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2.4 Magnetic resonance imaging, ultrasonography and conventional radiography in the assessment of bone erosions in juvenile idiopathic arthritis

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Objective

To compare magnetic resonance imaging (MRI), conventional radiography and ultrasonography in identifying bone erosions in patients with Juvenile Idiopathic Arthritis (JIA). To determine the validity and reliability of an MRI scale in detecting and grading joint damage.

Methods

In twenty-six JIA patients the clinically more affected wrist was studied with MRI, radiography and ultrasonography, coupled with standard clinical assessment and biochemical analysis. MRI images were assessed independently by 2 readers according to an appositely devised scoring system.

Results

Twenty-five out of 26 patients (96.1%), had one or more erosions as detected by MRI, while conventional radiography and ultrasonography revealed erosions in 13/26 (50%) and 12/24 (50%) patients respectively. The ability of MRI to detect erosive changes was significant higher with respect to conventional radiography ($P_B = 0.003$) and ultrasonography ($P_B = 0.0003$) in the group of patients with < 4 years disease duration. Ultrasonography and conventional radiography were of equivalent value for the detection of destructive changes. Wrist MRI score correlated highly with radiographic erosion score ($r_s = 0.82$) and with wrist limited range of motion score ($r_s = 0.69$). The inter-reader intraclass correlation coefficient (ICC) for MRI score was excellent (0.97); intra-reader ICCs were good for both investigators (0.97 and 0.79).

Conclusion

MRI seems to represent a powerful tool to disclose early structural damage in JIA. Preliminary results in terms of reliability, and construct validity of our MRI scale appear promising, however its suitability is yet to be tested in large-scale longitudinal studies in view of its further application in both clinical and research context.