Indirect Decompression of Lumbar Spinal Stenosis Following Minimally Invasive Transforaminal Lumbar Interbody Fusion

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Introduction: Minimally invasive transforaminal lumbar interbody fusion (MIS-TLIF) is increasingly utilized in the treatment of degenerative conditions of the lumbar spine. The restoration of disc height and lumbar sagittal alignment following MIS-TLIF provides indirect decompression of the neuroforamina, however its effects on central canal stenosis are not well characterized.

Objective: To evaluate clinical outcomes and radiologic variables of sagittal segmental alignment and central canal dimensions in patients with lumbar spinal stenosis undergoing MIS-TLIF.

Methods: We conducted a retrospective review of MIS-TLIFs performed between 2014 and 2018. We identified patients who had both preoperative and postoperative upright lateral radiographs and magnetic resonance imaging (MRI) of the lumbar spine. MRI scans were analyzed for changes in central canal dimensions. Radiographic measurements included disc and neuroforaminal height, segmental lordosis, and spondylolisthesis.

Results: Of the 74 consecutive patients who underwent 81 MIS-TLIFs, we identified 18 patients with 20 levels of intervention (Age 58.3 ±9.1 years, Mean ±SD; 66.7% Female), predominantly L4/5 (65%). Expandable interbody devices were utilized in 50% cases. No additional central canal decompression was performed beyond the limited facetectomy to access the disc space. Follow-up duration after surgery was 26.5 ±11.3 months. Patient-reported clinical outcomes were significantly improved postoperatively.

The anteroposterior dural sac diameter increased from 9.9 ±0.6mm (Mean ±SEM) preoperatively to 13.2 ±0.5mm postoperatively (P <0.001). Transverse dural sac diameter increased from 12.2 ±0.6mm to 16.5±0.6mm (P <0.001). There was a significant reduction in spondylolisthesis. The percentage offset of one vertebra over its adjacent segment decreased from 12.4 ±2.4% to 6.3 ±1% (P <0.01). Patients experienced significant increases in segmental disc height and lordosis, but neuroforaminal height was not significantly increased. Similar changes were observed within and between static and expandable cage subgroups; however, the magnitudes of disc height and segmental lordosis correction were greater with expandable cages.

Conclusions: MIS-TLIF results in successful indirect decompression of the central spinal canal, without additional posterior decompressive procedures.