

Assessing the use of the Ottawa ankle rules when investigating traumatic pathology of the foot and ankle in a Maltese primary care setting

Dr Maria Christina AXIAQ, Dr Anton BUGEJA

ABSTRACT

Background

The judicious use of ankle and foot radiography should balance a correct diagnosis in all cases of traumatic distal lower limb fractures with the avoidance of unnecessary radiation exposure for the patient. For this objective the Ottawa ankle and foot rules (OAR) have long been established as valuable and proven tools for such assessments. The doctor's requests should provide all the necessary information to allow correct interpretation of the x-rays as well as for research purposes.

Objective

A prospective study was carried out to evaluate use of the criteria in the OAR over a four week period to assess the need for foot and ankle x-rays in a Maltese public health centre. It also sought to assess whether the related documentation is appropriate.

Method

All the requests for ankle and foot x-rays made during August 2016 in a Maltese primary health centre were analysed. The data were obtained from the Radiology Information System, the programme used for electronic referral, and from patients' health centre files. The demographic and clinical information obtained was analysed for use of the criteria in the OAR.

Results

In total, 75 patients had an ankle and/or foot x-ray taken, with fractures detected in 15 patients. There was

evidence for use of the OAR in only 36 cases (48%). Minor differences were noted in the information recorded in the patients' files and in the electronic referrals.

Conclusions

Use of radiological services in primary care is useful in diagnosing ankle and foot traumatic pathology, but knowledge and use of the OAR is recommended to decrease the number of x-rays taken.

Keywords

Ankle injuries, foot injuries, primary healthcare, documentation, radiography.

INTRODUCTION

Acute ankle sprains are a common reason for primary care and emergency department visits, especially among adolescents (Tiemstra, 2012) and athletes (Yeung, 1994). In a cross-sectional study by Menz, et al. (2010), ankle and foot problems constituted 8 % of all musculoskeletal consultations but these were mostly of non-traumatic nature. This reflects the Maltese situation where consultations for the relevant trauma were not among the twenty most common reasons for GP consultations (Soler and Marnoch, 2008).

The Ottawa ankle and foot rules (OAR) are well-validated clinical decision aids that were developed in 1992 to avoid unnecessary radiography in cases of foot and ankle trauma. They have a sensitivity of 98%-100%, modest specificity and the potential to reduce unnecessary radiographs by 30-40% (Bachmann, et al.,

2003). A systematic review has confirmed the value of OAR for managing ankle sprains in primary care but has also pointed out the need for additional tests to exclude other injuries (Polzer, et al., 2012).

The OAR recommend that an ankle x-ray series is only required if there is malleolar pain and any of these findings:

- (a) Bone tenderness at the posterior 6cm or tip of the lateral malleolus, or
- (b) Bone tenderness at the posterior 6cm or tip of the medial malleolus, or
- (c) Inability to weight bear or limping immediately after injury or in the clinic.

Furthermore, a foot x-ray series is only required if there is malleolar pain and any of these findings:

- (a) Bone tenderness at the base of the most lateral metatarsal, or
- (b) Bone tenderness at the navicular bone, or
- (c) Inability to weight bear or limping immediately after injury or in the clinic (adapted from Stiell, 1996).

Assessment for the use and documentation of the OAR was made at Paola Health Centre which is the major public primary health care centre for the south of Malta. It has a direct catchment area for eleven localities with a subsidiary centre at Cospicua serving mainly the Cottonera area on the eastern shores of the Grand Harbour. Radiology services for all these localities, but also for other localities on the islands as needed, are provided at the Paola Centre from Monday to Saturday from 8am till 7pm (Government of Malta, 2016).

Referrals for x-rays are ordered electronically and the relevant handwritten medical records are kept in files. The possibilities provided by such referral are for foot x-ray, ankle x-ray, or foot and ankle x-ray. The doctor chooses the x-ray required, and is expected to input the relevant history and what information is expected for clinical decision making on the online request. Doctors working in private practice have access to the relevant radiology services through a purposely-designed form, from which the radiographer transcribes the above data. After patients' visits, the files are either archived at Paola Health Centre or sent to another clinic according to the patient's locality of residence.

