Lumbar Spinal Stenosis Recommendations of World Federation of Neurosurgical Societies Spine Committee

It is our pleasure to present the lumbar spinal stenosis (LSS) recommendations of the World Federation of Neurosurgical Societies (WFNS) Spine Committee in this special issue of **WORLD NEUROSURGERY**.

LSS has been a challenging topic among spinal disorders. It is a commonly seen disease in our daily practice. The incidence of patients is also increasing due to aging populations.

Guidelines efforts on this and similar topics are not new. The American Association of Neurological Surgeons/Congress of Neurological Surgeons Joint Section on Disorders of the Spine and Peripheral Nerves first published its release of guidelines for degenerative lumbar spine disorders in 2005, in the *Journal of Neurosurgery: Spine*.[1] In 2009, an expert panel of neurosurgical and orthopedic spine surgeons revised the guidelines. Spine and Peripheral Nerve Section of AANS and CNS then published their results in 2014, again in the *Journal of Neurosurgery: Spine*.[2,3] However, those guidelines were about fusion surgery only.

In 2011, the North American Spine Society published LSS guidelines with the title "Diagnosis and Treatment of Degenerative Lumbar Spinal Stenosis."[4,5]

The WFNS Spine Committee started to do similar work including a variety of spinal disorders. We created 2 consecutive consensus meetings to extract recommendations from the recent literature—in Milan, Italy in November 2018 and Belgrade, Serbia in March 2019. Approximately 15 neurosurgeons and orthopedic surgeons specializing in the spine have searched the past 10 years' literature and created statements to provide the most up-to-date solutions for this common disease. Next, those statements were discussed and voted on to reach a consensus, using the Delphi technique. In this special issue, you will find 6 papers dedicated to the diagnosis and treatment of LSS.

Although many surgeons operate on most cases of LSS,[6] some publications indicate that a conservative treatment or simple follow-up may be appropriate for some of those patients. Studies on the natural course of LSS are sparse. However, a few studies with long follow-ups have shown that only one third of the patients worsen if conservative measures are applied.[7]

Similar to other degenerative spine problems, lack of correlation between symptoms and degree of stenosis make the radiologic classifications difficult. Quantitative measurements do not help to estimate outcomes of LSS. Radiologists have done many efforts to standardize and classify the radiologic findings, but they could not reach a consensus on that.[8] They have localized the stenosis as central, lateral, and foraminal and classified the central zone narrowing as mild, moderate, and severe stenosis. They have found the relation between fluid and cauda equina more reliable than the anteroposterior diameter or even spinal canal area measurements. The instability signs remain debatable because the relationship between radiologic evidence of instability and its symptoms is controversial. Other than direct signs of instability on flexion and extension films, indirect signs on magnetic resonance imaging and computed tomography, such as Modic changes and end plate edema, may be more valuable in radiologic evaluation.

Using electrophysiology tests in diagnosis and outcome estimation of LSS has been proposed. However, conventional tests have not been found useful. Although electromyographic paraspinal mapping and motor evoked potentials can be accepted as more reliable tests, in general electrophysiologic tests do not predict outcome of patients with LSS.

Conservative therapy for LSS is not standard. The literature is full with different treatment options. But patients with mild symptoms may go to at least 3 weeks of therapeutic exercise and can get a positive response.[9] Besides, physical treatment with multimodality approaches are more valuable than 1 modal therapy. We must stress that moderate and severe cases should go to either a close follow-up or surgical intervention. Besides, in case of conservative treatment, surgery should be considered if the clinical condition does not improve in 3 months.

Facet joint injections may be helpful for back pain in LSS patients. Epidural injections may give rise to short-to intermediate-term benefits, but they are almost always transient. It is interesting, however, that the inclusion of steroids does not confer a benefit compared with local anesthetic alone.

If we look at the type of surgical techniques, we must admit that decompression is the basis of LSS surgery. Most studies concluded that surgery is effective, particularly in cases with prolonged and progressively worsening symptoms in the legs.[10]

The recent trend of "unilateral laminotomy with bilateral decompression" or "bilateral laminotomy" has similar results to open surgery and needs more research to investigate its value. In this regard, minimally invasive approaches have some advantages over open decompression for early clinical outcomes (blood losses, wound pain, and hospital stay). Besides, minimally invasive approaches have lower complication rates than open approaches. The overall complication rates and reoperation rates for lumbar decompressive surgery are not well known. Incidental durotomy is common (almost 10%), but it has only a minor effect on outcome.

We know that some surgeons prefer adding spinal fusion in almost all cases of LSS.[11,12] However, in case there is no low back pain, the necessity of fusion surgery even in degenerative listhesis is questionable. In conclusion, for patients with LSS and no signs or symptoms of instability and predominant leg pain, decompression alone should be recommended. *Stable spondylolisthesis* is a term to be used, and for those patients a fusion is not mandatory and decompression alone is suggested. In patients if bilateral facetectomy more than 50%

were done and/or bilateral discectomy was done, fusion may be advisable.

Another treatment option for instability in LSS is mobility-preserving surgery. The rationale for mobility-preserving operations for lumbar spinal stenosis is preventing adjacent segment disease. The mobility preserving devices have distinct types: 1) total disk replacement, 2) nucleus replacement, 3) interspinous devices—for distraction and stabilization, 4) posterior dynamic instruments, and 5) facet replacement. The first 2 techniques have no direct role in lumbar spinal stenosis.

Although the first implants were dynamic, such as ligament-based dynamism (Diam), then rod-based (semirigid) dynamic systems became popular and recently hybrid fixation devices (topping off implants) or the so-called rigid and dynamic fixation together have replaced the previous ones. They can prevent adjacent segment degeneration decompression, but the current evidences are not strong enough to suggest using them in daily practice.

If our aim is to perform an operation for lumbar spinal stenosis with preservation of mobility, less invasive approaches without fusion can be a strong option.[13]

Although we all seek evidence-based guidelines, it may not be possible to have such high-quality studies in all diseases. Difficulty in randomization and insurance issues are the main problems. The consensus study done by our spine committee can reach a strong conclusion of recommendations.

It is obvious that we need further studies to clarify some points, and we must revise them with regular intervals to update the knowledge and to increase the reliability.

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