Pediatric Rheumatology

Poster presentation

Quantitative assessment of synovitis in juvenile idiopathic arthritis using Dynamic Contrast-Enhanced Magnetic Resonance Imaging

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Objective

To evaluate the capability and reliability of Dynamic Contrast-Enhanced Magnetic Resonance Imaging (DCE-MRI) in the assessment of disease activity in juvenile idiopathic arthritis (JIA).

Methods

In 22 JIA patients 12 wrists and 10 hips were studied with DCE-MRI. A 3D FFE Dynamic sequence was acquired after contrast injection. Two readers delineated independently a region of interest (ROI) in the area of maximal synovial enhancement. Enhancement curves were obtained plotting pixel intensity against time from the ROIs. Maximum level of synovial enhancement (ME), maximum rate of enhancement (MV) and rate of early enhancement (REE) were obtained from the curves. Correlations with clinical parameters of disease activity and with static MRI synovitis score were investigated.

Results

The inter-reader agreement assessed by intra-class correlation coefficient (ICC) for ME (ICC = 0.98), MV (ICC = 0.97) and REE (ICC = 0.84) was excellent. ME and MV, as well as clinical parameters of disease activity, were significantly higher in patients with wrist active arthritis than in those with hip disease ($p < 0.0001$ and $p < 0.01$ respectively). In patients with wrist arthritis REE was correlated with wrist swelling score (r = 0.72), ESR (r = 0.69), pain assessment scale (r = 0.63) and C-HAQ (r = 0.60). In patients with hip arthritis ME was correlated with the hip limitation of movement score (r = 0.69). Static MRI synovitis score was correlated with MV(r = 0.63) in patients with wrist arthritis and with ME (r = 0.68) in those with hip arthritis.

Conclusion

DCE-MRI represents a promising and reliable method for quantitative assessment of disease activity in JIA, especially in patients with wrist arthritis.