Lumbar Central Spinal Canal Stenosis

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Central lumbar spinal canal stenosis is a medical condition characterized by the narrowing of the central Lumbar spinal canal.

Causes

Lumbar central spinal canal stenosis is often caused by age-related degenerative changes in the spine. Some common causes include:

Herniated Discs: When the discs between the vertebrae bulge or rupture, they can encroach upon the spinal canal, leading to stenosis.

Bone Spurs: The growth of bony projections, known as bone spurs or osteophytes, can occur due to the wear and tear of the spinal joints. These spurs can impinge on the spinal canal.

Thickened Ligaments: Over time, the ligaments that support the spine may become thickened, which can reduce the space within the spinal canal.

Symptoms: The symptoms of lumbar central spinal canal stenosis can vary from person to person. Some common signs and symptoms include:

Lower back pain: Chronic or intermittent pain in the lower back is a common symptom.

Leg pain: Pain, numbness, tingling, or weakness may radiate into the buttocks and down one or both legs. This pain may worsen with walking or standing and improve with sitting or leaning forward.

Neurological symptoms: Compression of the spinal cord or nerve roots can lead to symptoms such as muscle weakness, difficulty walking, balance problems, and bowel or bladder dysfunction in severe

cases.

Treatment: The treatment options for lumbar central spinal canal stenosis depend on the severity of symptoms and the impact on daily life. Some common treatment approaches include:

Non-surgical treatments: These may include physical therapy, exercises to strengthen the core and back muscles, pain management techniques, and medications to alleviate pain and reduce inflammation.

Epidural steroid injections: These injections can help reduce inflammation and provide temporary pain relief by delivering steroids directly to the affected area.

Surgical interventions: If non-surgical treatments fail to provide relief, surgery may be considered. The specific procedure depends on the individual case but may involve decompression of the spinal canal, removal of bone spurs or disc material, or stabilization of the spine.

The objective of a study of Khalifeh et al. was to evaluate radiologic changes in central spinal canal dimensions following minimally invasive transforaminal lumbar interbody fusion (MIS-TLIF) with placement of a static or an expandable interbody device.

MIS-TLIF is used to treat lumbar degenerative diseases and low-grade spondylolisthesis. MIS-TLIF enables direct and indirect decompression of lumbar spinal stenosis, with patients experiencing relief from radiculopathy and neurogenic claudication. However, the effects of MIS-TLIF on the central spinal canal are not well-characterized.

They identified patients who underwent MIS-TLIF for degenerative lumbar spondylolisthesis and concurrent moderate to severe spinal stenosis. They selected patients who had both preoperative and postoperative magnetic resonance imaging (MRI) and upright lateral radiographs of the lumbar spine. Measurements on axial T2-weighted MRI scans include anteroposterior and transverse dimensions of the dural sac and osseous spinal canal. Measurements on radiographs include disk height, neural foraminal height, segmental lordosis, and spondylolisthesis. They made pairwise comparisons between each of the central canal dimensions and lumbar sagittal segmental radiologic outcome measures relative to their corresponding preoperative values. Correlation coefficients were used to quantify the association between changes in lumbar sagittal segmental parameters relative to changes in radiologic outcomes of central canal dimensions. Statistical analysis was performed for “all patients” and further stratified by interbody device subgroups (static and expandable).

Fifty-one patients (age 60.4 y, 68.6% female) who underwent MIS-TLIF at 55 levels (65.5% at L4-L5) were included in the analysis. Expandable interbody devices were used in 45/55 (81.8%) levels. Mean duration from surgery to postoperative MRI scan was 16.5 months (SD 11.9). MIS-TLIF was associated with significant improvements in dural sac dimensions (anteroposterior +0.31 cm, transverse +0.38 cm) and osseous spinal canal dimensions (anteroposterior +0.16 cm, transverse +0.32 cm). Sagittal lumbar segmental parameters of disk height (+0.56 cm), neural foraminal height (+0.35 cm), segmental lordosis (+4.26 degrees), and spondylolisthesis (-7.5%) were also improved following MIS-TLIF. We did not find meaningful associations between the changes in central canal dimensions relative to the corresponding changes in any of the sagittal lumbar segmental parameters. Stratified analysis by interbody device type (static and expandable) revealed similar within-group changes as in the overall cohort and minimal between-group differences.

MIS-TLIF is associated with radiologic decompression of lumbar foraminal stenosis and central spinal canal stenosis. The mechanism for neural foraminal and central canal decompression is likely driven by a combination of direct and indirect corrective techniques [1)].

Lumbar Central Spinal Canal Stenosis Classification

Pfirrmann grading system for disc degeneration.

Schizas classification for Lumbar central spinal canal stenosis.

Lee classification for Lumbar Foraminal Stenosis.

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Khalifeh JM, Massie LW, Dibble CF, Dorward IG, Macki M, Khandpur U, Alshohatee K, Jain D, Chang V, Ray WZ. Decompression of Lumbar Central Spinal Canal Stenosis Following Minimally Invasive Transforaminal Lumbar Interbody Fusion. Clin Spine Surg. 2021 May 12. doi: 10.1097/BSD.0000000000001192. Epub ahead of print. PMID: 33979102.