

Intervertebral Disc Degeneration Related to Reduced Vertebral Marrow Perfusion by Dynamic Contrast-enhanced Magnetic Resonance Imaging

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摘要

Abstract

OBJECTIVE. The purpose of this study was to use dynamic contrast-enhanced MRI to ascertain the relation between intervertebral disk degeneration and lumbar vertebral marrow blood perfusion. **SUBJECTS AND METHODS.** We recruited 25 patients (50 vertebral bodies) who underwent dynamic contrast-enhanced MRI of the lumbar spine. The peak signal enhancement of each vertebral body was calculated from the time signal after curve fitting of a pharmacokinetic model. We controlled for other variables that might have affected blood perfusion by assessing two vertebral bodies in each patient. The 25 patients were divided into three groups. In group 1, one of the vertebral bodies (L1 or L3) evaluated was between two adjacent normal disks and the other was between two adjacent degenerated disks. In group 2, each of the two vertebral bodies evaluated was between two normal disks. In group 3 each of the two vertebral bodies evaluated was between two degenerated disks. **RESULTS.** Without normalization by minimization of other variables, there were no statistically significant differences in original peak enhancement values among groups 1, 2, and 3 ($p = 0.179$). After normalization, the peak enhancement in group 1 (0.846 ± 0.060) was significantly lower than that in group 2 (0.988 ± 0.047) ($p = 0.003$) or group 3 (0.973 ± 0.081) ($p = 0.008$). **CONCLUSION.** After normalization, lumbar vertebral marrow perfusion correlated well with intervertebral disk degeneration evaluated with dynamic contrast-enhanced MRI. Blood perfusion was 14% less in the vertebral body marrow between two degenerated disks than in vertebral marrow between two normal disks.