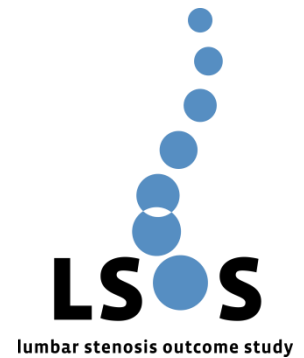


Abstract

Value of fat-suppressed fluid-sensitive MRI sequences for the detection and characterisation of Modic I end-plate changes of the lumbar spine



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*European Congress of Radiology ECR, Vienna (A), March 2016
(Oral Presentation)*

Purpose

To assess the value of fat-suppressed fluid-sensitive sequences for the assessment of Modic I end-plate changes on magnetic resonance imaging (MRI) of the lumbar spine.

Methods/Materials

Institutional review board-approved multi-center study with written informed consent. Sagittal T1-weighted (T1w), T2w, and fat-suppressed fluid-sensitive MRI images of 100 consecutive patients (consequently 500 vertebral segments; 52 female, mean age 74 ± 7.4 years; 48 male, mean age 71 ± 6.3 years) with suspected lumbar spinal canal stenosis were retrospectively evaluated. We recorded the presence (yes/no) and extension (i.e. Likert-scale of height, volume, and end-plate extension) of M1 end-plate changes in T1w/T2w sequences and compared the results to fat-suppressed fluid-sensitive sequences using the McNemar and Wilcoxon signed-rank test.

Results

Fat-suppressed fluid-sensitive sequences revealed significantly more Modic I changes compared to T1w/T2w sequences (156 vs. 93 segments, respectively; $p < 0.001$). The extension of Modic I changes in fat-suppressed fluid-sensitive sequences was significantly larger compared to T1w/T2w sequences (height: 2.27 ± 0.79 vs. 2.53 ± 0.82 , volume: 2.1 ± 0.65 vs. 2.35 ± 0.76 , end-plate: 2.19 ± 0.81 vs. 2.46 ± 0.76), ($p < 0.05$). Modic I changes which were only visible in fat-suppressed fluid-sensitive sequences but not in T1w/T2w sequences were significantly smaller compared to Modic I changes which were visible in T1w/T2w sequences (height: 1.8 ± 0.8 vs. 2.54 ± 0.8 , volume: 1.72 ± 0.7 vs. 2.34 ± 0.8 , end-plate: 1.97 ± 0.9 vs. 2.46 ± 0.8), ($p < 0.05$).

Conclusion

In conclusion, fat-suppressed fluid-sensitive MRI sequences of the lumbar spine revealed significantly more Modic I end-plate changes and demonstrated a greater extent compared to standard T1w/T2w imaging. We suggest that fat-suppressed fluid-sensitive MRI sequences should be part of clinical routine protocols.