

ABSTRACT

Authors: Varvara Choida^{1,2,3}, Timothy J.P. Bray^{1,4}, Niels Van Vucht⁴, Maaz Ali Abbasi⁴, Alan P. Bainbridge^{1,5}, Tom Parry¹, Debajit Sen^{2,3}, Sue Mallett¹, Coziana Ciurtin^{2,3}, Margaret A. Hall-Craggs^{2,4}

Affiliations

1. Centre for Medical Imaging, University College London, University College London, London, UK.
2. Centre for Adolescent Rheumatology Research, Division of Medicine, University College London, Rayne Building, London WC1E 6JF, UK
3. Rheumatology Department, University College London Hospitals NHS Foundation Trust, London, London, UK
4. Department of Radiology, University College London Hospitals NHS Foundation Trust, London, UK
5. Department of Medical Physics, University College Hospitals Trust, London, UK

Title: Assessment of joint inflammation by whole-body MRI (WBMRI) in juvenile idiopathic arthritis (JIA)

Background

WBMRI enables a comprehensive assessment of joint inflammation in children and young people (CYP) with JIA. The clinical relevance of WBMRI-detected inflammation in joints is important to investigate.

Objectives

To evaluate the frequency of WBMRI detected subclinical joint inflammation in CYP with JIA and CYP without inflammatory arthritis. To explore the relationship between WBMRI-detected and clinically-detected joint inflammation in different types of JIA.

Methods

CYP aged 14-24 with JIA or non-inflammatory joint pain (controls) were prospectively recruited in a cross-sectional study. All participants underwent a Dixon-based WBMRI scan after being clinically assessed (Table 1), Based on clinical findings, the CYP with JIA were divided into the active (≥ 1 active joint or sacroiliitis) and inactive group (no active joints or sacroiliitis). Three radiologists blindly and independently reviewed the post-contrast images for joint inflammation, and this was considered present if detected by ≥ 2 radiologists. Peripheral joint inflammation was defined as above-normal intensity synovial enhancement with ≥ 1 feature among synovial hypertrophy, subarticular osteitis, joint effusion or periarticular soft tissue oedema. The frequency of subclinical joint inflammation (WBMRI-detected inflammation in ≥ 1 clinically inactive joint per participant) was compared between the control and JIA groups, and between the JIA subgroups using unpaired proportions.

Results

47 CYP with JIA and 13 controls were included. The median age of participants was 17 years (IQR 16 to 20) with 62% and 85% JIA and control females, respectively. . 27 (57%) of JIA patients were treated with biologic DMARD and 29 (62) with conventional synthetic DMARD.

A higher percentage of JIA patients (60%, 28/47) had WBMRI- detected inflammation in at least one joint compared to controls (15%, 2/11), difference of 45% (95% CI: 21, 69). 76% (19/25) of JIA patients labelled active clinically had WBMRI-detected inflamed joints, compared to 41% (9/25) in those identified as inactive by clinical examination. Similarly, the majority of controls were inactive (12/13) with only 17% (2/12) of inactive joints positive by WBMRI. (Table 1).

The proportion of joints active clinically vs. on WBMRI was investigated for different JIA subtypes (Figure 1), and showed acceptable proportion of patients classified in a similar way by both clinical and WBMRI assessment.

Conclusion

This study demonstrated that WBMRI-detected joint inflammation in CYP is a common finding in JIA, while very rarely found in controls. Further research further research is ongoing to investigate the clinical relevance of WBMRI detected subclinical inflammation in JIA. follow the disease course in these patients.

Table 1. WBMRI-detected joint inflammation compared to clinical assessment of active joint inflammation

	JIA N(%)	Control s N(%)	Clinicall y Active JIA N(%)	Clinicall y Inactive JIA N(%)	Active Contro l	Inactiv e Contro l
WBMRI						
Positive (at least one joint with	28 (60)	2 (15)	19 (76)	9 (42)	0 (0)	2 (17)

	inflammation)						
	Negative (no joints with inflammation)	19 (40)	11 (85)	6 (24)	13 (59)	1 (100)	10 (83)
Total		47	13	25	22	1	12



