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Can imaging improve diagnosis and outcome in rheumatic diseases

OP0149 AN MRI GUIDED TREAT-TO-TARGET STRATEGY IN RHEUMATOID ARTHRITIS PATIENTS IN CLINICAL REMISSION IMPROVED MRI INFLAMMATION BUT NOT DAMAGE PROGRESSION – RESULTS FROM THE IMAGINE-RA RANDOMISED CONTROLLED TRIAL

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Background: Magnetic Resonance Imaging (MRI) bone marrow oedema (BME)/ osteitis and MRI synovitis have been identified as predictors of structural damage progression in rheumatoid arthritis RA.[1] [2] Targeting MRI remission may reduce inflammation and halt damage progression.
Objectives: To investigate whether a 2 year treat-to-target (T2T) strategy targeting MRI remission (defined as absence of BME) suppresses MRI-determined measures of disease activity and structural joint damage in RA patients in clinical remission.
Methods: In the two year investigator initiated, randomised, open label multicentre IMAGINE-RA study, 200 RA patients in clinical remission (defined as DAS28-CRP<3.2 and no swollen joints) receiving conventional synthetic disease-modifying antirheumatic drugs (csDMARDSs) were randomised 1:1 to a conventional DAS28-CRP guided T2T treatment strategy targeting DAS28 <3.2 and no swollen joints or an MRI guided T2T treatment strategy applying the same clinical T2T strategy and in addition targeting absence of MRI BME. Patients were followed every 4 months over a 2 year follow-up period. In all patients contrast-enhanced MRIs of the 2nd–5th metacarpophalangeal (MCP) joints and wrist of the dominant hand were performed at baseline, 12 and 24 months. In the MRI T2T arm MRI was performed every 4 months ahead of the clinical visit and assessed for presence/absence of BME by one blinded evaluator so the result was available for the investigator at the visit. In the conventional T2T arm MRI findings were blinded to the investigator. If treatment target was not met treatment was escalated according to a predefined treatment algorithm starting with increment in csDMARD and then adding biologic DMARDs. MRIs (0, 12 and 24 months) were evaluated according to the RAMRIS scoring system, with known chronology by one blinded experienced reader. Pearson´s chi-square statistics and repeated-measures logistic regression models were used to assess outcomes.
Results: MRI outcomes of inflammation and damage at 24 months are presented in the table 1. The MRI T2T arm showed statistically significant reductions at 24 months in all inflammatory endpoints (osteitis, tenosynovitis and total inflammation score, p<0.018), except synovitis, (p=0.074), compared to the conventional T2T arm. No differences between treatment strategies were seen in damage progression.

Abstract OP0149 – Table 1 MRI outcomes at 24 months

MRI outcomes at 24 months

	MRI T2T	Conventional T2T	Difference between groups (95% CI)	P value*
MRI				
Inflammation				
Change in osteitis (RAMRIS) score	-1.8 (0.6)	-0.1 (0.5)	-1.8 (-3.2 to -0.3)	0.018
Change in synovitis (RAMRIS) score	-0.5(0.3)	0.3 (0.3)	-0.8 (-1.8 to o.1)	0.074
Change in tenosynovit (RAMRIS) score	-0.9 (0.3)	0.3 (0.3)	-1.2 (-2.1 to -0.3)	0.007
Change in total inflammation (RAMRIS) score	-2.9 (1.0)	0.7 (1.0)	-3.6 (-6.4 to -0.8)	0.013
Damage				
Change in erosion (RAMRIS) score	0.5 (0.2)	0.6 (0.2)	-0.1 (-0.6 to 0.4)	0.663
Change in JSN (RAMRIS) score	0.1 (0.2)	0.4 (0.1)	-0.3 (-0.7 to 0.2)	0.236
Change in total damage (RAMRIS) score	0.6 (0.3)	1.0 (0.3)	-0.3 (-1.2 to 0.5)	0.395
No progression in erosion (RAMRIS), n (%)	59 (79.7%)	70 (75.3%)	OR, 1.06 (0.02 to 66.59)	0.976

