Does Dynamic Contrast-Enhanced Magnetic Resonance (DCE-MRI) Aid The Diagnosis Of Early Rheumatoid Arthritis In The Wrist?

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AIM

The aim of the present study is to determine whether dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI) evaluated using semi-automatic image processing software Dynamika® may aid the radiological evaluation of arthritis in the wrist joint, compared to RAMRIS scoring alone.

INTRODUCTION

Rheumatoid arthritis patients are characterized by swelling, stiffness and pain in joints. They are at risk of developing irreversible joint damage. Newer treatment strategies with early aggressive medication with disease modifying anti-rheumatic drugs (DMARDs) seems to prevent or reduce the permanent joint damage(1). Identification of early disease is therefore essential.

Recent publication have shown that measures of perfusion detected with ultrasound Doppler in the wrist has the highest predictive value of future erosive outcome in low disease activity scores(2). DCE-MRI is another method for evaluating perfusions characteristic and might give extra information for the diagnosis of rheumatoid arthritis.

METHODS

16 patients suspected for arthritis were referred to standard-MRI and DCE-MRI of the most affected hand.

The MRI pictures were obtained on a 1.5 Siemens Avanto Magnetom, using the following sequences for RAMRIS: coronal and axial T1w TSE and STIR T2 coronal. For the DCE-MRI: T1 VIBE 3D, perfusion study with contrast (Dotarem 0,2 ml/kg). Standard contrast enhanced images were obtained five minutes after contrast injection (T1 VIBE).

The OMERACT rheumatoid arthritis MRI scoring system (RAMRIS)(3) was done by an experienced radiologist. This is a scoring system for synovitis, bone oedema and erosions.

DCE-MRI

DCE-MRI is an imaging technique based on sequential acquisition of rapid MRI sequences before and during infusion of a contrast agent. For the analyses we used Dynamika®(v.4.4), a software using voxel by voxel model based classification(4).

RESULTS

In 5 patients both RAMRIS and DCE-MRI showed arthritis of the wrist. In 2 patients neither RAMRIS nor DCE-MRI could find arthritis of the wrist. In 1 patient there was no agreement between RAMRIS and DCE-MRI. In 5 patients both RAMRIS and DCE-MRI showed arthritis of the wrist.

In 8 patients RAMRIS could not establish definite signs of arthritis. DCE-MRI classified 6 of the patients as having no active arthritis and 2 patients as having active arthritis (Figure 5)

CONCLUSIONS

This study showed good correlation between typical arthritis/ no arthritis scored by RAMRIS and DCE- MRI. Furthermore in two patients DCE- MRI showed sign of inflammation in equivocal cases where RAMRIS could not define arthritis. This suggests DCE- MRI can confirm the clinical diagnosis of arthritis/synovitis earlier in some patients. Further studies are needed.

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