



Incomplete Documentation of the Elements of the Ottawa Ankle Rules Despite an Electronic Medical Record

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Ottawa Ankle Rules



- Ankle injuries make up 5% of all ED visits
- Ankle or midfoot fractures occur in < 15% of patients presenting to ED c/o ankle/foot pain
- 1992 Ottawa Ankle Rules (OAR) developed to prevent unnecessary radiographs in ED
- Systematic review of 27 studies of 15,581 patients
 - OAR sensitivity 96.4-99.6% for excluding ankle fractures
 - OAR specificity 10-79%
- < 2% of patients who were negative for fracture according to OAR actually had a fracture

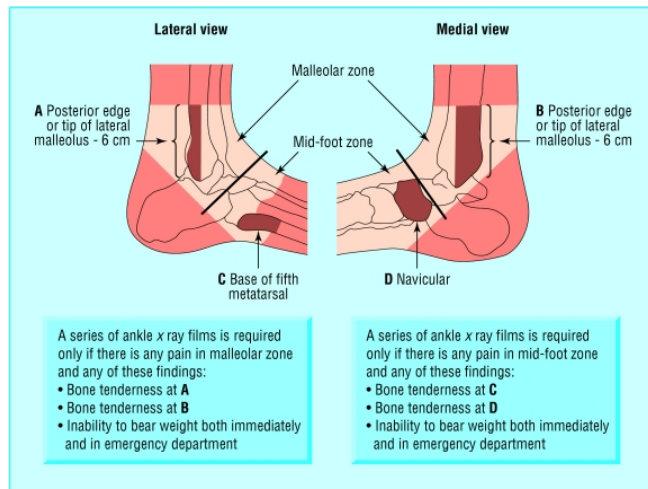
- Heyworth J. Ottawa ankle rules for the injured ankle. *Br J Sports Med* 2003; 37(3):194.

- Bachmann LM, et al. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review. *BMJ* 2003; 326(7386):417.

-Boruta, PM, Bishop, JO, Braly, WG, Tullos, HS. Acute Lateral ankle ligament injuries: a literature review. *Foot Ankle* 1990; 11:107



Ottawa Ankle Rules



Stiell, IG, McKnight, RD, Greenberg, GH, et al, JAMA 1994; 271:827



Overuse of X-rays

- Evidence suggests that when the OAR are utilized a potential 28% reduction in radiographs utilized and estimated savings between \$18-90 million annually in medical expenditures
- **Purpose of this study**
 - To measure the frequency of complete documentation of the elements of the Ottawa Ankle Rules (OAR) in acute foot and ankle injuries in an Emergency Department with an electronic medical record

– Stiell IG, Greenberg GH, McKnight RD, Nair RC, McDowell I, Reardon M et al. Decision rules for the use of radiography in acute ankle injuries. Refinement and prospective validation. JAMA 1993; 269(9):1127-1132





Methods

- Study approved by the IRB
- Conducted at Level I trauma center
 - Approximately 68,000 encounters/year
 - Fast track area available
 - Residents (IM, FM, EM) & Attending staff
 - EMR for nursing/physician documentation
 - including check-box template for PE



Methods

- March 2007 – August 2008
- Complaints of ankle or foot pain
- N = 700 via power analysis 798 Charts reviewed
- Assessed charts from Information Warehouse
 - Presenting symptoms
 - Radiograph results
 - Individual OAR components
- Stata v.10 (College Station, TX) 95% CI \pm 5 %



Methods

- Inclusion
 - ≥18 yo
 - Ankle/foot pain
- Exclusion
 - Non-traumatic or non-acute ankle/foot pain
 - Prisoners
 - Trauma alert
 - Pregnancy





Methods

Hip Exam
 Thigh Exam
 Knee Exam
 Lower Leg Exam
 Ankle Exam

Left Right Both

No deformity
 No ecchymosis
 No swelling
 No hematoma
 No erythema
 No warmth
 No tenderness to palpation
 Full ROM
 Tendon function normal
 Capillary refill < 2 sec
 Distal motor intact
 Distal sensory intact
 All of the above are normal

