumbar spinal stenosis has usually been treated by a wide laminectomy with/without spinal fusion[4,7,9]. With the development of minimally invasive surgical techniques, unilateral laminectomy for bilateral decompression(ULBD) has recently been performed as one of the treatment options for spinal stenosis[3,6,7,12]. ULBD is a minimally invasive surgical technique for spinal stenosis because simultaneous decompression of the contralateral side is possible via unilateral laminectomy while preserving the structural integrity of the posterior spine. However, several postoperative complications have been reported with this surgery[2,9].

The authors present a case of postoperative paraparesis that was due to acute spinal epidural hematoma following ULBD, and this was successfully treated with performing an additional laminectomy on the contralateral side.

Case Report

A 47-year-old male presented with lower back pain and bilateral leg pain of 3 years duration. He could not walk more than 100 meters due to his bilateral leg pain. On admission, the Visual Analogue Scale(VAS) scores for the back and leg pain were 7 points and 8 points, respectively. He had a no previous history of medical illness. There were no abnormal findings in the preoperative laboratory analyses including platelet count, prothrombin time and partial prothrombin time. On the neurological examination, he did not show any motor weakness. He showed a decreased bilateral knee jerk and ankle jerk reflexes. A plain radiographic examination revealed a decreased intervertebral height at the L2-3 and L3-4 levels, but there was no instability. Magnetic resonance(MR) imaging and MR myelography demonstrated severe spinal stenosis at the L2-3 and L3-4 levels (Fig. 1). Therefore, we decided to perform ULBD on the left side at the L2-3 and L3-4 levels.

The patient was prepared for surgery and he was positioned as for standard laminectomy. After a midline skin incision was made, the laminas on the left side were exposed in the conventional way. The surgical microscope was then moved into the operative field. After performing a laminectomy with medial facetectomy and foraminotomy with using high-speed drill and Kerrison punches, decompression of the L3 root on the left side was confirmed. The operation table was then tilted to the contralateral side. After removing the base of the spinous process, the ligamentum flavum and medial facet on the contralateral side was carefully removed with Kerrison punches. Decompression of the nerve root was confirmed with probing.

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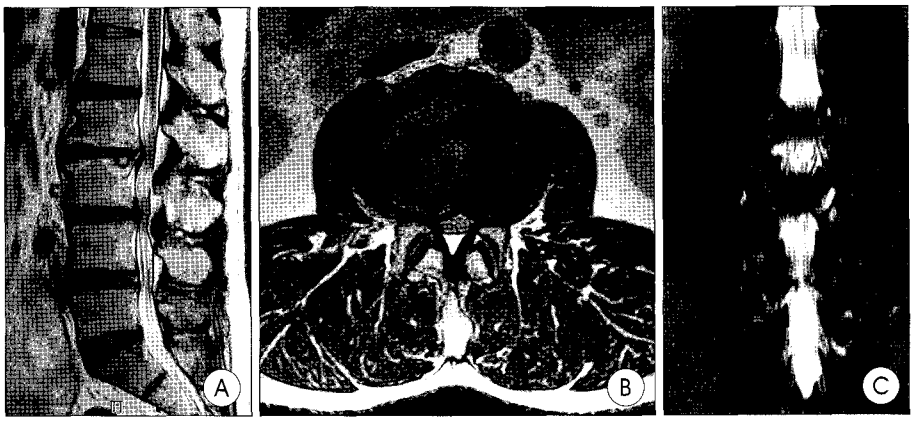

Fig. 1. Magnetic resonance images (A, B) and magnetic resonance myelography (C) showing severe spinal stenosis at the L2-3 and L3-4 levels. Note the narrow cross-sectional area at the L2-3 level.

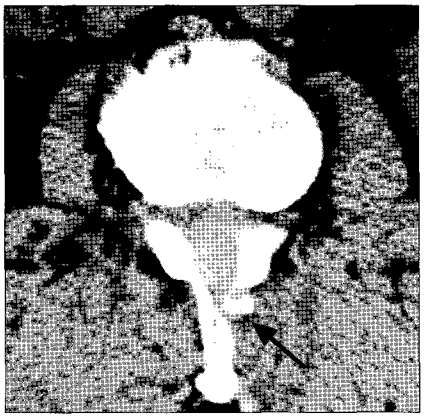

Fig. 2. Computed tomography scan showing the acute spinal epidural hematoma at the L2-3 level. Drains were inserted on the unilateral laminectomy site (black arrow).

The same procedure was performed on the left side at the L3-4 level. During the surgery, bleeding from the contralateral side was controlled using hemostatic materials such as thrombin-soaked Gelfoam. After copious irrigation was done with physiological saline and a drain was inserted, the fascia and skin was finally sutured.

