

Clinical Study

Outcome of decompression with and without fusion in spinal stenosis with degenerative spondylolisthesis in relation to preoperative pain pattern: a register study of 1,624 patients

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Abstract

BACKGROUND CONTEXT: Patients with spinal stenosis with concomitant degenerative spondylolisthesis (DS) and predominant back pain (PBP) have been shown to have inferior outcome after surgery. Studies comparing outcome according to preoperative pain predominance and treatment received are lacking.

PURPOSE: The purpose was to study if adding spinal fusion to the decompression in DS affects outcome in patients with PBP (back pain [BP] Visual Analog Scale [VAS] more than or equal to leg pain [LP] VAS) compared with predominant leg pain (PLP) (BP VAS less than LP VAS).

PATIENT SAMPLE: The Swedish Spine Register was used and included 1,624 patients operated for DS at the L4–L5 level.

OUTCOME MEASURES: Self-reported measures were used, including a VAS for BP and LP, the EuroQol-5D (EQ-5D), and the physical and mental component summaries of the Short-Form 36 to estimate health-related quality of life and the Oswestry disability index (ODI) to estimate function.

METHODS: Inclusion criterion was single-level DS operated on with either decompression only (D) or decompression and instrumented posterolateral fusion (DF). Based on preoperative LP and BP scores, the patients were assigned to one of the two groups: LP predominance or BP predominance. The patients completed the outcome protocol at 1- and 2-year follow-ups. Statistical analysis was performed using linear regression adjusting for multiple potential confounders.

RESULTS: In the adjusted outcome at the 1-year follow-up, patients with PLP reported a 7.9-mm more improvement on the VAS for BP with fusion, compared with D (95% confidence interval [CI], 0.7–15.2), $p=.03$. Despite more change in the fused group, the reported BP levels remained similar in the D versus decompressed and fused at the 1-year follow-up (28 vs. 24, $p=.77$). The patients with PBP benefited from adding fusion in terms of BP 7.1 (95% CI, 0.3–13.9, $p=.04$), LP 8.8 (2–15.7, $p=.01$), the ODI 5.7 (1.6–9.9, $p=.006$), and the EQ-5D 0.09 (1.7–0.02, $p=.02$) at the 1-year follow-up as the DF group reported greater change in the outcome compared with the D group. At the 2-year follow-up, no significant differences were found between D and decompressed and fused in either the LP or the PBP groups.

CONCLUSIONS: Patients with PBP operated with DF report better outcomes in terms of pain, function, and health-related quality of life than patients with D. Although these differences are significant on a group level, they may fail to reach minimal clinical significant difference. Patients with PLP report significantly more improvement in terms of BP with DF compared with D, but because of baseline differences in preoperative BP, these improvements may not be explained by the added fusion per se. At the 2-year follow-up, no significant differences were observed between the D and DF patients in either the PBP or PLP groups, but greater loss to follow-up in the DF groups could potentially bias these findings. © 2015 Elsevier Inc. All rights reserved.

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Introduction

Decompression and fusion are frequently performed for lumbar spinal stenosis with concomitant degenerative spondylolisthesis (DS) [1–3]. Evidences for [4–9] and against improved outcome when fusion is added to the decompressive procedure exist [10,11]. These results suggest that a more nuanced selection of patients for concomitant spinal fusion is warranted, thereby benefiting the appropriately selected patients whereas sparing others the increased morbidity associated with adding spinal fusion [12]. There are many factors to consider when deciding if to fuse a DS [13,14], such as age, bone quality, comorbidity, smoking, previous spine surgery, orientation of facet joints, disc height, and intensity of back pain (BP). Predominant back pain (PBP) is associated with inferior outcome in surgery for lumbar spinal stenosis with and without DS [15–17], but to our knowledge, few studies exist comparing outcome for patients with PBP or PLP operated with decompression only (D) versus decompression and fusion in DS. The role of decompression in DS is to relieve the radicular pain and neurogenic claudication, but the role of spinal fusion is to address the concomitant BP and elimination of segmental instability [14]. As the perceived role of fusion is to eliminate BP and a large proportion of patients with DS have predominance of BP [16,18], an analysis of the role of spinal fusion in DS in patients having PBP versus LP is warranted. Using the Swedish Spine Register (Swespine), we examined the outcome of surgery for DS according to the treatment (D vs. decompression and posterolateral fusion) in patients with either LP or PBP.

Material and methods

The Swedish Spine Register

Data on all the patients were extracted from the Swespine [3]. The Swespine is a quality register owned by the Swedish Association of Spinal Surgeons (<http://www.4s.nu>) and is financed by the Ministry of Health and Welfare. The register is useful in monitoring surgical activities within Sweden including surgical trends and implants used. More than 90% of clinics performing spine surgery in Sweden participated. The patient protocol is self-administered, but secretaries at the local level send out follow-up protocols. The operating surgeon is responsible for filling in surgical data. The register was created in the 1990s and has published 14 annual reports. The register protocol has been validated and includes questions regarding age, gender, workers' disability, working status (including type of work), duration of LP and BP, use of analgesics, comorbidity, self-estimated walking distance, and sport activities [19]. Intrinsic to the protocol are also the Oswestry disability index (ODI), the Visual Analog Scale (VAS) for pain, the Short-Form 36, and the EuroQol-5D

EVIDENCE & METHODS

Context

While spinal decompression and fusion is a well-accepted treatment for patients with neurogenic claudication with concomitant spinal stenosis and spondylolisthesis, the applicability of this surgery to individuals with axial back pain with similar spinal pathology is less well understood. The authors sought to address this clinical question using data from the Swedish Spine Register.

Contribution

This study included 1,624 patients. Those with predominant back pain with spinal stenosis and spondylolisthesis had superior outcomes when treated with decompression and fusion as opposed to decompression alone. While statistically significant, it is unclear that these findings reach the level of clinical importance.

Implications

This study suffers from several limitations, included differential loss to follow-up between the study groups. This is appropriately recognized by the authors. While the study suggests that patients with predominant back pain with stenosis and spondylolisthesis have superior outcomes following a fusion-based procedure, it is unclear that these differences are clinically meaningful. Given the design of the Swedish Spine Register, the authors were also unable to control for possible confounding due to differences in surgical indication and patient selection within the two cohorts. These are important issues to recognize when considering the clinical application of this study's findings.

—The Editors

(EQ-5D) questionnaires. In addition, questions about reduction in LP and BP and satisfaction with the operation are asked at the 1-year follow-up. The follow-up protocols are mailed to all the patients.

Patients

During January 2003 to June 2010, 1,624 patients older than 50 years were operated for spinal stenosis with concomitant DS at the L4–L5 level. All multilevel operations and all patients younger than 50 years were excluded to obtain a cohort with the same kind of morphologically well-defined lumbar pathology to subsequently compare in terms of pain predominance and treatment received (Fig. 1). Predominant BP group consisted of patients with higher or equal BP levels as graded on the VAS compared with LP levels (BP more than or equal to LP). Predominant leg pain

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