BET 2: DIAGNOSTIC VALUE OF ULTRASOUND IN DETERMINING LATERAL LIGAMENT INJURY OF THE ANKLE

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ABSTRACT

A short cut review was carried out to establish whether diagnostic ultrasound can accurately diagnose integrity of the lateral ligament complex in comparison to MRI. Two studies were directly relevant to the question using the described search methodology. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these papers are tabulated. Despite the utility of ultrasound there is no certainty of its advantage over MRI for injuries of the anterior talofibular ligament.

CLINICAL SCENARIO

A 22-year-old football player presents with a soft tissue injury to the ankle sustained earlier that same day while training. You suspect he has injured the anterior talofibular ligament (ATFL), but the acute clinical picture is confusing because of pain and swelling. You have access to diagnostic ultrasound (USS) to assess the integrity of the lateral ligament complex and want to know if this will give you an accurate diagnosis comparable to that of MRI.

Table 2 Relevant papers

Author, country, date	Patient group	Study type	Outcomes	Key results	Study weaknesses
Margetić P, Pavić R[1] 2012, Croatia	A comparative study of 30 patients (17 male, 13 female) who suffered acute ankle injury evaluated by USS and MRI were recruited to the study.	Prospective comparative study (Evidence level 2).	USS (Index test) MRI (Reference test)	1. USS vs MRI are reported to be equally sensitive in their diagnostic capacity for detecting muscle, tendon and ligament ankle injury. However there are no sensitivity or specificity values presented for USS. 2. The specificity or grade of injury for ATFL varied between USS and MRI. USS detected significantly larger number of grade one lesions, whereas MRI detected greater number of grade three lesions (P=<0.05 for both comparisons). However there are no sensitivity or specificity values presented for MRI.	It is unclear whether the selection of patients is a consecutive or random sampling technique (selection bias). The study design is ambiguous and unclear whether a case-controlled design was avoided. No information regarding 'inclusion and exclusion criteria'. Table 1 highlights 'case code' essentially the patient's initials, which is a breach in relation to confidentiality and maintenance of anonymity. The study population was reported (n=30) however there is no 2×2 contingency table present and only twenty-nine patients received the reference standard MRI potentially giving rise to partial verification bias. It is unclear whether the results of the reference standard were interpreted without knowledge of the results of the index test (information bias) and overestimation of diagnostic accuracy. There is no information regarding dropout rates/withdrawals included in the analysis.
Lee SH, Yun SJ[2] 2017, Republic of Korea	A point-of-care study of consecutive patients aged 18–40 (n=85) who presented to ED with acute ankle injury. 76 men and nine women, aged 27.3±6.5 years, presented with 5.8±2.5 previous episodes of ankle sprain.	Prospective cross-sectional consecutive study (Evidence level 2)	USS (Index test) MRI (Reference test)	USS sensitivity 96.4%–100%, specificity 95.0%–100% and accuracy 96.5%–100%. ICC (between sonographer and reference standard): 1 st sonographer (emergency physician) ICC=0.84–1; second sonographer (msk radiology fellow) ICC=0.93–1. Inter-observer agreement (1 st vs. second sonographer) ICC=0.87–1.	Only subjects aged 18–40 years and those who presented to ED when a study sonographer was on shift were recruited - selection bias, threat to external validity. Limited and vague exclusion criteria. The senior musculoskeletal radiologist who interpreted the ankle MRI (reference standard) 'was aware of the patients' clinical symptoms and laboratory findings' indicative of information bias. It is unclear whether there was an appropriate interval between index test and reference standard.

THREE PART QUESTION

IN (adults with lateral ankle injury) IS (diagnostic ultrasound as good as MRI) AT (diagnosing ATFL ligament injury)

SEARCH STRATEGY

The MEDLINE (1946-04/2018), CINAHL (1982-04/2018), AMED (1985 – 04/2018), SPORTDiscus (1830 – 04/2018) and EMBASE (1996 – 04/2018) databases were searched using the OVID interface.

The Cochrane Library was also searched using the strategy:

(Diagnostic Ultrasound OR Ultrasound [USS]) AND (MRI OR MR OR MRI) AND (anterior talofibular ligament [ATFL] OR ankle lateral ligament complex OR ankle injury OR ankle sprain).

All searches were limited to Human AND English language.

1. Ankle ligament injury/
2. ATFL/
3. Ankle sprain/
4. Ankle injury/
5. Ankle inversion injury/
6. 1 OR 2 OR 3 OR 4 OR 5
7. Ultrasonography/
8. USS/
9. Ultrasound scan/
10. 7 OR 8 OR 9
11. MRI/
12. MR scan/
13. MRI/
14. 11 OR 12 OR 13
15. 6 AND 10 AND 14

SEARCH OUTCOME

The search originally yielded forty-one papers. However following a manual sift this number was reduced to two papers,[1 2] which answered the three-part question appropriately. The two papers were systematically evaluated using the QUADAS two tool[3] See table 2.

COMMENT(S)

Surprisingly, there is a distinct lack of high quality research evaluating the diagnostic value of USS vs. MRI to evaluate ATFL injury, a common musculoskeletal complaint. Of the two studies that address the three-part question, there is good reason to apply significant caution when interpreting their findings and concluding statements due to the methodological fragility and arguably high risk of underlying bias.

Clinical bottom line

USS is a convenient, relatively inexpensive tool used extensively within many facets of healthcare worldwide. However further research is essential before we can conclude with any clarity and certainty that diagnostic ultrasound is as good as MRI at diagnosing ATFL ligament injury.

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