

**William BM, et. al. "Osteomyelitis in Feet of Diabetics: Clinical accuracy, Surgical utility, and Cost-Effectiveness of MR Imaging". Radiology 1995; 196:557-564**

**Clinical Question:** Is MRI an accurate test to diagnose osteomyelitis?

**Background:** Osteomyelitis is an infection of bone which is progressive and results in inflammatory destruction of the bone, bone necrosis, and new bone formation. Osteomyelitis can occur in several ways: following hematogenous spread, secondary to a contiguous focus of infection, and association with vascular insufficiency. This condition must be diagnosed quickly and treated aggressively to prevent spread of infection.

**Study Design:** This study was done at the Thomas Jefferson University Hospital, with the collaboration of both Radiology and Orthopedic Surgery departments. It prospectively analyses 59 patients (62 feet) to detect the presence and extent of osteomyelitis. There was no clearly stated inclusion / exclusion criteria but the patient group involved 27 diabetics and 35 non-diabetics with ages ranging from 2-85. Imaging was performed with a 1.5 – T MRI unit and an extremity coil. The paper discusses clinical accuracy, surgical utility, and cost effectiveness of MR imaging, but the focus of this review will be the clinical accuracy.

**Critical Review:**

**Are the results valid?** Probably not.

- - The MRI diagnosis of osteomyelitis was compared to bone biopsy (n = 42) or clinical follow up as the reference standard. The interpreters were not blinded; although clinical information provided to the MRI reader was typically limited to patient age, sex, and concern for infection, this information was not controlled. Also the same radiologist may not have been interpreting all the films.
- - The spectrum of patients were not clearly defined. No demographic data was offered. The study differentiates diabetics from non-diabetics but does not comment on the extent of diabetic disease, or any co-morbid diseases. Also previous surgeries, trauma, infections to the sites of concern were not discussed. The paper also gives an age range from 2-85, which is much too broad for our typical clinic practice.
- - The utilization of the reference standard in every patient is not stated. Also the time the biopsy was done in comparison to MRI is not known. For example, the clinical diagnosis and bone marrow biopsy of a patient may have been positive for osteomyelitis, and the MRI may have been done later, so the patient could be included in the study.
- - The technical aspects of the tests were very clearly stated to permit replication

**What are the results?**

- - The paper differentiated diabetics from non-diabetics, but this differentiation was really unjustified. Below is the culmination of data

		Presence of Osteomyelitis	
		+	-
MRI	+	30	3
	-	5	24
	Totals	35	27

Sensitivity: true positives / (true positives + false negatives) = 86%

Specificity: true negatives / (true negatives + false positives) = 89%

+ LR = 7.8      - LR = 0.16

Comparison with TPBS / WBC Scintigraphy was not done in this study but references were made to several other published reports.

Table of TPBS Combined with WBC Scintigraphy likelihood ratios

	LR +	LR -
Seabold et al (1993)	1.8	0.36
Larcos et al (1991)	3.6	0.27
Jacobson et al (1991)	8.1	0.30
Keenan et al (1989)	4.8	0
Schauwecker (1988)	9.1	0
Maurer et al (1986)	6.8	0.28

**Will the results help me in caring for my patients?**

- - Will the reproducibility of the test result and its interpretation be satisfactory in my setting? Probably yes. The reproducibility is good, but the interpretation depends on the skill of the radiologist.
- - Are the results applicable to my patient? Probably not. The patient in question is one with possible diabetic ankle osteomyelitis, which is in a different bony distribution compared to the patients in the article. Also the inclusion / exclusion criteria were not clearly identified.
- - Will the results change my management? Difficult to answer. If you believe the calculated likelihood ratios and believe in the validity of this paper, then probably so.
- - Will the patients be better off as a result of the test? Again, difficult to say based on the validity of the paper. The test is a non-invasive one though, so doing it will not hurt the patient in any way (though the results might).