

## CASE REPORT

# Septic arthritis following puncture wound of the foot

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## INTRODUCTION

The Accident and Emergency (A&E) Department at Southampton General Hospital sees nearly 600 patients with puncture wounds of the feet every year. The majority of patients have no problems secondary to this injury. However in some retrospective series the incidence of infective complications is said to be in the region of 10% (Houston *et al.*, 1962). In our experience this does not seem to be so. However some risk is present. On this basis many doctors treat patients presenting with a puncture wound to the foot by giving 'prophylactic' antibiotics. We describe a patient who despite having antibiotics developed septic arthritis.

## CASE REPORT

A previously healthy 16-year-old male patient presented to the A&E department shortly after stepping onto a rusty nail. The nail penetrated his shoe and punctured the sole of his foot. He was complaining of pain at the site of the injury. On examination there was a small puncture wound at the base of left second toe. There was no evidence of infection. A radiograph excluded radiopaque foreign body. His tetanus status was checked and he was started on oral flucloxacillin 250 mg 6 hourly and allowed home. One week later he returned complaining of increasing pain at the site of the injury. On examination he was afebrile but the injured part of his foot was swollen, red and tender. Active and passive movements of his second toe were impossible because of pain. A further radiograph of the foot was normal. The white cell count was  $6.4 \times 10^9/l$  and the ESR was 34 mm in the first hour. A isotope bone scan, using 555MBq (15 mCi) of  $^{99m}\text{Tc}$  methylene diphosphonate (Subramanian *et al.*, 1972), showed a hot spot in the area of the left second metatarsophalangeal joint. A presumptive diagnosis of septic

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arthritis was made. He was admitted and under a general anaesthetic the joint was explored. On opening the joint pus was drained. After cleaning the wound a drain was left *in situ* and the wound was closed. Culture of the pus grew *Pseudomonas aureginosa* which was resistant to flucloxacillin. Blood cultures taken on admission were negative. At present the wound is healed and apart from some joint stiffness the patient is asymptomatic.

## DISCUSSION

Puncture wounds of the foot present relatively often to A&E departments. At Southampton General Hospital almost 600 patients with this injury are seen every year. That is 0.1% of all new patients. In one series from the USA 7.4% of lower extremity pathology was attributed to puncture wounds (Reinherz *et al.*, 1985).

Patients sustaining this seemingly innocuous injury may develop serious complications. Cellulitis is seen in up to 8% of cases within 4 days of the injury (Houston *et al.*, 1962). This often settles with elevation and rest. However in one series (Edlich & Rodeheaver, 1984) 2% of the patients developed osteomyelitis or septic arthritis following such injury. This usually became evident one week after injury, although one case presented 16 months after injury. The organisms usually implicated are Streptococci and Staphylococci (Fitzgerald & Cowan, 1975). However in the last 20 years there have been several reports of *Pseudomonas osteomyelitis* following puncture wound of the foot (Johnson, 1968; Lang & Peterson, 1976). Clinical presentation of the eight patients in Lang's series was as a local inflammatory process without systemic toxicity. Laboratory investigations were of limited value as seven had a normal white cell count and out of the seven in whom the ESR was measured it was normal in three. All had normal radiographs at presentation.

The treatment of puncture wounds of the feet is not standardized. Some patients are treated by superficial cleaning, tetanus prophylaxis and are then discharged; others are prescribed antibiotics as a 'prophylactic measure'. Fitzgerald & Cowan (1975) surveyed 887 patients attending the Emergency Room at the Mayo Clinic. Thirty-four percent of their patients received one or more antibiotics. Only one third of these patients had evidence of infection at the time the antibiotics were prescribed, the remainder were treated 'prophylactically'. Of this latter group 16 patients developed osteomyelitis. To date there has not been a prospective randomized trial evaluating the management of puncture wounds. However the advice based on retrospective surveys is that complications can be prevented by careful attention to the wound (Sanford, 1981). Any foreign body needs to be removed. If there is a suspicion of a retained foreign body, the patient should have soft tissue radiographs (Riegler & Rouston, 1979). Superficial wounds should be cleaned with povidone iodine rather than hexachlorophene. Appropriate tetanus prophylaxis should be provided (Houston *et al.*, 1962). Any deep wounds should be surgically debrided. Antibiotic treatment is usually not recommended with the exception of deep wounds especially those that extend to the bone or to the joint and in old wounds that are already infected. Wound swab must be taken prior to the commencement of treatment (Edlich & Rodeheaver, 1984).

The presentation of our patient was similar to those in the Lang & Peterson (1976) series. Unlike in other patients in the literature the investigation which helped to establish the diagnosis was the isotope bone scan. It enabled us to make a decision to explore his foot at an early stage and so possibly limit any long-term damage. The value of this investigation in the early management of post-puncture wound complications was not described before.

## REFERENCES

- Edlich R. H. & Rodeheaver G. T. (1984) Puncture wounds of the foot. *Comprehensive Therapy* **10**, 41–8.
- Fitzgerald R. H. & Cowan J. D. E. (1975) Puncture wounds of the foot. *Orthopaedic Clinics of North America* **6**, 965–72.
- Houston A. N., Roy W. A. & Faust R. A., (1962) Tetanus prophylaxis in the treatment of puncture wounds of patients in the deep south. *Journal of Trauma* **2**, 439–46.
- Johanson P. H. (1968) Pseudomonas infections of the foot following puncture wounds. *Journal of the American Medical Association* **204**, 170–2.
- Lang A. G. & Peterson H. A. (1976) Osteomyelitis following puncture wounds of the foot in children. *Journal of Trauma* **16**, 993–9.
- Reinherz R. P. *et al.*, (1985) Management of puncture wounds in the foot. *Journal of Foot Surgery* **24**, 288–92.
- Riegler H. F. & Rouston G. W. (1979) Complications of deep puncture wounds of the foot. *Journal of Trauma* **19**, 18–22.
- Sanford C. C. (1981) Puncture wounds of the foot. *American Family Physician* **24**, 119–22.
- Subramanian G., McAfee J. G. & Bell E. G. (1972) <sup>99</sup>Tc<sup>m</sup>-labelled polyphosphonate as a skeletal imaging agent. *Radiology* **102**, 701–4.