

# Accuracy of MRI, MR Arthrography, and Ultrasound in the Diagnosis of Rotator Cuff Tears: A Meta-Analysis

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## Introduction

This study involved a systematic review and meta analysis of the available literature looking at the diagnostic accuracy of MRI, MRA and US in diagnosing rotator cuff tears in studies using surgery as the reference standard.

The authors identify that there was a previous literature review on this topic carried out in 2003. The author's reasoning for the need for an updated review include the fact that the 2003 study used both surgical and non surgical reference standards, along with advances in US and MR in the intervening time (2003-2009).

## Methods

The authors report that they searched the Medline database and articles which met the author's inclusion criteria were reviewed. 1195 items were returned from MEDLINE database and 65 met inclusion criteria. (Inclusion criteria - English language papers, raw data on cuff tears, surgical reference standard, and diagnostic imaging studies interpreted by a radiologist. Also data not published in a prior study). 140 data sets included in this literature. 67 MRI, 48 Ultrasound and 25 MR arthrography. The authors give a detailed explanation of how they came to decide whether or not to include some of the data found (heterogeneous nature of data). There is no description of any tool used to assess the quality of the included studies. There is no mention of following up on references found, or discussion with any 'experts' in the area, or any mention of identifying any unpublished data, nor whether or not a second author repeated the review and identified same studies.

Data was pooled to analyse sensitivities and specificities of the imaging techniques. The results were then compared using the chi square test. ROC curves were then constructed using regression for each imaging technique. A z test was used to compare points on the curve where sensitivity equalled specificity.

## Results

There is no record of demographics of study participants. The authors report that in diagnosing a full or partial-thickness rotator cuff tear, MRA was more sensitive and specific than either MRI or ultrasound ( $p < 0.05$ ). They found no significant differences in either sensitivity or specificity between MRI and ultrasound in the diagnosis of partial- or full-thickness rotator cuff tears ( $p > 0.05$ ). Summary ROC curves for MRA, MRI, and ultrasound for all tears showed the area under the ROC curve was greatest for MRA (0.935), followed by ultrasound (0.889) and then MRI (0.878); however, pairwise comparisons of these curves showed no significant differences between MRI and ultrasound ( $p > 0.05$ ).

**Discussion**

The authors discuss the reasons for wide ranging sensitivities and specificities found for all 3 imaging techniques in the included studies. They then compare their results to that of the 2003 review and discuss possible reasons for the differing results and weaknesses of that study.

**Conclusion**

The authors identify limitations of the study and summarise their findings - that MRA is more accurate than MRI or US in identifying cuff tears. US and MRI are equally accurate. The authors conclude that US may be the most cost efficient effective method for screening for cuff tears.