
CASE REPORT

DECREASED LUMBAR DISK BULGING AFTER ENDOSCOPIC LAMINECTOMY FOR DECOMPRESSION AND RADIOFREQUENCY ANNULOPLASTY

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Abstract

Background: Numerous novel technologies introduced by pain specialists to treat lumbar disk herniations rely on decreasing the size of the disk herniation without creating a large annular defect.

Case presentation: A patient with a soft, contained L4-5 disk herniation underwent an endoscopic laminectomy and planned discectomy. During the discectomy portion of the procedure, no annular defect was found and an annuloplasty was performed instead with a drastic improvement in the size of the disk bulge radiographically.

Conclusion: Soft, contained disk herniations causing mild mass effect on neural structures can be decreased in size by radiofrequency annuloplasty.

Background

Numerous technologies have been introduced by pain specialists to treat lumbar disk herniations as alternative options to traditional discectomies¹⁻³. These procedures, performed by pain anesthesiologists, physiatrists, or spine surgeons, rely on blind decompression, nucleoplasty, or annuloplasty with the goal of decreasing the size of the disk herniation and subsequently decompressing the neural elements without creating a large annular defect. Decreasing the size of or eliminating an iatrogenic annular defect theoretically decreases the chance for disk herniation recurrence. Unfortunately even though theoretically plausible options, none of the alternative methods above have been effective enough to replace discectomies as the treatment of choice in patients who exhaust conservative measures. In this case report, we describe the radiographic improvement of an L4-5 disk bulge on magnetic resonance imaging (MRI) after endoscopic radiofrequency annuloplasty with the goal of demonstrating that annuloplasty can indeed decrease the size of a disk bulge significantly. This information can serve as a basis for future

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novel non-surgical technologies that aim to treat soft, contained disk herniations with shrinking rather than discectomies.

Case Presentation

A 41-year-old female with no significant past medical history presented with chronic back pain and bilateral leg pain. Her pain was managed medically until 6 months prior to our visit when her pain became intractable to conservative measures. On examination, she was neurologically intact. An MRI scan performed 13 days prior to her operation demonstrated a contained disk herniation at L4-5 causing bilateral lateral recess stenosis and mild mass effect on the descending L5 nerve roots (Fig. 1). She was therefore offered an endoscopic bilateral L4-5 decompression via a right-sided approach with initial plans to perform a discectomy after the decompressive laminectomy.

On the day of operation, the patient was positioned prone on a Wilson frame. A combination of conscious sedation and epidural anesthesia was utilized. The first stage of the operation involved performing an L4-5 diskogram with indigo carmine

(Korea United Pharmaceutical, Yoenki, Republic of Korea) to assist in intraoperative visualization of any annular defect present. The next step of the operation was to perform a percutaneous endoscopic spinal stenosis lumbar decompression as described previously.⁴ After the decompression as we approached the disk space to perform a discectomy, there was no annular defect seen and the bilateral L5 roots were adequately decompressed dorsally. There was indigo carmine dye seen behind thin portions of the annulus, a sign of disk degeneration (Fig. 2). Therefore instead of performing a discectomy and inducing an iatrogenic annular defect, we performed an annuloplasty with a Trigger-Flex[®] radiofrequency probe (Elliquance, New York, USA). Technically what this entailed is ablation of all degenerated areas in the annulus, signified by the indigo carmine dye beneath the outer layers with the radiofrequency probe, utilizing quick millisecond pulse treatment. Postoperatively, the patient had complete improvement of her radiculopathy and back pain with the exception of some incisional pain. Her postoperative MRI 1 day after her operation demonstrated significantly decreased size of her disk bulge (Fig. 3).

Fig. 1

A: Preoperative sagittal T2 MRI demonstrating an L4-5 contained disk herniation contained with associated T2 signal posteriorly;
B: Preoperative axial T2 MRI demonstrating broad based L4-5 disk herniation causing mass effect on the descending bilateral L5 nerve roots

