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Correlation between MMP-3 Activity and Intervertebral Disk Degeneration According to Radiologic Data

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Introduction

During the degeneration process, tissue resorption causes a progressive and important decrease in intervertebral disk height. The main characteristics of disk degeneration are intradiscal clefts and teardrops. It is accepted that matrix-degrading enzymes, such as matrix metalloproteinases (MMPs), play an important role in disk tissue degeneration and destruction.

Materials and Methods

This study involved 42 patients between 26 and 69 years of age who underwent surgery for lumbar disk herniation (46 disk spaces). Tissue sections were used to immunolocalize MMP-3. The number of labeled cells was determined using morphometric analysis. Cell proliferation, cleft and teardrop formation, granular matrix changes, and mucosal degeneration were statistically assessed. Additionally, enzymatic gelatinolytic activity was determined using zymography. MMP-3 levels and histological degeneration scores were compared using the Pfirrmann classification, a radiologic disk degeneration grading system.

Results

The intradiscal expression of MMPs in the nucleus pulposus and annulus fibrosus cells was confirmed using immunohistochemistry, and gelatinolytic enzymatic activity was confirmed with in situ zymography. A significant relationship was determined between disk degeneration, characterized by intradiscal cleft and teardrop formation, and MMP-3 levels. Disk cell proliferation and matrix degeneration (granular changes and mucosal degeneration) were also found to be related to MMP-3 expression. Similarly, a relationship between enzymatic activity and cleft formation was determined.

Conclusion

Our findings support the hypothesis that MMP-3 enzyme levels play an important role in IVD degeneration. This association is supported by the high correlation between cleft and teardrop formation and MMP expression. These findings indicate the important role of MMPs in the loss of normal disk function as a result of IVD degeneration, which causes lumbar pain.

I confirm having declared any potential conflict of interest for all authors listed on this abstract
Yes

Disclosure of Interest
None declared

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