

Diagnosis

The Ottawa ankle rules have a high sensitivity for excluding fractures of the ankle and midfoot in acute ankle sprain

Bachmann LM, Kolb E, Koller MT, et al. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review. *BMJ* 2003;326:417-9.

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QUESTION: In emergency departments patients with an acute ankle sprain, are the Ottawa ankle rules accurate for excluding fractures of the ankle and midfoot?

Data sources

Studies were identified by searching 6 databases, reviewing reference lists, and contacting authors.

Study selection

Studies published in any language were selected if they evaluated the Ottawa ankle rules for diagnosing fractures of the ankle or midfoot and reported sufficient data to calculate the false positive and false negative rates.

Data extraction

Data were extracted on sample size, demographic characteristics of the patients, setting, type of Ottawa ankle rules used, study quality, and outcomes. Main outcomes included sensitivity, specificity, and negative likelihood ratios. After inspection of the receiver operating characteristics curve, sensitivities but not specificities were pooled using the bootstrap.

Main results

27 (15 581 patients) of 32 studies that met the selection criteria were included in the meta-analysis. 47 of 15 581 patients (0.3%) had a false negative result. The table shows the pooled sensitivities, distribution of specificities, pooled negative likelihood ratios, and the probability of a fracture after a negative test result (assuming a 15% prevalence of fractures) stratified by several characteristics.

Conclusion

In patients presenting to emergency departments with an acute ankle sprain, the Ottawa ankle rules are accurate for excluding fractures of the ankle and midfoot.

COMMENTARY

We know more about how well the Ottawa ankle rules rule out clinically important fractures of the ankle and midfoot than just about any other diagnostic test.¹ Dozens of rigorous studies evaluating its performance, and now this systematic review by Bachmann *et al*, have been published. The rules are exceptionally simple, relying on just 2 observations: local tenderness and the ability to walk. They are designed to be very sensitive for use in ruling out clinically important injuries, and they do so with a high degree of accuracy. In 27 studies, only 47 of 15 581 patients (0.3%) had a false negative result. False negative rates differed little according to age of patient, prevalence of fracture, or methodological strength of the study.

However, the Ottawa ankle rules, like other fine clinical prediction rules, come up short in the real world of clinical decision making. They are not followed, even when actively promoted.² Are there good reasons for this or are we clinicians just backsliders? As with any guideline, there may be the usual grousing about loss of clinical autonomy and "cook-book medicine." But just behind the scene, and perhaps not mentioned because of political correctness, is bound to be socially instilled reluctance to miss clinically important findings (Alvan Feinstein's "chagrin factor") and fear of malpractice. The value judgment to follow a decision rule depends on the social context over and above raw, compelling facts. How small must the false negative rate be to be small enough? For reason to prevail, this question needs to be argued out in society and the courts and not just in doctors' offices and emergency departments.

The Ottawa ankle rules are an extraordinarily sound basis for evaluation of ankle injuries, and the results should be taken seriously when deciding whether to recommend ankle radiography. But the rules should be treated as providing valuable information, not decisions. Methodologists may call them "decision rules," but clinicians, insurers, and lawyers should treat them as guidelines and not be constrained by the results. Patient issues other than fracture/not fracture are important too, and social baggage surrounding clinical decision making cannot be discounted.

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1 http://www.ohri.ca/programs/clinical_epidemiology/OHDEC/clinical.asp
2 Cameron C, Naylor CD. *CMAJ* 1999;160:1165-8.

Diagnostic properties of the Ottawa ankle rules for detecting fractures of the ankle and midfoot in acute ankle sprain *

Category	Subcategory	NT	Sensitivity (95% CI)	Median (IQR) specificity	-LR	Post-test probability of a fracture†
All studies		39	98% (96 to 99)	32% (24 to 44)	0.10	1.7% (1.1 to 2.8)
	Ankle	15	98% (96 to 99)	40% (28 to 48)	0.08	1.4% (0.5 to 3.1)
	Foot	10	99% (97 to 100)	38% (25 to 70)	0.08	1.4% (0.5 to 3.4)
Type of assessment	Combined	14	96% (94 to 99)	26% (19 to 34)	0.17	2.9% (1.7 to 5.0)
	Children	7	99% (98 to 100)	27% (24 to 36)	0.07	1.2% (0.5 to 3.1)
Population	Adults	32	97% (96 to 99)	37% (22 to 46)	0.11	1.9% (1.1 to 3.1)
	<25 th centile	7	99% (98 to 100)	48% (42 to 77)	0.04	0.7% (0.4 to 1.9)
	25 th to 75 th centile	22	98% (96 to 99)	30% (24 to 40)	0.09	1.6% (0.9 to 2.8)
Prevalence of fracture	>75 th centile	10	97% (94 to 99)	27% (16 to 40)	0.22	3.7% (1.7 to 8.3)
	≤48	5	100% (98 to 100)	28% (25 to 32)	0.06	1.1 (0.4 to 3.2)
	>48	34	97% (96 to 99)	37% (20 to 47)	0.11	1.9 (1.2 to 3.1)

*NT = number of 2x2 tables ; IQR = interquartile range. LR and CI defined in glossary.
†Post-test probability of a fracture after a negative result assuming a 15% prevalence of fractures.