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Case Study: Lumbar Radicular Symptoms in a Twenty Four Year Old Male

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Patient History

A 24-year-old male in the United States Air Force complains of 5-month history of back pain radiating to the left buttock, leg and great toe. There was no inciting event. He rates his pain at 7/10. The pain is aggravated by lifting, coughing, bending, running and bending forward and relieved only slightly by rest. He is unable to perform his duties on the flight line because of his pain. He has failed to improve despite treatment with physical therapy and medications including prednisone. Epidural steroid injections gave approximately 25% decrease in symptoms for a short duration. The patient wishes for definitive treatment to return to the flight line. contralateral posterior disc space, 88% removal of disc from the available cross-sectional disc area was achieved, versus 45% using conventional instruments ($p < 0.00001$). There was no significant difference in the effectiveness of hydrosurgical instruments in removing disc material in this area versus the total disc surface.

Examination

A physical exam revealed a positive straight leg raise at 30° with pain radiating to left buttock and posterior thigh. He has no motor or sensory deficits. Deep tendon reflexes are normal and symmetric. An MRI of the lumbar spine reveals a large, noncontained, subligamentous left paracentral herniated nucleus pulposus at L4-L5 with compression of the traversing L5 nerve root (Figure 1A, 1B).

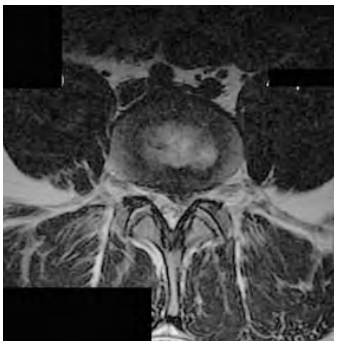

Figure 1A. T2 axial MRI showing HNP left L4-L5 with compression of L5 nerve root.

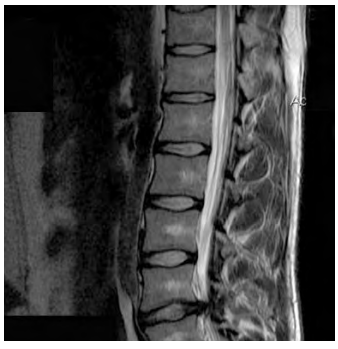

Figure 1B. T2 sagittal MRI showing HNP, left L4-L5 with compression of L5 nerve root.

Selected Treatment

This patient is an excellent candidate for decompressive microdiscectomy. Standard lumbar microdiscectomy performed using traditional techniques results in 85% to 95% good to excellent results in the immediate postoperative period. However, recurrence rates have been reported as high as 26% within one year after microdiscectomy,[1] and radicular pain secondary to epidural fibrosis has been reported as high as 21%.[2]

An alternative treatment is decompression via a HydroDiscectomy utilizing the SpineJet® Micro 3.8 System to remove tissue through a 4mm cannula system (Figure 2A, 2B). The SpineJet Micro 3.8 System uses high velocity water to pulverize the disc material and remove tissue through an evacuation tube in a controlled and safe manner.

The cannula system has been designed to minimize the residual annular defect after decompression. The 4mm working cannula is inserted into the disc space over a dilator rather than cutting the annular fibers. After decompression, when the cannula is removed, the elasticity of the annular fibers reduces the size of the annulotomy. These factors contribute to minimizing the annulotomy thereby decreasing the rate of potential recurrent herniation.[3]

Additionally, performing the HydroDiscectomy through a cannula minimizes the intra-operative nerve root manipulation. This decreases the amount of postoperative epidural fibrosis and the potential for chronic nerve root irritation in the absence of recurrent herniation.

Lastly, the SpineJet Micro 3.8 System allows the surgeon to remove disc material precisely. The surgeon has complete control over how much or how little disc material is removed. This allows the decompression to be performed efficiently.

Outcome

The patient was taken to the operating room and had a HydroDiscectomy performed at L4-L5 with decompression of the left L5 nerve root (Figure 3). The least amount of disc material required to decompress the nerve was removed. The

patient tolerated the procedure without complications. At the first postoperative visit, 27 days after surgery, the patient had complete resolution of his leg pain. By two and a half months postoperatively, he was performing low-impact cardiovascular training 25 minutes per day without difficulty and was deemed fit for full duty. To return to the flight line, an MRI of the lumbar spine was required per USAF regulations. His repeat MRI 7 months postoperatively shows no residual herniation (Figure 4A, 4B).

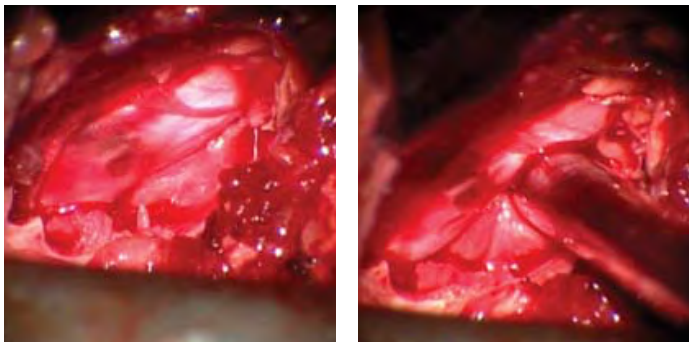

Figure 3. HydroDiscectomy utilizes the SpineJet Micro 3.8 HydroSurgery System to remove disc material through a 4mm cannulated system.

Figure 4A. 17 months postoperative T2 axial MRI with no appreciable herniation.

Figure 4B. 17 months postoperative T2 sagittal MRI with no appreciable herniation.

Summary

In a retrospective study of 27 patients, who underwent a HydroDiscectomy procedure with the SpineJet®, there were no recurrent herniations requiring revision decompression one year after surgery, compared to 6 of 34 patients (17.6%) who underwent traditional microdiscectomy who required a revision microdiscectomy within a year after surgery.[2]

Seven of the 34 patients in this study, treated with the traditional microdiscectomy, experienced postoperative radicular symptoms in the absence of reherniation at 3-month follow-up with pain similar to pre-operative pain. Only one patient of the 27 treated with HydroDiscectomy had radicular symptoms in the absence of recurrent herniation.[2] The difference in the rate of persistent leg pain and recurrent herniations between the two groups was statistically significant (p:<0.025).

Despite removal of a small amount of disc material, the postoperative MRI shows no residual herniation 7 months postoperatively. Additionally, there is no epidural fibrosis since there was little intra-operative manipulation of the nerve root.

References

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3. Carragee EJ, Ha MY, Suen PW, Kim D. Clinical outcomes after lumbar discectomy for sciatica: the effects of fragment type and annular competence. JBJS. 2003; 85-A:102-108.

Notes

"The views expressed in this article are those of the author(s) and do not reflect the official policy or position of the Department of the Navy, Department of Defense, or the United States Government."