

Audit on the use of radiography and the management of ankle sprains in A&E

Malcolm Borg, Agnes Cachia Pickard

Abstract

Objective: To determine the need for a local implementation strategy of the Ottawa Ankle and Foot rule in the A&E Department of St. Luke's Hospital, Malta and to examine the current management practices of ankle sprains.

Methods: A prospective study was conducted on all patients aged 16 years and over presenting to the A&E department of St. Luke's Hospital, Malta over a six week period with ankle and mid-foot injuries. Data collected included time and mechanism of injury, clinical examination findings, radiographic investigations ordered, management and disposal of patient.

Results: Sixty nine (95%) of the 73 patients presenting with ankle injuries underwent x-ray investigation. In total 90 x-ray series (i.e. AP and lateral) were performed, 62 of which were ankle x-rays and 28 were foot x-rays. Clinical application of the Ottawa ankle rules (OAR) would have resulted in a reduction of ankle x-rays by 19.4% and foot x-rays by 32.1%. Management of severe ankle sprains included written discharge instructions in 54% and referrals to physiotherapy in 31%. One patient out of the 13 with severe ankle sprains was given a follow up appointment at Fresh Trauma Clinic (FTC).

Conclusion: A local implementation strategy for the OAR in the A&E department may result in an overall reduction in radiographic requests by 21%. An appropriate guideline for management of ankle injuries incorporating the OAR is needed and should be developed using the available evidence base.

Key words

Ankle sprains, management

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Introduction

Sprains of the ankle ligaments are amongst the commonest musculoskeletal injuries accounting for approximately 302,000 A&E attendances per year in the UK.¹ No local epidemiological data is as yet available, however applying the UK population based incidence rate of 60.9 per 10,000 per year to the Maltese population would result in 2400 sprains being seen yearly at A&E. It is likely that a much greater proportion of patients, particularly those with minor sprains, never attend hospital and are seen in primary care.

Of the large numbers of patients presenting with ankle injuries only 15% will be found to have a fracture.² The Ottawa Ankle Rule (OAR) was developed in 1992 so as to try to reduce the number of unnecessary radiographs taken and is now widely regarded as the standard for determining which patients should undergo radiographic investigation³ (Figure 1). The systematic review by Bachmann *et al.* concluded that, with a sensitivity of 99.6%, it is an accurate instrument for excluding fractures of the ankle.²

Traditionally ankle sprains have been classified clinically into Grade I, Grade II and Grade III injuries depending upon the degree of associated swelling and tenderness, functional loss and mechanical instability.⁴ Non-operative treatment known as 'Functional Treatment' rather than immobilisation is widely accepted as the treatment for Grade I and II ankle sprains.⁵ Functional treatment consists of the RICE principle (rest, ice, compression and elevation) immediately after the injury, a period of protection with an elastic or inelastic support, and physical rehabilitation. The latter which is central to the management consists of four components i.e. range of motion exercises, progressive muscle strengthening exercises, proprioceptive training and, particularly for athletes, activity-specific training. The management of Grade III ankle injuries is more controversial and a Cochrane review in 2002 found insufficient trials to determine whether surgical or functional treatment is superior.⁸

The aim of this study was two-fold. The first part of the study aimed to compare radiographic requests with the guidance set out in the OAR so as to determine the need for a local implementation strategy of the OAR. The second part of the study served to outline the current local management practices of ankle sprains in A&E.

Methods

A prospective study was carried out on all patients aged 16 and over attending the A&E Department of St. Luke's Hospital between 1st August and 15th September 2006 with an isolated ankle/mid-foot injury. For each patient a proforma was attached at triage and completed by the examining clinician. Information was collected on the patient's age, sex, details of injury and findings on examination including inability to weight bear. Information was also collected

on radiographs taken, x-ray findings, treatment modalities and disposal of the patient. Incompletely filled forms were completed retrospectively using the patient's notes. Cases with insufficient information were excluded from the study.

In the acute setting it is not possible to classify an ankle injury into Grades I to III. Consequently the injuries were subdivided into mild and severe categories. The mild category included those patients with minimal swelling and who were able to weight bear. Those patients who had severe swelling or difficulty weight bearing (i.e they were unable to take 4 steps in A&E) were included in the severe category.

Results

We collected information on 81 cases of ankle injuries during the study period. However sufficient data was only available for 73 cases to be enrolled in the first part of the study and 56 cases in the second part.