METHOD

After the necessary permissions from the Primary Health Care and Medical Imaging departments were secured, all requests for ankle and foot radiographs taken at Paola

Health Centre during August 2016 were obtained from the Radiology Information System (RIS). The patients' demographic details (namely gender, age, and locality of patient) were recorded. The clinical details present in the request were reviewed and the following additional information was tabulated:-

- (a) Ankle x-ray requested? (Yes=1, No=0)
- (b) Foot x-ray requested? (Yes=1, No=0)
- (c) Online request (exact text recorded)
- (d) Was a fracture reported by the radiologist? (Yes=1, No=0)
- (e) If a fracture was reported, the exact text was recorded.

From the latter information (i.e. online request, (c) in the above list) the following information was extracted

- (f) Was trauma recorded? (Yes=1, No=0)
- (g) Was there tenderness in the malleoli, navicular or 5th metatarsal head or was the patient unable to weight bear or limped immediately after injury or in the clinic? (Yes=1, No=0).

From this information, use of the OAR was considered as present in cases where (f) and (g) were present. A search was also made in the relevant patients' files, recording whether:

- the file was found;
- an entry was present;
- the information listed in (f) and (g) above was present.

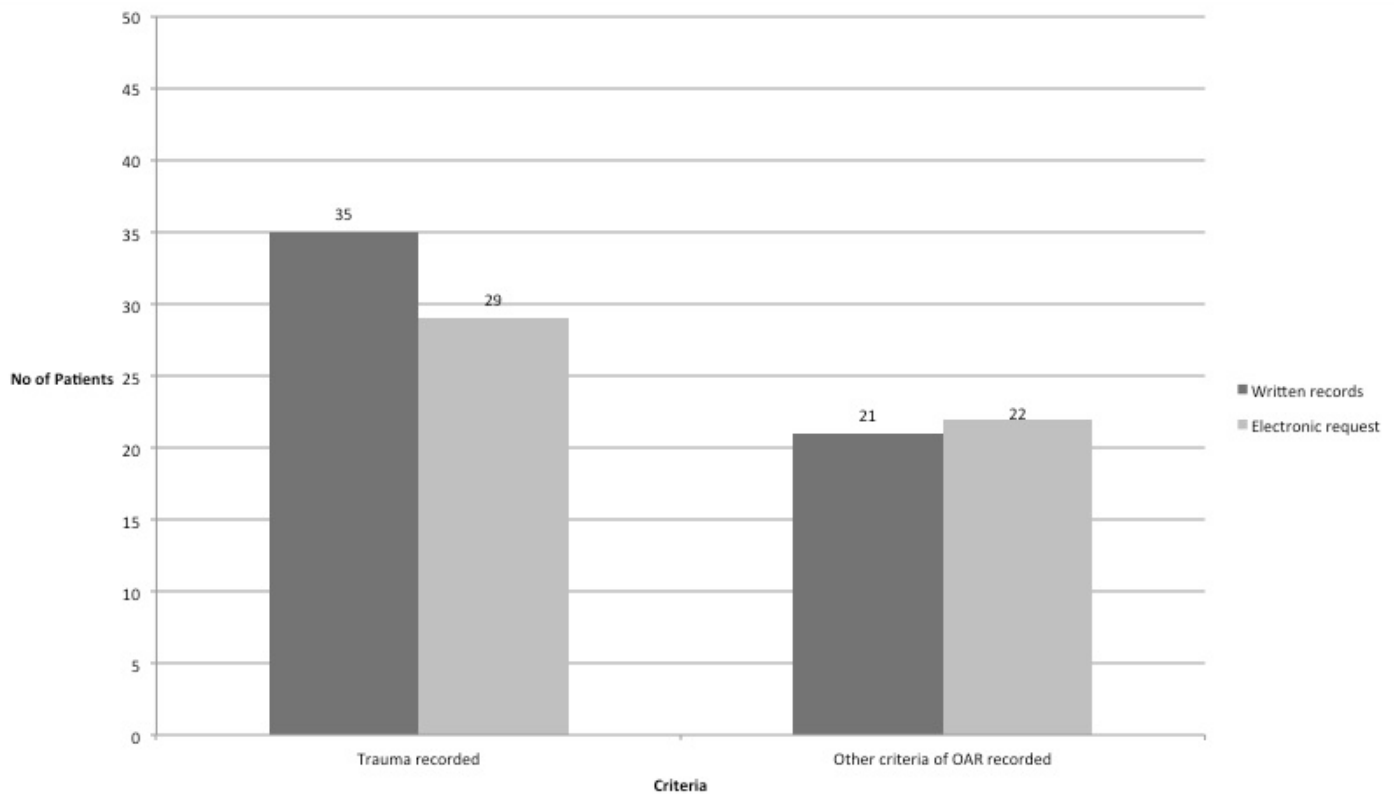
Use of the OAR through information present in the file was analysed as above. The physician's use of the OAR was considered as present if there was evidence of its use from the electronic request or from the information in the patient's file.

