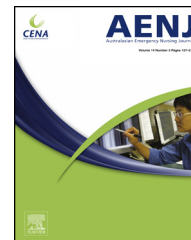




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RESEARCH PAPER

Nurse practitioners treating ankle and foot injuries using the Ottawa Ankle Rules: A comparative study in the emergency department



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KEYWORDS

Ankle;
Emergencies;
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Summary

Background: Nurse practitioners (NPs) in the Emergency Department (ED) have been trained to assess a range of clinical problems and minor complaints such as acute ankle injury. This study compared assessment of suspected ankle and foot injuries using the Ottawa Ankle Rules (OAR) by NPs and ED medical doctors (ED-Drs).

Methods: A prospective, comparative, observational study was undertaken in an Australian acute adult and paediatric urban district ED. NPs and ED-Drs recorded information for patients with acute ankle and/or mid-foot injuries on demographic characteristics, OAR features, use of X-ray and patient management. Outcome measures included X-ray rates and identification of fracture.

Results: 174 patients were included in this study: 51 received NP and 123 received ED-Dr care. Assessed as requiring X-ray assessment (NP: 78.4%, ED-Dr: 88.6%; $p=0.081$), and detection of significant fracture (NP: 17.6%, ED-Dr: 22.8%; $p=0.453$) were similar. ED-based medical registrars were more likely to miss a fracture compared with NP (NP: 0%, ED-based Registrar: 28.6%,

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$p = 0.013$). There were no significant differences in rates of OAR features for patients seen by NPs or ED-Drs.

Conclusion: This study suggests that NPs are less likely to miss significant fractures of the ankle and/or foot compared with ED-based medical registrars. Future research should focus on actual use of the OAR and accuracy of X-ray assessment by NPs.

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What is known

- The nurse practitioner role in the emergency department was initially introduced in response to overcrowding and extended patient waiting times.
- The Ottawa Ankle Rules (OAR) is a clinical guideline that has been developed to assist emergency clinicians to determine the need for X-ray in patients who present with an acute ankle or mid-foot injury.
- There is a lack of evidence regarding the use of the OAR by nurse practitioners in Australia.

What this paper adds?

- The majority of patients (85.6%) who present to the ED with a suspected ankle and/or foot injury receive X-ray assessment.
- 23.5% were found to have a clinically significant fracture.
- Nurse practitioners requested X-rays at a similar rate to emergency-based medical doctors and did not miss detection of a single fracture.

Introduction

The Emergency Department Nurse Practitioner (NP) is a specialised nurse who can manage a range of clinical problems in the emergency setting for adult and paediatric conditions that include, but are not limited to minor injuries (sprains, strains and fractures) and illness (e.g., urinary tract infection, vaginal bleeding early pregnancy).¹ Musculo-skeletal injury is among the most common complaint seen by the NP in the Emergency Department (ED).¹ However, there is a lack of research that has evaluated the competence of the NP in management of patients with acute ankle injury.

Adults and children with acute ankle injuries commonly present to the ED,² representing a significant use of hospital resources. There are approximately 100,000 ankle injury presentations to EDs annually in Australia.³ Early and accurate diagnosis and treatment of ankle injuries is ideal. Misdiagnosis and inappropriate treatment may lead to chronic problems including decreased range of motion, chronic pain and joint instability predisposing to further injuries.^{2,4} Unwarranted imaging may also lead to unnecessary patient exposure to radiation and increased medical costs and patient waiting time in the ED. In a prospective survey of ED patients with acute ankle injuries over a five-month period, 90% of patients received an X-ray as part of clinical assessment.⁵ Despite the large volumes of X-ray,

only a small proportion (15%) of patients are found to have clinically significant fractures.^{6,7}

The Ottawa Ankle Rules (OAR) is a clinical guideline that has been developed to assist clinicians in the ED setting to determine fracture risk in patients who present with an acute ankle or mid-foot injury.⁵ The guideline can be used to assist clinicians in being more selective in their use of radiography. The OAR has been extensively validated worldwide and in various clinical settings.⁶ Although initially developed for adults, a substantial number of studies have also validated its' applicability in the paediatric population^{8–14}, showing that application of the OARs can potentially reduce X-ray rates. Without such guidelines, ED-Drs tend to follow an expedient and convenient route of ordering X-ray for most ankle injury presentations.^{7,15} This practice is promoted by the nature of emergency treatment whereby high case-volumes are coupled with brief ED-Dr contact.⁵ Validation studies of the OARs conducted in Australia,¹⁶ Switzerland,¹⁷ Hong Kong,¹⁸ France,¹⁹ Iran²⁰ and Greece²¹ have been able to reproduce high sensitivities (98–100%) in detecting ankle and foot fractures. A meta-analysis of twelve validation studies for application of the OAR in children revealed a pooled sensitivity of 98.5%: ten studies showed sensitivities in the range of 96.8–100%.¹³

Despite extensive validation of the OAR, little is known about the awareness and acceptance of the OAR among clinicians in the ED. Graham et al.²² evaluated for awareness of the OAR in five countries (America, Canada, UK, Spain and France). They found that more than 69% of respondents (medical doctors) knew of the OAR, except in Spain where only 21% of respondents reported being aware of the rules. Canadian and UK medical doctors reported using the rules frequently (80%) in their practice. However, less than 30% of medical doctors in the US, France and Spain reported regularly applying the OAR in practice. Implementation studies have failed to show an improvement in compliance and reductions in X-ray ordering rates even after the introduction of comprehensive strategies.^{10,23}

Studies in overseas settings have shown that suitably qualified nurses can competently interpret and apply the OAR.^{24–29} The diagnostic accuracy and reproducibility in the interpretation of the OAR by specialised emergency nurses was compared to junior medical doctors in a Dutch ED.²⁸ The emergency nurses were trained in a one-day course on the anatomy and trauma mechanisms of ankle and foot injuries and appropriate treatment. Sensitivity for detecting fractures in both groups (specialised emergency nurses and junior medical doctors) was 93%. In an observational UK study conducted by retrospective medical record review,²⁶ NPs requested significantly fewer X-rays than medical doctors (61.5% vs 80.4%, $p < 0.001$). Although not statistically significant, a higher proportion of patients who received an

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