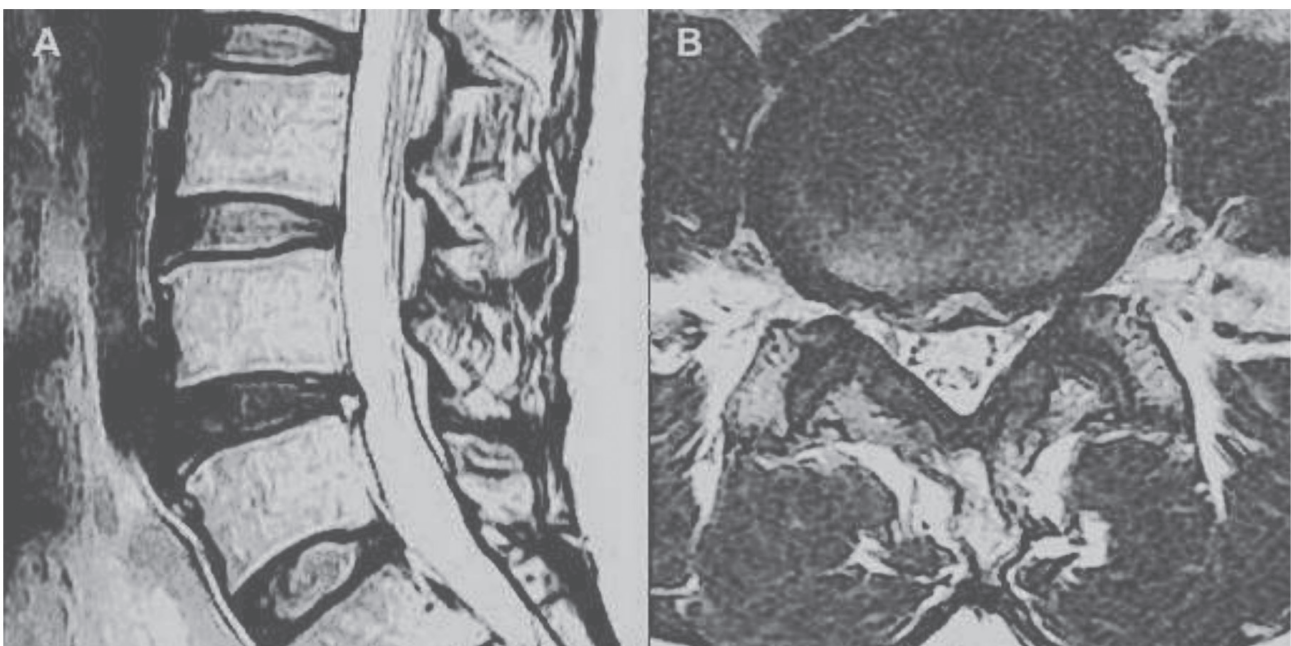


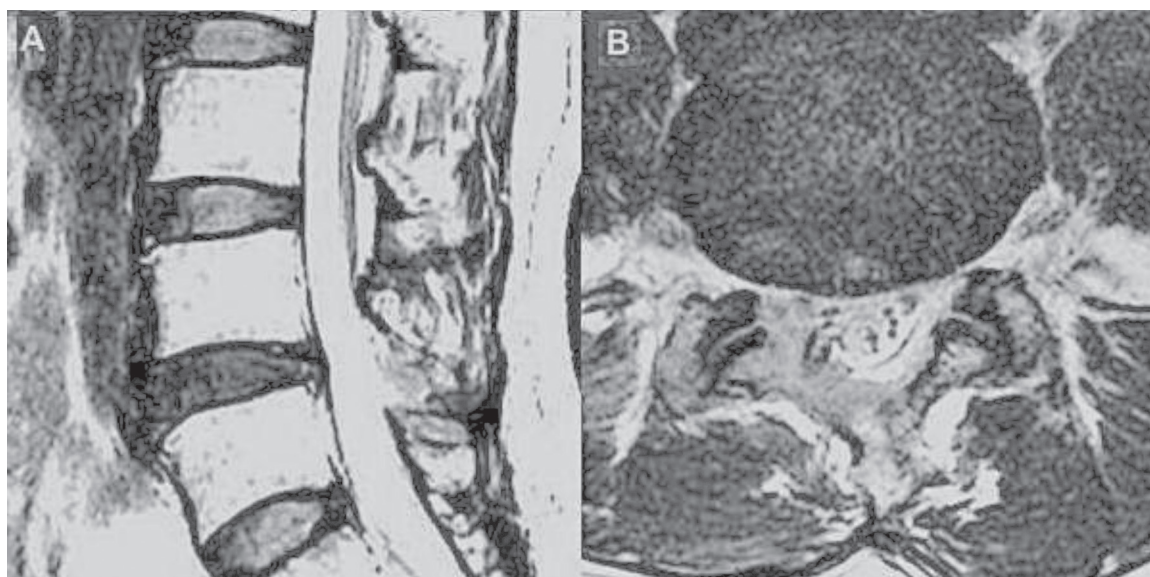
Fig. 2

Intraoperative photo demonstrating the degeneration present in the annulus, as signified by the indigo carmine dye staining, and the use of the radiofrequency probe in performing an annuloplasty in the area of annular degeneration



Fig. 3A

Postoperative sagittal T2 MRI illustrating resolution of disk herniation and T2 signal seen in the disk space preoperatively. B: Postoperative axial T2 MRI demonstrating decompression of the canal and resolution of the L4-5 disk herniation seen preoperatively



Discussion

In this case report, we report a patient with a soft, contained disk herniation undergoing endoscopic radiofrequency annuloplasty with clear radiographic improvement in the size of the disk bulge on imaging studies that are closely tied to the time of surgery. We would like to make it clear that it is not our goal to make any judgment regarding the efficacy of endoscopic radiofrequency annuloplasty over discectomy when there is no annular tear present, especially that our patient would have almost certainly improved with only the decompression performed prior to the annuloplasty. To make that claim would require a prospective trial following a group of patients undergoing annuloplasty over a substantial period of time to demonstrate robust clinical effectiveness and continued radiographic improvement. As the sinuvertebral nerve courses in close proximity to the annulus, it would not be unreasonable to believe that

annuloplasty would administer a good pain result as well due to ablation of this nerve, which is closely associated with the annulus.^{5,6} Nonetheless, this case report proves that radiofrequency ablation of the disk space can produce a drastic improvement in the size of a contained disk herniation in the acute postoperative period. This finding should revive the development of novel technologies by pain anesthesiologists, physiatrist, and surgeons that can perform an annuloplasty without decompression at all.

Conclusion

Soft, contained disk herniations causing mild mass effect on neural structures can be decreased in size by radiofrequency annuloplasty. Further prospective studies are needed to determine the robustness of the radiographic effect and also to associate this procedure with clinical outcomes.

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