Clinical validity of the Nerve Root Sedimentation Sign for the diagnosis of lumbar spinal stenosis

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The validity of clinical, radiological and other diagnostic criteria to select surgical and conservative treatment in lumbar spinal stenosis (LSS) is under ongoing dispute. A new radiological sign in LSS, the Nerve Root Sedimentation Sign in transverse magnetic resonance imaging, has been shown to discriminate well between selected patients with and without LSS. However, the performance of this new test, when used in a broad patient population, is not yet known.

Methods

Retrospective study of consecutive patients with suspected LSS from 2004-2006, before the sign had been described, to assess its association with clinical outcomes. Based on radiological and clinical diagnostics, patients had been treated with decompression surgery or conservative treatment (physical therapy, non-invasive pain therapy). Changes in functional limitation from baseline to 24-month follow-up measured by the Oswestry Disability Index (ODI) were compared between Sedimentation Sign positives and negatives in both treatment arms.

Results

Of the 146 patients (52% female, mean age 59 yrs), 71 underwent decompression surgery. Baseline ODI in this treatment arm was 52%, the sign was positive in 44 (mean ODI improvement of 25%) and negative in 27 (ODI improvement 24%) patients, with no significant difference between groups. In the 75 patients of the conservative treatment arm, baseline ODI was 44%, the sign was negative in 45 (ODI improvement 17%) and positive in 30 (ODI improvement 5%). Here a positive sign was associated with a smaller ODI improvement with sign negatives (t-test, p=0.003).
Results

Change in ODI from baseline to follow-up in treatment groups. The diagonal line represents no change: points below the line show ODI improvement, points above the line show ODI deterioration (circles denote Sedimentation Sign positives; dots denote sign negatives)
Results

Change of ODI in treatment groups according to Sedimentation Sign classification

Change of VAS back pain in treatment groups according to Sedimentation Sign classification
Discussion

This study allowed an unbiased clinical validation of the Sedimentation Sign by avoiding it influencing treatment selection. In patients commonly treated with decompression surgery, the Sedimentation Sign does not appear to predict surgical outcomes. Patients with beginning LSS due to spondylolisthesis or scoliosis were also included here, which explains the sign negatives. In the conservative treatment arm a positive sign appears to identify a group of patients who are less likely to benefit from conservative treatment. In these cases, surgery might be effective; however, this needs confirmation in further prospective studies.

Positive Sedimentation Sign

Minimum CSA at L3/4 42 mm$^2$ with positive sign, walking distance 60 m (female, 84 yrs, T2)
Patients with suspected LSS and a positive Sedimentation Sign undergoing conservative treatment might benefit from decompression surgery.
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