95% CI, 95% confidence interval; JSN=joint space narrowing; MRI=Magnetic Resonance Imaging; RAMRIS=RA magnetic resonance imaging scoring system; T2T=treat-to-target; total damage score=sum score of MRI erosion and JSN; total inflammation score=sum score of MRI synovitis, osteitis and tenosynovitis. Data are presented as least square means (SE) unless otherwise stated. Analyses are based on full analysis set (patients having a baseline visit and at least one follow-up visit) with no data imputation to replace missing data. *P values are based on repeated-measures logistic regression models. For some of the variables, fewer patients were included in the analyses due to missing data, with the minimum being 85 (range 85-89) in the MRI T2T arm and 90 (range 90-95) in the conventional T2T arm.

Conclusions: An MRI T2T strategy, aiming to eliminate MRI BME, was more effective than a conventional T2T strategy in reducing MRI inflammation but not MRI damage progression. The reduced inflammatory load caused by the MRI T2T strategy may reduce long-term structural joint damage and improve patient-reported outcomes, but more than two years follow-up data are needed to clarify this.
Clinicaltrials.gov Identifier: NCT01656278

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OP0150 ULTRASOUND POWER DOPPLER ACTIVITY PREDICTS CLINICAL JOINT SWELLING IN EARLY RHEUMATOID ARTHRITIS PATIENTS: SECONDARY ANALYSES FROM THE ARCTIC TRIAL

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Background: Ultrasound is increasingly applied in the management of rheumatoid arthritis (RA). It is important to detect synovitis early to prevent future joint damage and disability. It is not known whether subclinical ultrasound inflammation in a joint precedes clinical joint swelling.
Objectives: We aimed to investigate whether ultrasound power Doppler (PD) activity in a joint is associated with subsequent clinical joint swelling in early RA patients.
Methods: In the treat-to-target ARCTIC trial, DMARD naïve early RA patients were randomised to follow-up with or without ultrasound, with the same treatment algorithm applied in both arms. Patients were assessed by 44 swollen joint count at all visits (13 visits over two years). Ultrasound examinations were performed using a validated 0–3 semi-quantitative scoring system.[1] with assessments at all visits in the ultrasound arm and at baseline, 12 and 24 months in the conventional arm. We calculated the risk of next-visit clinical joint swelling according to ultrasound inflammation status in clinically non-swollen joints at the preceding visit. We estimated the odds ratio of a joint being swollen at next visit in joints with different PD activity (PD score: 1, 2 or 3), compared to non-swollen joints with no PD activity (PD score=0). These calculations were performed in a logistic mixed-effects model with random intercepts for patient and joint in order to account for within-patient and -joint dependencies, and were adjusted for age, gender, ACPA status, DMARD treatment and strategy arm. Joints injected with corticosteroids were excluded. Data from the two strategy arms were pooled and analysed together, as clinical and radiographic outcomes were similar in the two arms after two years.[2]
Results: 230 patients were included (118 in the ultrasound strategy arm, 112 in the conventional strategy arm). Mean (SD) age was 51.4 (13.7) years, 61% were female and mean baseline DAS was 3.46 (1.17). The risk of clinical joint swelling at the next visit increased with grade of PD activity (table 1).

Abstract OP0150 – Table 1. Risk of swollen joint at the next visit in joints with subclinical synovitis

Ultrasound assessment	Joint swelling at the next visit n (%)	OR	*p*-value
PD 0	706/42819 (1.7%)	Reference:	
PD 1	37/469 (7.9%)	3.6 [2.3–5.5]	**<0.001**
PD 2	33/189 (17.5%)	11.8 [6.9–20.1]	**<0.001**
PD 3	7/45 (15.6%)	12.1 [4.1–35.7]	**<0.001**

PD=Power Doppler. Odds ratios are adjusted for within-patient and within-joint dependencies, gender, age, DMARD treatment, ACPA status and strategy arm.
Conclusions: We found PD activity in non-swollen joints to be strongly associated with development of clinical joint swelling at the next visit, and the risk increased with higher power Doppler activity. This study supports the use of ultrasound as a tool to detect joints at risk for developing clinical synovitis.

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[2] Haavardsholm EA, et al. BMJ 2016.

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