Of the 73 patients presenting with ankle injuries 69 (95%) patients underwent x-ray investigation, whilst 4 patients were not x-rayed. Two of those not x-rayed fulfilled OAR criteria for ankle x-rays. In total 90 x-ray series (i.e. standard AP and lateral views) were performed of which 62 were ankle x-rays and 28 were foot x-rays. Of the ankle x-rays carried out, 50 (80.6%) were indicated whilst 12 (19.4%) did not fulfil OAR criteria for x-ray investigation. Of the 28 foot x-rays performed 19 (67.9%) fulfilled OAR criteria while 9 (32.1%) radiographs were not indicated according to the OAR (Figure 2). None of those who did not require an x-ray according to the OAR were found to have a fracture.

Of the 56 patients included in the second part of the study, 43 had a mild ankle sprain and 13 had a severe sprain. Figure 3 shows the different management practices employed in these patients. Half of those with severe ankle sprains were advised a period of non-weight bearing and crutches. 26% of patients with a mild ankle sprain and 54% of those with severe ankle sprains were given written instructions reinforcing the RICE advice and illustrating simple range of motion exercises. Referrals to physiotherapy were given to 7% of the minor sprain group and 31% of those with severe ankle sprains. One patient out of the 13 with severe ankle sprains was provided with a follow up appointment at Fresh Trauma Clinic (FTC). The remainder were not followed up.

Discussion

In addition to the number of cases that were excluded due to insufficient data being collected we are aware of several patients who failed to be recruited into the audit. Consequently we were unable to draw any reliable conclusions regarding the epidemiology of ankle sprain injuries presenting to the A&E.

This study showed that application of the OAR would have resulted in an overall reduction in the use of ankle and foot radiographs of 22%. A local implementation strategy would allow the OAR to be introduced into clinical practice with the aim of bringing about this reduction. Two large multi-centre trials, that tested the effect of implementation of the OAR, utilised lectures, handouts, pocket cards and posters and both achieved a reduction in the use of ankle radiography of between 18 and 25%.^{7,8} In the study by Auleley *et al.*, a 15% reduction in x-ray requests was maintained post-implementation using posters alone. Similar measures for implementation of the OAR could be adopted locally including lectures in the induction period of medical and nursing staff in A&E

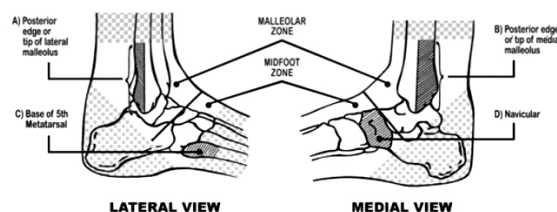
and primary care and the hanging of posters in the triage room and minor injury area.

The second part of the audit outlines the inconsistencies in certain aspects of clinical management of ankle sprains. The provision of the RICE protocol and analgesia is fairly consistent in the mild ankle sprain group and even more so in those with severe ankle sprains. The exact nature of the RICE advice (suggested duration of rest period; frequency, mode and duration of ice application; type of support prescribed) is not specified and was beyond the scope of this study. Written instructions, which would have reinforced the RICE advice given by the clinician, were only provided in a quarter of cases of mild ankle sprains and in half of those with severe sprains. The written instructions also contain an explanation of the range of motion exercises which are the first step in the rehabilitation process. This shortcoming is particularly serious when one considers that the majority of patients with serious sprains were not provided with any further physiotherapy.

The best form of support for patients with severe ankle sprain injuries is a source of much debate due to the lack of well designed studies comparing the four main functional treatment strategies (elastic bandaging, tape, semi-rigid ankle supports and lace-up ankle supports). Although elastic bandaging is the mainstay of treatment both in Malta and the UK the use of semi-rigid ankle supports show statistically significant better results with regard to return to work and sports.⁹ An ongoing trial by Lamb *et al.* will hopefully shed light on this aspect of management.¹⁰

The 31% referral rate of patients with severe ankle sprains to physiotherapy was comparable to that observed in consultant practice in the UK.¹¹ In this survey only 22% of respondents referred severe ankle sprains to physiotherapy whilst the majority (69.9%) used physiotherapy only in selected cases. This may reflect the fact that whilst the benefit of exercise therapy and proprioceptive exercises is clear in the literature there is still ambiguity surrounding the role and timing of supervised physiotherapy in ankle sprain management. Several studies demonstrated that early functional treatment started within the first week of injury resulted in an earlier return to work and sports.^{12,13} These conclusions were supported by 2 treatment reviews which also established that proprioception training is effective in preventing recurrent ankle sprains.^{14,15} A study by Holme however failed to demonstrate any advantage of supervised physiotherapy in improving strength, pain and postural