 Ligaments of the Ankle
 Ottawa Ankle Rules

Deformity »
 Ecchymosis »
 Swelling »
 Hematoma »
 Erythema
 Warmth
 Tenderness »
 Lateral Medial
 Medial collateral ligaments Lateral collateral ligaments
 Posterior edges of medial malleoli Inferior edges of medial malleoli
 Posterior edges of lateral malleoli Inferior edges of lateral malleoli
 Tibia Proximal fibula
 Base of 5th metatarsal Achilles tendon Peroneal tendons

Active ROM abnormal »
 Passive ROM abnormal »
 Tendon function abnormal
Distal Pulses: Diminished Absent
 Capillary refill delayed
 Distal motor impaired
 Distal sensory diminished

Foot Exam

Enter

No Navicular exam



Results

(n = 700)

- 700 individuals included in our study
- M: 51%F: 49%
- Mean Age: 33 ± 14 years (range 18-87)
- 663 (95%) had a radiograph
 - Ankle only: 313 (47%)
 - Foot only: 205 (31%)
 - Both: 145 (22%)
- Total fractures: 138 (21%)
 - Ankle: 83/458 (18%; CI₉₅ 15-22%)
 - Foot: 55/350 (16%; CI₉₅ 12-20%)
 - 5 patients had both ankle/foot fractures



Results

Components of the Ottawa Ankle Rule

Component	Documented (%)	Present (%)	Absent (%)
Inability to bear weight	700 (100)	153 (22)	547 (78)
Lateral malleolar tenderness	116 (17)	114 (16)	2 (0.3)
Medial malleolar tenderness	43 (6)	41 (6)	2 (0.3)

Fifth metatarsal tenderness	207 (30)	75 (11)	132 (19)
Navicular tenderness	3 (0.4)	1 (0.1)	2 (0.3)





Results

Relationship Of Ankle Exam Documentation Completeness To Ankle Radiograph Ordering

Documentation of ankle exam	Ankle Radiograph	
	No	Yes
Positive	8	196
Negative	2	0
Incomplete	232	262

• 206 (29%, CI95 26-33%)



Results

Relationship Of Foot Examination Documentation Completeness And Foot Radiograph Ordering

Documentation of foot exam	Foot Radiograph	
	No	Yes
Positive	12	102
Negative	0	0
Incomplete	338	248

• 114 (16%, CI95 14-19%)



Discussion

- Insufficient documentation to support clinicians' action even with templated charting
- Two types of error masked by incomplete documentation
 1. Incomplete documentation with radiograph
 2. Incomplete documentation without radiograph

Anis AH, Stiell IG, Stewart DG, Laupacis A. Cost-effectiveness analysis of the Ottawa Ankle Rules. Ann Emerg Med 1995; 26(4):422-428.



Discussion

- Innate Expectations vs Patient Satisfaction
- Misguided Request vs Clinical Decision Rules
- Noncompliance to OAR = Better Outcomes ???
- Medicolegal risks

- *Wilson DE, Noseworthy TW, Rowe BH, Holroyd BR. Evaluation of patient satisfaction and outcomes after assessment for acute ankle injuries. Am J Emerg Med 2002; 20(1):18-22.*
- *Cabana MD, Rand CS, Powe NR, Wu AW, Wilson MH, Abboud PA et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. JAMA 1999; 282(15):1458-1465.*
- *Callens S, Volbragt I, Nys H. Impact of cost containment measures on medical liability. J Eval Clin Pract 2006; 12(6):595-600*
- *Roberts RG. Seven reasons family doctors get sued and how to reduce your risk. Fam Pract Manag 2003; 10(3):29-34.*
- *Gandhi TK, Kachalia A, Thomas EJ, Puopolo AL, Yoon C, Brennan TA et al. Missed and delayed diagnoses in the ambulatory setting: a study of closed malpractice claims. Ann Intern Med 2006; 145(7):488-496.*



Discussion

- Limitations
 - Retrospective
 - Fracture miss rate
 - Accuracy of documentation reviewed
 - No reference examination
 - Accuracy of physicians or the OAR



Conclusion

- Incomplete documentation of OAR components is common even with an EMR
- Engenders both medicolegal risk and inability to perform quality analyses to minimize unnecessary radiographs
- Overuse of clinical resources and potential for medical error
- Improvement in documentation completion may illustrate area of time/cost savings



Questions?