RESULTS

Out of the 793 people using the radiological services at Paola Health Centre in August 2016, 9.5% (n=75) had a radiograph of the foot and ankle. These were mostly female patients (M=32, F=43). The patients involved had a wide age range (8 to 103 years, mean=40 years, median=36 years). The radiographs taken were mainly ankle x-rays (with a total of 60 x-rays, 32 involving the ankle only) while 43 foot x-rays were taken (in 15 only a foot x-ray was taken). Twenty eight patients had both an ankle and foot x-ray series taken.

Fifty four patients (72%) came from the direct catchment area of Paola Health Centre, 11 (14.6%)

Figure 1: Recording of OAR criteria in the 50 patients with both electronic and written records.



patients came from the villages of the subsidiary clinic - Cospicua - while 10 (13.4%) lived at an address in other parts of the country. In 22 cases, 15 from the direct catchment area and 7 of other clinics, the handwritten documentation could not be readily accessed. In 3 cases, no entry was registered in the available written records.

When considering all the 75 patients, trauma was recorded either in the written documentation or in the electronic referral in 61 patients but reference to the OAR was only made in 36 cases (59%). Out of the 50 cases with both electronic and handwritten information, 35 had trauma recorded in the written documentation whilst 29 were recorded on the electronic request. Entries for other parameters of the OAR were almost equal, with criteria recorded in 22 cases and 21 recorded in the electronic request and files respectively (Figure 1).

Fifteen patients (20%) were diagnosed with at least one fracture. From all the x-rays under study, six ankle fractures were reported by the radiologists. Four involved the malleoli while two involved the tibial element of the ankle joint. Ten foot fractures were also reported; in four cases the fifth (i.e. most lateral metatarsal) was fractured and in another four, other metatarsals were fractured, including two cases where more than one metatarsal

was fractured. A fractured phalanx and a navicular bone fracture were also reported. Of these, one had both a fracture of one of the ankle malleoli and the 4th metatarsal bone while in another a linear fracture of the shaft of the right tibia was recorded.

DISCUSSION

The number of cases where radiography was used could indicate investigations of non-traumatic complaints concerning the ankle and foot, although the need and value for such intervention needs to be studied separately. Nonetheless, it is evident that there is the need to implement and fully document use of the OAR, a recommendation that also emerged from an audit carried out in the local main Emergency and Admitting department in 2006 (Borg and Cachia, 2008). The reasons for such practice remain to be identified. Medicolegal implications of missed fractures and ease of ordering radiographs could be two reasons but a more direct assessment of the doctor's knowledge and use of the OAR on the lines studied in Ireland by Doherty and Quin (2008) may contribute towards more effective use of radiological services in cases of ankle or foot trauma. The use of templates which prompt the use of the OAR for electronic ordering of ankle and foot

x-rays in cases with trauma may also be of help, even though the effect of this has been shown to be limited by Salazar et al. (2011).

