
Proceedings Paper:
Young, F.M., Broadley, P., Lang, I. et al. (4 more authors) (2016) Assessing the Impact of Contrast-Enhanced Magnetic Resonance Imaging on Clinicians' Decision-Making in Juvenile Idiopathic Arthritis of The Hip. In: Rheumatology. Rheumatology 2016 , 26-28 Apr 2016, Glasgow, UK. Oxford University Press , i155-i156.

https://doi.org/10.1093/rheumatology/kew183

Title

ASSESSING THE IMPACT OF CONTRAST ENHANCED MAGNETIC RESONANCE IMAGING ON CLINICIANS' DECISION-MAKING IN JUVENILE IDIOPATHIC ARTHRITIS OF THE HIP

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Background

Contrast-enhanced magnetic resonance imaging (CE-MRI) is considered the gold standard imaging modality for suspected hip arthritis in children. A recent study at our institution identified discrepancies in radiological interpretation of CE-MRI hip scans and we report this separately. Acknowledging potential variability of reporting, we conducted the present study to explore the impact of CE-MRI on clinical decision-making.

Methods

We conducted a retrospective case-note review of patients who underwent hip CE-MRI at our Institution between January 2011 and September 2014, to confirm or exclude the presence of hip inflammation. The impact of CE-MRI findings on clinical management was assessed using clinic data and contemporaneous radiological reports. Clinical data included inflammatory markers, reported symptoms and medication changes before and within three months following CE-MRI. Clinician suspicion of inflammation or lack of it was determined if explicitly recorded by the clinician at the visit when CE-MRI was requested. Decision-making was based upon changes made to the patient's treatment following CE-MRI.

Results

Eighty-four patients under the care of three paediatric rheumatologists and one adolescent/adult rheumatologist with median age of 13 years (1-16 years) were included. Twenty-two scans (26%) demonstrated inflammation. A significant difference ($p<0.001$) in treatment decisions was observed between those receiving an inflammatory versus non-inflammatory CE-MRI report (Table 1). Nineteen (86%) of the 22 patients in whom CE-MRI reported evidence of synovitis received increased treatment (steroid/DMARD and/or biologic drug). Clinician suspicion of inflammation or non-inflammation was compared against CE-MRI report (gold standard). Clinician specificity for inflammation was 45.8% and sensitivity 70.6%; Positive and negative predicted values were 31.6% and 81.5% respectively. The number of patients with an inflammatory diagnosis increased from 28 to 42 (33% to 50%) following CE-MRI scanning.

Conclusion

CE-MRI report influenced rheumatologist decision-making. Most notably an inflammatory scan result was associated with increase in treatment.

When CE-MRI was negative, clinical suspicion of inflammation had a greater impact on decision to treat than scan result (active inflammation of other joints may also have influenced decision-making).

Clinicians were able to reliably identify non-inflamed hips.

Clinician specificity for hip inflammation was low resulting in a high number of unnecessary MRI scans.

	MRI Interpretation			
	Inflammation		No Inflammation	
Outcome **Clinician suspicion**	No treatment increase/NSAIDS	Steroids/DMARDs/Biologics	No treatment increase/NSAIDS	Steroids/DMARDs/Biologics
Inflammation	0	12	12	14
Non-inflammatory	1	4	21	1
Other	0	0	3	0
Unsure	2	3	7	4

Table 1: Treatment decisions by clinician suspicion and CE-MRI scan interpretation. Patients suspected to have 'Other' causes or in which the clinician was uncertain were not included in specificity or sensitivity calculations.