

Background:

In the surgical treatment of neurogenic claudication and/or radiculopathy in isthmic spondylolisthesis (IS) it is debatable whether instrumented fusion (DF) has to be added to decompression (D). To that end a randomized controlled trial was performed comparing both treatment options, and the 2-year results demonstrated a superior outcome for DF. Eligible patients that declined randomization were included in an observational cohort study. The objective of the current study is to analyze this larger population, to assess a possible difference in outcome between randomized and patient-preferred treatment, and to evaluate whether a subgroup of patients would benefit more from a particular treatment.

Methods:

Between 2008–2017, 172 patients with low-graded isthmic spondylolisthesis enrolled in this study (84 in RCT) and were followed up for 2 years. Primary outcome measures were Roland Disability Questionnaire (RDQ) and patient's perceived recovery. Visual-analogue scale (VAS) for back pain and leg pain, and proportion of reoperated patients were evaluated as secondary outcome measures. Subgroup analyses were performed for gender, age, BMI, smoking, patient preference, and DF after D.

Results:

85 patients received decompression-alone (D), and 87 patients received decompression-and-fusion (DF). Both groups were similar at baseline. At 12-week follow-up, improvement of RDQ scores were comparable (D: 5.1 points 95% CI [3.7 to 6.5] and DF: 6.6 points 95% CI [5.3 to 8.0], $p = 0.38$). In contrast, both VAS back pain (25.5 points 95% CI [18.6 to 32.3] in D versus 35.9 points 95% CI [29.1 to 42.6], $p = 0.034$) and leg pain (23.5 points 95% CI [13.3 to 33.7] in D versus 34.0 points 95% CI [24.1 to 43.8], $p = 0.04$) improved significantly more in DF. At 2-year follow-up, DF-group showed 4.1 points more improvement in RDQ scores (9.8 95% CI [8.3 to 11.4] versus 5.7 95% CI [4.1 to 7.3], ($p < 0.001$), and more improvement in VAS-back pain (-17.4 (95% CI [-27.2 to -7.5] $p = 0.001$). VAS-leg pain did not differ between both groups ($p = 0.1$). Perceived recovery was comparable in both groups at 12-week follow-up (37% (D) versus 58.3% (DF; $p = 0.08$), but superior for DF (74% versus 47.1%; $p < 0.001$) at 2-year follow-up. No subgroups demonstrated a superior outcome for the D-group. At 2-year follow-up, cumulative probability of reoperation was 38.6% in the D-group and 6.2% in the DF-group ($p < 0.001$). RDQ score was significantly worse in patients that were submitted to DF after D (Figure 1).

Conclusion:

In patients with isthmic spondylolisthesis, DF showed superior functional outcome and perceived recovery compared to D at 2-year follow-up. Additionally, DF resulted in less reoperations, and adding fusion to decompression in second stage led to inferior functional outcome. No subgroups could be discerned to have a better outcome with mere decompression. Therefore, we recommend DF over D as a primary surgical treatment option in isthmic spondylolisthesis.

Roland Disability Questionnaire

