Instrumented fusion in one level spondylolisthesis cause hypolordosis at two-year follow up – a secondary analysis of a randomized controlled trial

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Background

Degenerative spondylolisthesis (DS) is one of the most commonly treated spinal pathologies. In recent years there have been an increasing focus on the sagittal balance of the spine; especially in adult spinal deformity. However, as most deformities in the elderly are iathrogenic, special attention should be addressed to first spinal procedure. While instrumentation creates a stable fixation, it may also alter the sagittal profile of the lumbar spine, especially if lordosis is not addressed and further activation of the compensatory mechanisms at the fused levels are compromised.

Materials and Methods

Patients scheduled for one-level fusion due to DS were randomized to either instrumented or un-instrumented in-situ fusion. Patients underwent 36” lateral X-rays before surgery and at one- and two-year follow up. Patient reported outcomes (PROs) were ODI, SF-36, EQ-5D and VAS for back and leg pain.

Radiological parameters measured were local lordosis at the spondylolisthesis (LS), Pelvic Incidence (PI), Pelvic Tilt (PT), Sacral Slope (SS), Sagittal Vertical Axis (SVA), Global Lordosis (GL) lordosis at the L4-S1(L4-S1) and Thoracic Kyphosis (TK).

Results

A total of 98 patients were eligible for inclusion with 51 in the instrumented group. Mean age at surgery was 72 years, there were no difference in demographics, PROs or radiological parameters at inclusion. The instrumented group had longer duration of surgery (124 vs 87 min; $p<0.001$) and increased blood loss (384 mL vs 238 ml; $p<0.001$). Mean LS was 16.8°, with no difference between groups ($p=0.987$). At two-year follow up, the instrumented group had significantly reduced lordosis at the fused level (LS) -2.6°± 4.2° vs 1.3° ± 5.0° $p=0.004$. The difference in lordosis did not translate into a difference in PROs at two-year follow up.

Conclusion

We found that one-level instrumented fusion in degenerative spondylolisthesis resulted in hypolordosis at the instrumented level compared to un-instrumented fusion. Long term studies will show if this increases the risk of developing secondary spinal deformity.