Immediate after the surgery, the patient did not show any new focal neurological deficit. However, paraparesis (Power Grade II) developed along with severe bilateral buttock pain five hours after the operation. The computed tomography scan revealed acute spinal epidural hematoma at the L2-3 level (Fig. 2). He underwent emergency surgery for decompression of the hematoma. After removing the epidural hematoma, active bleeding was noted on the contralateral side. We tried to control the bleeding using hemostatic materials. However, controlling the bleeding was not easily done because the focus of the bleeding was located at the cephalad end of ULBD on the contralateral side. Therefore, we decided to perform an additional laminectomy on the contralateral side. After exposing contralateral lamina, a laminectomy was carefully performed with using only Kerrison punches because the ligamentum flavum under the lamina had already been removed during the ULBD. There was active bleeding from the engorged epidural veins near the L2 root, and this was directly coagulated using bipolar cauteries. Immediate after the second surgery, he showed full recovery of the neurologic deficit.

Six months after surgery, the VAS scores of his back and leg pain decreased significantly by 1 point and 1 point, respectively, and he could walk about 4 kilometers.

Discussion

ULBD is a minimally invasive surgical technique that is used to treat lumbar stenosis. Because decompression of the contralateral side can be performed simultaneously via the unilateral approach, the midline and contralateral posterior spinal structures can be preserved during ULBD. Therefore, it is believed that the number of patients who need spinal fusion after ULBD is much smaller than the number of patients who need spinal fusion after having undergone conventional posterior decompression procedures[9]. The clinical outcomes of ULBD have been reported to be comparable to those of standard laminectomy[3,4,7,11,12]. According to the report of McCulloch et al.[7], good outcomes were shown in 70 to 80% of the patients at 3 to 5 years postoperatively. Recently, several authors have modified the surgical techniques of ULBD with using a tubular retractor or a microendoscopic system, which resulted in smaller skin incisions and less injury to the paraspinal muscles[1,2,4,9].

However, several perioperative complications have been reported with this surgery[2,4,9]. According to the report of Ikuta et al.[2] who analyzed the short-term results of performing ULBD for spinal stenosis with using the microendoscopic system, the postoperative complication rate was 31.9%; there were four dural tears, three fractures of the inferior facet joint, one postoperative epidural hematoma and seven transient leg symptoms on the contralateral side. Considering the fact that they used the microendoscopic system instead of microscopy for UBLD, their complication rate was relatively higher than those rates of conventional posterior surgery such as laminectomy or laminotomy. They thought that the transient leg symptoms on the contralateral side might be due to nerve root compression that occurred during surgery or to the postoperative epidural hematoma. Therefore, although they reported only one epidural hematoma demonstrated by MR images, it is assumed that the incidence of postoperative epidural hematoma might be higher than that stated in their report.

When performing ULBD, ligamentum flavum on the contralateral side is removed while preserving contralateral lamina. Therefore, there is always a potential dead space between the

contralateral lamina and the dural sac after ULBD. Furthermore, bleeding control of the cephalad or caudal end on the contralateral side via the ipsilateral laminectomy site is sometimes troublesome. This is why that acute spinal epidural hematoma could develop on the contralateral side after ULBD. Ikuta et al[2] reported epidural hematoma in a 79-year-old man with L4-5 degenerative stenosis after ULBD. They showed that the postoperative epidural hematoma prevented the enlargement of the dural sac and this compressed the nerve root on the contralateral side. However, after conservative care, the follow-up MR image demonstrated disappearance of the hematoma and sufficient decompression. However, in our present case, rapid neurological deterioration developed due to the acute spinal epidural hematoma that followed the ULBD. Because we performed too vigorous decompression of the contralateral side, the engorged contralateral epidural vein near the L2 root was injured during the surgery. Unlike the lower lumbar levels, epidural hematoma in the upper lumbar levels could cause rapid neurological deterioration, as was seen in our case. The cross-sectional area of the upper lumbar levels is narrower than that of the lower lumbar levels, and the lamina width of the upper lumbar levels is also narrower than that of the lower lumbar levels. In this case, the bleeding was not easily controlled via the unilateral laminectomy site because the bleeding focus was located at the cephalad end of the ULBD on the contralateral side. Therefore, we decided to perform an additional laminectomy on the contralateral side and direct coagulation of the bleeding focus. In this situation, the laminectomy on the contralateral side should be carefully performed with using only Kerrison punches. The laminectomy that is done using a high-speed drill can easily cause a dural tear and neural injury because the decompressed dural sac directly contacts the contralateral lamina.

When performing ULBD, the possibility of acute spinal epidural hematoma should be kept in mind, especially in the upper lumbar levels. To prevent acute spinal epidural hematoma, meticulous bleeding control especially of the cephalad or caudal end on the contralateral side is mandatory.

Conclusion

Although ULBD is an effective minimally invasive surgery for treating spinal stenosis, the possibility of acute spinal epidural hematoma should be kept in mind, and especially in the upper lumbar levels. When controlling bleeding is not feasible via the unilateral laminectomy site, laminectomy on the contralateral side and direct coagulation of the bleeding focus should be performed, as we did in our case.

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