Management of Isthmic Spondylolisthesis with Posterolateral Endoscopic Foraminal Decompression

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Study Design. Prospective evaluation of 24 consecutive patients with isthmic spondylolisthesis with chronic back, buttock, and leg pain treated by endoscopic foraminal decompression and followed for a minimum of 2 years.

Objectives. To assess the efficacy of endoscopic foraminal decompression and mobilization of the exiting and transiting nerves, discectomy, ablation of Osteophytes, and impinging pars as a means of treatment by the posterolateral approach.

Summary of Background Data. Open decompression with or without fusion is a commonly accepted procedure for symptomatic isthmic spondylolytic spondylolisthesis in patients who fail to respond to conservative treatment. There is no published data on the outcome of endoscopic procedures for this condition.

Methods. Endoscopic foraminal decompression achieved with laser-assisted bone and soft-tissue ablation was performed on 12 males and 12 females with an average age of 42.4 years (36 – 72 years) followed for an average period of 34 months (28 months – 46 months). The average preoperative duration of symptoms was 6.1 years (3 – 9 years)

Results. One hundred percent cohort integrity was maintained at the final follow-up. Results were analyzed using the percentage change in Oswestry Disability Scores and in Visual Analogue Pain scores. Using a percentage change in Oswestry Disability Score of 50 or more plus VAP scores of 50 or more to determine good and excellent outcomes, 79% (19 out of 24) exceeded this value.

Conclusion. Laser-assisted endoscopic foraminal decompression provides a minimalist means of exploring the extraforaminal zone, the isthmic defect, the foramen and its contents, the disc and the epidural space. It allows adequate resection of decompression and discectomy, without the need for open decompression and fusion, and targets the symptomatic level effectively in patients with Grade I – III isthmic spondylolisthesis.

Keyword: decompression, discectomy, endoscopy, foraminoplasty, fusion, spondylolisthesis

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Editor’s summary and comments:

The authors present a small but convincing study about the effective use of a minimally invasive technique for decompression of nerve root entrapment in lumbar isthmic spondylolisthesis. Their patients had failed conservative therapy and would otherwise have been candidates for decompression and fusion. The patients were sedated but not under a general anesthetic. The procedure is not blind but done under radiologic control and direct vision with the endoscope with removal of pathology using a side-firing laser. It was prompted by the authors’ experience with 250 cases of ELF (extraforaminal laser foraminoplasty) for chronic lumbar spondylosis or failed back surgery.

This study is a prospective, independently evaluated study with outcome measurements for endoscopic foraminal decompression with foraminoplasty and discectomy in chronically symptomatic patients. The ELF technique was adapted to the anatomical challenge presented by isthmic spondylolisthesis. The patients had failed to improve on conservative means, just as in other similar technique studies, which included endoscopic spinal interventions for disc prolapse and degenerative disc disease.

The study cohort was 24 patients with grade I – III isthmic disease with typical and expected symptoms of back and buttock pain with or without leg pain. Average age was 42.4 years, all older than 21 years; minimum history of symptoms was one year. Excluded from the study were
patients with severe congenital abnormalities, post-surgical, post-traumatic, localized bone infection, and degenerative spondylolisthesis. Pre-operative studies included radiological studies with instability radiographs (flexion and extension), MRI, and discography. The authors endeavored to confirm that the isthmic level was the symptomatic level.

The technique should be recognizable to others doing minimally invasive laser-assisted endoscopic spine surgery with the addition of an author-invented jig to insure optimal alignment of the approach line to the foramen. The laser utilized was the Holmium-YAG pulsing laser under saline irrigation. Tissues causing distortion, compression, traction, or irritation of the nerve root were ablated, including perineural fibrosis using this side-firing (90°) laser device.

Outcomes were studied using accepted scoring: Oswestry Disability Scoring and Visual Analogue Scoring. The authors recognized that patients may have had predominant pain from the isthmic levels with the adjacent level also responsible for symptoms. The surgery was done on the side of predominant symptoms, not bilaterally. In 10 of the 24 patients, the adjacent level was also responsible for pain. It is not clear whether the adjacent levels were treated, but the lack of data about this suggests that it was not treated, just the isthmic level. The results were impressive with 82% (12 of 14 patients) with grade I spondylolisthesis demonstrated good to excellent outcome; 6 of 9 with grade II or 60% reporting good to excellent relief. The reduction in pain followed a similar pattern (Visual Analogue Scores).

The authors reported no complications. In the final follow-up 2 patients with worse outcomes had spinal fusions and significant improvement thereafter.

This article and the authors’ thoughtful consideration of this treatment approach should be explored by spine surgeons. The authors did this surgery after many cases with ELF and, hence, had excellent experience in dealing with the pathological anatomy of listhesis patients. Their intra-operative photos are excellent, also confirming their familiarity with the oddities of this disease entity. They report no complications; failure to improve is not a complication. The patients were sedated but not anesthetized, promptly discharged, and subsequently followed up in a reasonable manner. The patient population is small, but the statistics speak for themselves. I think a larger study is in order, perhaps multicenter, and with psychological profiling and kinesthetic analyses as well. That the authors were able to resect isthmic abnormalities with a minimally invasive approach using the laser is laudable.

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