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Posterior Lumbar Inter-laminar Dynamic Stabilization Combined with Fusion for the Treatment of Multiple Level Lumbar Stenosis

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Objective: To evaluate the efficacy and safety of posterior lumbar inter-laminar dynamic stabilization combined with fusion for the treatment of multiple level lumbar stenosis.

Methods: From September 2007 to January 2010, 14 patients with multiple level lumbar stenosis were treated with posterior lumbar inter-laminar dynamic stabilization combined with fusion in our hospital. There were 6 male and 8 female with an average age of 58.7 years (53-71 years old). The diagnosis included degenerative stenosis with instability in 6 cases, degenerative stenosis with spondylolisthesis in 4 cases, simple degenerative stenosis in 4 cases. All patients in this group had lower back pain, neurological symptom and neurological claudication. Plain and dynamic X-ray, CT scan and MRI test were performed for all the patients to rule out the symptomatic levels pre-operatively. All the cases had two levels procedures. All patients underwent posterior selective decompression, transpedicular instrumentation system fixation and interbody fusion or pesterolateral fusion combined with selective decompression, disc excision and inter-luminar Coflex implantation under general anesthesia. Interbody fusion: 11 cases. Pesterolateral fusion: 3 cases. The VAS scale and Oswestry Disability Index were evaluated pre-operatively and post-operatively for clinical outcome. Plain and flexion-extension X-ray were taken for radiographic evaluation. Patient's satisfaction for the treatment was reported at the latest follow-up.

Results: All patients underwent the procedure safely and the average operating time was 165 minutes (140-190) with an average blood loss of 340 ml (300-400). There was no nerve injury, extensive bleeding and infection occurred in this group. All patients were mobilized with soft brace five days post-operatively and discharged 7-10 days post-operatively. All patients were followed at 1, 3, 6, 12, 24 months post-operatively for clinical and radiographic evaluation. The average follow up time was 5.7 months (3-9). The average VAS scale was from 8.1 pre-operatively to 3.2 post-operatively and 2.7 at the latest follow-up. The average Oswestry Disability Index was from 55.3 pre-operatively to 23.9 post-operatively and 24.5 at the latest follow-up. There were significant differences between the index of preoperation and postoperation. The fusion segment is solid fused and the non-fusion segment had acceptable motion range in follow-up. The average range of motion of the operated lumbar segment was 3.6 degree (2-6). There was no implant migration found at the follow up. At the latest follow up, the patient's satisfaction was 92.9% (13/14).

Conclusion: The posterior lumbar inter-laminar dynamic stabilization combined with fusion for the treatment of multiple level lumbar stenosis, especially for degenerative stenosis is a minimal invasive procedure which can achieve adequate decompression to improve the neurological symptoms while maintaining the motion of the operated segment. Short term follow up results showed that it is a safe and effective procedure for the surgical treatment of degenerative lumbar Stenosis. The long term outcome of this procedure is to be evaluated.