

Poster Presentation

Assessment of Radiological and Morphological Grading Systems of Intervertebral Disc Degeneration

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Introduction

Intervertebral disc (IVD) degeneration is considered to be one of the main pathophysiological causes of low back pain. Several grading systems have been developed for both morphological and radiological assessment. The aim of this study was to assess the morphological and radiological characteristics of IVD degeneration and validate popular radiological Pfirrmann scale against morphological Thompson grading system.

Methodology

Full spinal columns (vertebrae L1-S1 and IVD between them) were harvested from cadavers through an anterior dissection. MRI scans of all samples were conducted. Then, all vertebral columns were cut in the midsagittal plane and assessed morphologically.

Result

A total of 100 lumbar spine columns (446 IVDs) were included in the analysis of the degeneration grade. Morphologic Thompson scale graded the majority of discs as grade 2 and 3 (44.2% and 32.1%, respectively), followed by grade 4 (16.8%), grade 1 (5.8%), and grade 5 (1.1%). The Radiologic Pfirrmann grading system classified 44.2% of discs as grade 2, 32.1% as grade 3, 16.8% as grade 4, 5.8% as grade 1, and 1.1% as grade 5. The analysis on the effect of age on degeneration revealed significant, although moderate, positive correlation with both scales. Analysis of the agreement between scales showed weighted Cohen's kappa equal to 0.61 ($p < 0.001$). Most of the disagreement occurred due to a 1-grade difference (91.5%), whereas only 8.5% due to a 2-grade difference.

Conclusion

With the increase in the prevalence of IVD disease in the population, reliable grading systems of IVD degeneration are crucial for spine surgeons in their clinical assessment. While overall there is an agreement between both grading systems, clinicians should remain careful when using Pfirrmann scale as the grades tend to deviate from the morphological assessment.

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