Lumbar Foraminal Stenosis Magnetic resonance imaging

- Non-Hodgkin's lymphoma presenting with lower extremity edema and radiculopathy in a post-kidney transplant patient: A case report
- Clinical efficacy of robot-assisted single-position OLIF with lateral plate combined with posterior unilateral fixation for single-segment lumbar spinal stenosis
- Magnetic Resonance Imaging Predictors of Surgical Difficulty in Transforaminal Endoscopic Lumbar Discectomy for Far-Lateral Disc Herniation Under Local Anesthesia
- Biportal Endoscopic Decompression with Maximized Facet Joint Preservation for Central to Extraforaminal Lumbar Stenosis
- Case Report: The Successful Use of Hydroxyzine for Analgesia in a Patient With Lumbar Spinal Stenosis
- Reliability of surgeon-reported MRI findings to a national spine register
- Treatment of gas-containing lumbar disc cysts via a combination of posterior and extraforaminal approaches in arthroscopic-assisted uni-portal spine surgery: a case report and literature review
- GPT4LFS (generative pretrained transformer 4 omni for lumbar foramina stenosis): enhancing lumbar foraminal stenosis image classification through large multimodal models

Nerve compression is best appreciated on sagittal MRI through the foramen (especially T2WI). T1WI can highlight the fat that surrounds the nerve in a normal foramen (often absent in foraminal stenosis).

MRI: demonstrates impingement on neural structures and loss of CSF signal on T2WI due to central canal stenosis, lateral recess stenosis, foraminal stenosis as well as juxtafacet cysts, increased fluid in the facet joint and vacuum disc. MRI is poor for visualizing bone which contributes significantly to the

pathology.

Although magnetic resonance imaging (MRI) is widely used, and is considered by many as an appropriate tool for studying spine pathologies, there is limited data to suggest that MRI examinations are sufficiently sensitive or specific for the diagnosis of LSFS.

There is no widely used diagnostic criterion or grading system for lumbar foraminal stenosis on MRI. For clinical studies with the objective of comparing different therapeutic methods for lumbar foraminal stenosis, an adequate grading system that has good reproducibility is necessary. In addition, in daily routine practice, a grading system for lumbar foraminal stenosis is necessary for writing radiologic reports.

There have been few reports on the grading or classification of lumbar foraminal stenosis on MRI [1) 2)]. The grading system suggested by Wildermuth et al. [3)] focused on only the degree of epidural fat obliteration. The classification of lumbar foraminal stenosis proposed by Kunogi and Hasue [4)] included the anteroposterior, cephalocaudal, and circumferential types without stenosis grade. The grading system of Wildermuth et al. and the classification proposed by Kunogi and Hasue do not consider direct nerve root compression or deformity, which may be important.

Effective foraminal height, effective superior foraminal width and the effective ratio can regard as the main evaluation index for LPS in parasaggital MRI finding [5)].

In patients with developmental or combined stenosis of the central spinal canal, a concomitant foraminal stenosis is likely to be present, or at least should be suspected [6)].

In a T1 MRI the normal is appearance with white fat signal surrounding the exiting nerve roots.

In stenotic (narrowed), there is no fat surrounding the nerve.

The association between disc pathology and facet osteoarthrosis can cause occult foraminal stenosis. Strategies to image the spine under physiological load conditions may improve the clinical diagnosis of radicular pain [7)].

Higher superior articular process area (SAPA) values were associated with a higher possibility of LFS [8)].

Classification

Lumbar Foraminal Stenosis Magnetic resonance imaging classification

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Wildermuth S, Zanetti M, Duewell S, Schmid MR, Romanowski B, Benini A, Böni T, Hodler J. Lumbar spine: quantitative and qualitative assessment of positional (upright flexion and extension) MR imaging and myelography. Radiology. 1998 May;207(2):391-8. Erratum in: Radiology 1998 Sep;208(3):834. PubMed PMID: 9577486.
2)

Grenier N, Kressel HY, Schiebler ML, Grossman RI, Dalinka MK. Normal and degenerative posterior spinal structures: MR imaging. Radiology. 1987 Nov;165(2):517-25. PubMed PMID: 3659376.
4)

Kunogi J, Hasue M. Diagnosis and operative treatment of intraforaminal and extraforaminal nerve root compression. Spine (Phila Pa 1976). 1991 Nov;16(11):1312-20. PubMed PMID: 1750006.
5)

Zhou H, Dong G, Huang H, Xia ZM, Zhang ZH. [MRI finding of the lumbar foraminal stenosis and its clinical significance]. Zhongguo Gu Shang. 2010 Aug;23(8):587-90. Chinese. PubMed PMID: 20860131.
6)

Cinotti G, De Santis P, Nofroni I, Postacchini F. Stenosis of lumbar intervertebral foramen: anatomic study on predisposing factors. Spine (Phila Pa 1976). 2002 Feb 1;27(3):223-9. PubMed PMID: 11805682.
7)

Splendiani A, Ferrari F, Barile A, Masciocchi C, Gallucci M. Occult neural foraminal stenosis caused by association between disc degeneration and facet joint osteoarthritis: demonstration with dedicated upright MRI system. Radiol Med. 2014 Mar;119(3):164-74. doi: 10.1007/s11547-013-0330-7. Epub 2013 Dec 12. PubMed PMID: 24337755.
8)

Lim TH, Choi SI, Cho HR, Kang KN, Rhyu CJ, Chae EY, Lim YS, Lee Y, Kim YU. Optimal Cut-Off Value of the Superior Articular Process Area as a Morphological Parameter to Predict Lumbar Foraminal Stenosis. Pain Res Manag. 2017;2017:7914836. doi: 10.1155/2017/7914836. PubMed PMID: 28163566; PubMed Central PMCID: PMC5253487.