

EDITORIAL



Fusion for Lumbar Spinal Stenosis — Safeguard or Superfluous Surgical Implant?

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Lumbar spinal stenosis is typically caused by degenerative facet-joint arthrosis and leads to compression of the nerves, resulting in walking disability and leg pain in the elderly. The use of surgical decompression alone to treat lumbar spinal stenosis declined slightly in the United States between 2002 and 2007, whereas the use of a combined procedure of decompression and fusion increased by a factor of 15 during this period.¹ Evidence showing a benefit of adding fusion to decompression surgery is lacking, even in the subgroup of patients who have degenerative spondylolisthesis (a slip of adjacent vertebrae caused by facet-joint arthrosis).^{2,3} Decompression with fusion is performed in approximately half of all patients with lumbar spinal stenosis who undergo spine surgery and in 96% of the subgroup of patients who have concomitant spondylolisthesis.^{4,5}

Degenerative spondylolisthesis is believed to be associated with a risk of progressive instability caused by the manipulation and destruction of spinal elements during surgery.^{6,7} Performing fusion in addition to bony decompression surgery is generally accepted as the best practice, even in the case of degenerative stable spondylolisthesis in which the anteriorly slipped vertebra does not move more than 3 mm forward on the adjacent vertebra below.^{4,8} Previous studies, however, have not shown benefits of fusion over decompression alone for the treatment of stenosis.^{2,3,9} Moreover, in an analysis of Medicare data that assessed resource use among 32,152 patients in the United States in 2007, the rate of life-threatening stroke and cardiopulmonary events among patients who underwent complex fusion surgery was reported to be triple the rate among patients who underwent decompression surgery

alone.¹ In addition to the higher risk of complications, the more complex surgery was associated with higher health care costs owing to longer hospital stays and the additional costs of the implants.

In two studies in this issue of the *Journal*, Försth et al.¹⁰ and Ghogawala et al.¹¹ provide evidence suggesting that there is little value in adding fusion to decompression surgery. In both studies, standard bony decompression was compared with decompression plus instrumented fusion among patients who had stenosis that was limited to a maximum of two lumbar levels and did not involve spinal instability, which is the most common form of spinal stenosis. In the Swedish Spinal Stenosis Study, Försth et al. included patients with spondylolisthesis and patients without spondylolisthesis, whereas in the U.S. trial, Ghogawala et al. included only patients with spondylolisthesis and excluded those with spinal instability, as confirmed on flexion–extension radiographs.

Ghogawala et al. randomly assigned 66 patients with stenosis and spondylolisthesis at five hospitals. This trial showed a small benefit — just above the minimal clinically important difference — of decompression plus fusion on the primary outcome measure, the generic physical-component summary score of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). The secondary outcome measure — the score on the Oswestry Disability Index (ODI) — did not differ significantly between the treatment groups. The ODI is used to assess disability related to low back pain; it is used internationally as a disease-specific functioning scale and is accepted to be superior to generic scales with regard to the evaluation of spinal treatments.

Försth et al. randomly assigned 247 patients with or without spondylolisthesis at seven hospitals to one of the two procedures. In concordance with their earlier large-scale observational cohort study of the National Swedish Register for Spine Surgery,⁹ the authors reported that the more technically advanced decompression with fusion procedure was associated with higher costs but did not provide improvement with respect to the primary outcome measure, the ODI, or to any other clinical outcome, including walking distance.

Ghogawala et al. correctly conclude that the moderate difference in SF-36 score in favor of instrumented fusion does not justify the associated higher costs for implants and the longer duration of surgery than those with decompression alone. Given that the disease-specific ODI is a better outcome measure for the treatment of spinal stenosis than the general SF-36, the fact that both trials showed that the improvements in the scores on the ODI did not differ significantly between the two surgical approaches suggests that the costlier approach of instrumented fusion does not add value for patients.

A remarkable difference between the two studies is the observed rate of reoperation. Many patients underwent revision surgery after decompression surgery alone (21% in the Swedish trial and 34% in the U.S. trial) and after decompression plus fusion surgery (22% in the Swedish trial and 14% in the U.S. trial). The higher rate of reoperation in the decompression-alone group in the trial by Ghogawala et al. probably reflects decision making about revision surgery in the United States. Patients who have unfavorable outcomes after laminectomy are perhaps offered revision with added instrumented fusion more often in the United States than in Sweden. In contrast, in the United States, physicians have higher thresholds to perform revision surgery after fusion surgery, resulting in lower rates of reoperation than those in the Swedish trial.

Both trials show clearly that for most patients, stenosis surgery should be limited to decompression when no overt instability is present. Evidence from the trials by Försth et al.¹⁰ and Ghogawala et al.¹¹ suggests that fusion for the treatment of stenosis is no longer the best practice and that its use should be restricted to patients who have proven spinal instability, as confirmed on flexion–extension radiographs; vertebral destruction caused by trauma, tumors, infections,

or spinal deformities, such as congenital spondylolisthesis or adult scoliosis¹²; or neuroforamen stenosis with compressed exiting nerves caused by postsurgical disk collapse. Fusion might even be debatable for neuroforamen stenosis caused by disk collapse after failed initial surgery, because evidence to support fusion for this indication is lacking.

The goal of surgery in lumbar spinal stenosis is to improve walking distance and to relieve pain by decompression of nerve roots. The addition of instrumented fusion — “just to be sure” — for the treatment of the most frequent forms of lumbar spinal stenosis does not create any added value for patients and might be regarded as an overcautious and unnecessary treatment.

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