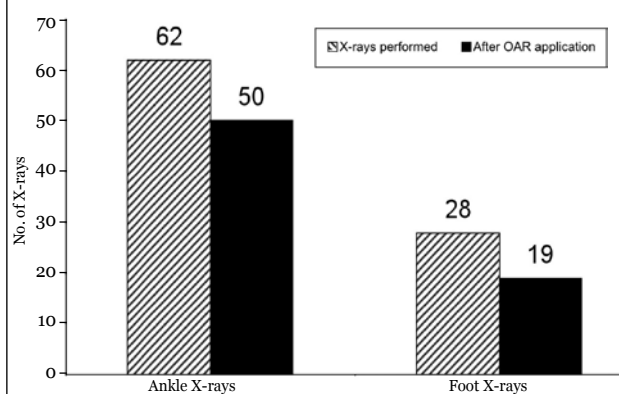
Figure 1: Ottawa Ankle Rule



- a) An ankle x-ray series is only required if there is any pain in malleolar zone and any of these findings:
1. Bone tenderness at A or
 2. bone tenderness at B or
 3. Inability to bear weight both immediately and in ED
- b) A foot x-ray series is only required if there is any pain in midfoot zone and any of these findings:
1. Bone tenderness at C or
 2. Bone tenderness at D or
 3. Inability to bear weight both immediately and in ED

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Figure 2: Number of ankle and foot radiographs performed during the study and if the OAR had been applied



sway over simply providing subjects with standard information regarding early functional treatment.¹⁶

There appears to be need of more evidence on which to base best practice with regards to patient selection for supervised rehabilitation. Whilst it seems sensible to provide aggressive supervised rehabilitation by a physiotherapist for the athletic population with Grade III sprains, a comprehensively written discharge instruction sheet containing rehabilitation information may achieve similar outcomes whilst being more economical in older and less active patients with moderate sprains.

The greatest shortcoming we have noted in the management of severe ankle sprains is the low follow up rate of patients, with only one being referred to FTC. Follow up is necessary in all patients with severe sprains not only to ensure that effective rehabilitation is underway but also to enable reassessment of the patient to exclude alternative diagnoses and to identify those individuals who may need secondary repair as a result of failure of conservative management.⁵

Conclusion

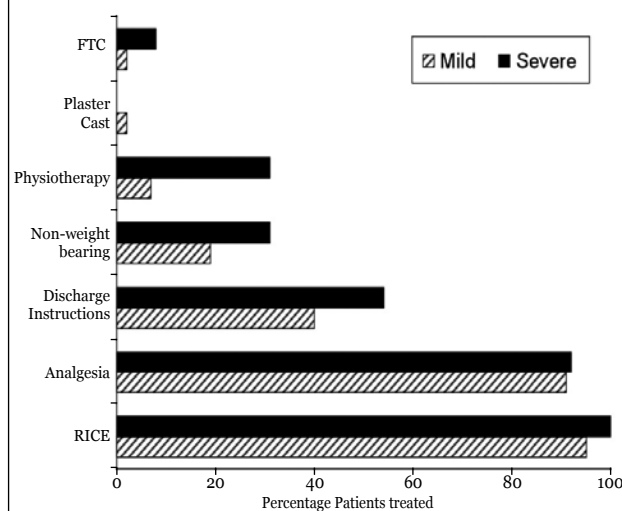
Based on the evidence emerging from this study and from our literature search, we conclude that a local implementation strategy for the OAR in the A&E department would achieve a reduction in the use of ankle/mid-foot radiography of about 22%. We also believe that if the OAR were applied at triage this would significantly reduce the waiting time of patients presenting with ankle injuries.

Secondly it appears necessary to introduce A&E Department guidelines for the management of ankle sprains based on currently available evidence and, where this is lacking, based on consensus. These should include criteria for referral to physiotherapy and FTC. Furthermore, we believe there is a need to update the written instructions provided to patients that are currently available in the A&E department.

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Figure 3: Management of mild and severe ankle sprains (FTC: Fresh trauma clinic, RICE: Rest, ice, compression, elevation)



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