In view of the findings noted above, an audit of the documentation kept should also be carried out to implement an appropriate action plan to ensure that the relevant files are readily accessible to clinical practice and research. This should be done by particular assessment of the transferring of files and the adoption of common archiving practices within the different health centres. Until then, differences in the level of documentation between the handwritten and electronic records should be noted, studied further and actively considered when carrying out audits or research projects in Maltese health centres. In a setting whereby electronic and written documents or requests are used together to manage patients, an investigation into the discrepancies between information recorded in the two media should also be looked into.

LIMITATIONS

In the absence of a database recording traumatic and ankle foot pathology at the health centres, the above assessment used the electronic referral to the radiography department as the primary source to identify the cases for study. In doing so, it is acknowledged that cases where the use of the OAR with the consequent decision taken not to investigate by x-rays are not represented above. With the methodology used, both traumatic and non-traumatic x-rays were taken into account and this could have had an effect on the results, as the OAR apply only for traumatic cases. Furthermore, adoption of a larger sample for study would have allowed further analysis of the data gathered.

CONCLUSIONS

Through the results above, it emerges that there is a need to further adopt and document the use of OAR in the assessment of ankle and foot trauma in a public health centre in Malta. Assessment of the transferring of files and the adoption of common archiving practices within the different health centres should also be implemented.

REFERENCES

- Bachmann, L.M., Kolb, E., Koller, M.T., Steurer, J. and ter Riet, G., 2003. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review. *British Medical Journal*, 326, p.417.
- Borg, M. and Cachia Pickard, A., 2008. Audit on the use of radiography and the management of ankle sprains in A&E. *Malta Medical Journal* 20(4), pp.12-14.
- Doherty, U. and Quin, G., 2008. Ankle and foot injuries in general practice. *Forum* 51-52. Available at: <https://www.icgp.ie/assets/68/DC468C34-19B9-E185-83A3C055032ED6DE_document/OAR_51.pdf> [Accessed 5 February 2017].
- Government of Malta, 2016. *Paola Health Centre*. [online] Available at: <<https://health.gov.mt/en/phc/Pages/Health-Centres/Paola-Health-Centre.aspx>> [Accessed 5 February 2017].
- Menz, H.B., Jordan, K.P., Roddy, E. and Croft, P.R., 2010. Characteristics of primary care consultations for musculoskeletal foot and ankle problems in the UK. *Rheumatology (Oxford)* 49(7), pp.1391-8.
- Polzer, H., Kanz, K.G., Prall, W.C., Haasters, F., Oeckert, B., Mutschler, W. and Grote, S., 2012. Diagnosis and treatment of acute ankle injuries: development of an evidence-based algorithm. *Orthopaedic Reviews* 4 e5:22-32.
- Salazar, L., Best, T.M. and Hiestand B., 2011. Incomplete documentation of elements of Ottawa Ankle Rules despite an electronic medical record. *American Journal of Emergency Medicine* 29(9), pp.999-1002.
- Soler, J.K. and Marnoch, G., 2008. Knowledge Management. *Maltese Family Doctor* 17(1), pp.28-34.
- Stiell, I., 1996. Ottawa ankle rules. *Canadian Family Physician* 42, pp.478-80.
- Tiemstra, J.D., 2012. Update on Acute Ankle Sprains. *American Family Physician* 85(12), pp.1170-76.
- Yeung, M.S., Chan, K.M., So, S.H. & Yuan, W.Y., 1994. An epidemiological survey on ankle sprain. *British Journal of Sports Medicine* 28(2), pp.112-16.

Dr Maria Christina AXIAQ

MD

Foundation Year 2 doctor

Email: mariac.axiaq@gmail.com

Dr Anton BUGEJA

MD, MMCFD

Specialist in Family Medicine

Email: antonbugeja@hotmail.com