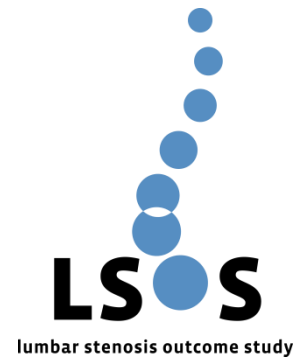


Abstract

Relationship between listhesis on upright radiographs and central spinal canal stenosis as assessed by supine MRI



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Purpose

To assess the correlation between the extent of degenerative listhesis on upright conventional radiographs with the grade of central spinal stenosis on supine magnetic resonance imaging (MRI) in patients with lumbar spinal stenosis (LSS).

Methods/Materials

Conventional radiographs and MR images of 143 consecutive patients (75 female, mean age 72 years) were retrospectively evaluated in this IRB-approved study. The presence and extent of listhesis (in millimeter, mm) were assessed on upright radiographs and supine MRI of the lumbar vertebral segment L 4/5. In addition, the grade of central spinal stenosis of the same segment was evaluated on MRI according to the classification of Schizas and correlated to the listhesis severity/grading on radiographs. ICC statistics were performed to assess the intra-reader and inter-reader agreement.

Results

Listhesis was detected in significantly more patients on radiographs (n=54; 38 %) compared to MRI (n=28; 20 %), $p < 0.001$. Pairwise comparison demonstrated a significant larger extent of listhesis on radiographs (mean 6.6 ± 2.9 mm) compared to MRI (mean 5.6 ± 1.9 mm), $p < 0.001$, each. A significant positive correlation was found regarding the extent of listhesis measured on radiographs and the grade of stenosis on MRI ($r = 0.563$, $p < 0.001$). Applying a cutoff value of ≥ 5 mm listhesis on radiographs results in a specificity of 90% for detection of patients with surgical relevant stenosis. The intra-reader and inter-reader agreement were excellent for the grading of listhesis on radiographs and MRI (ICC = 0.951 and ICC = 0.907, respectively).

Conclusion

Upright radiographs demonstrated more and larger extents of listhesis compared to supine MRI. In addition, the extent of listhesis on radiographs (particularly ≥ 5 mm) is indicative for surgical relevant grades of spinal canal stenosis in patients with suspected LSS. Lumbar radiographs could be used to estimate the grade of lumbar spinal stenosis, identify surgical relevant stenosis and add ancillary information to an MRI examination due to its acquisition under weight-bearing conditions