

Abstract

When a patient first presents with an acute swollen, erythematous, and painful 1st metatarsophalangeal joint, gout is often the first presumed diagnosis. We present an unusual case of septic arthritis seventeen years after the initial puncture wound, which clinically was presumed to be gout until aspiration of the 1st metatarsophalangeal joint demonstrated *Pseudomonas aeruginosa*. After a review of the literature, to our knowledge, it is the longest case of latent Pseudomonal osteomyelitis of the foot following a puncture wound.

Introduction

The incidence of osteomyelitis has been reported at 1.8% of all puncture wounds¹. Wide variation exists in the literature regarding the percentage of these cases being caused by *Pseudomonas*, with reports ranging from 10.6% to 93%^{1,2}. We present an unusual case of septic arthritis seventeen years after the initial puncture wound, which clinically was presumed to be gout until aspiration of the 1st metatarsophalangeal joint demonstrated *Pseudomonas aeruginosa*.

History

A 32yo male with an unremarkable past medical history presented to the emergency room with the complaint of increased swelling, pain, and redness to the 1st metatarsophalangeal joint (MTPJ) of the right foot. Radiographs of the right foot were negative for acute pathology and his uric acid was 5.3 mg/dl. He was treated for presumed gout, which included a course of oral non-steroidal anti-inflammatories, and referred for follow up with Rheumatology. Two days later, the patient presented to the Rheumatologist for further evaluation. Upon further questioning, the patient admitted that 17 years ago he had stepped on a nail, which had punctured his right foot in the area of the 1st MTPJ, at summer camp in West Virginia. Shortly thereafter, he went whitewater rafting and noticed increased redness, swelling, and pain to the right 1st MTPJ. He presented to the emergency room, was given a tetanus prophylaxis and oral antibiotics, and the puncture wound healed without surgical intervention. For four years after the initial injury, every two to three months, the joint would increase in redness, swelling and pain, but would resolve on its own. He related that for the last ten years the joint had been asymptomatic. The Rheumatologist aspirated the right 1st MTPJ. Aspiration demonstrated 114,975 WBCs, 60% neutrophils no crystals in a yellow, turbid fluid, and the aspirate sent for culture and sensitivity. He was started on Augmentin, but two days later, he returned to his rheumatologist due to increasing pain, swelling, and redness of the right 1st MTPJ. Cultures demonstrated one colony of pan-sensitive *Pseudomonas aeruginosa*. The patient was admitted for IV antibiotics and possible surgical intervention.

Podiatry was consulted two days after admission as the patient did not improve of IV Zosyn and the addition of IV Cipro. Examination of the right foot demonstrated severe pain to palpation at the right 1st MTPJ with the point of maximal tenderness noted at the sesamoid apparatus. Range of motion of the joint was guarded due to pain. The skin overlying the joint was erythematous, edematous, and tense. The patient was non-weightbearing as he was unable to place pressure upon that right foot. The rest of the exam was within normal limits. The labs during admission were unremarkable. Radiographs taken in the emergency room 1 week prior were reviewed, and upon closer inspection, the AP view [figure 1] demonstrated irregularity of the sesamoids, particularly the tibial sesamoid with what appears to be lysis of the proximal lateral portion of the sesamoid. This fluffy appearance of the sesamoid can also be appreciated in the lateral view [figure 2]. MRI was ordered to confirm or exclude the extent of bony involvement. The tibial sesamoid demonstrated signal changes consistent with osteomyelitis; however, to our surprise, the fibular sesamoid demonstrated signal changes consistent with osteomyelitis with some question of involvement of the metatarsal head [figure 3].

After thorough review of the radiographs, MRI, and the patient's recalcitrant pain and erythema in spite of IV antibiotics, surgical intervention would be necessary. The patient was taken to the operating room the next day. Incision planning included a dorsal medial longitudinal incision for joint exposure/washout, and a transverse plantar incision for the excision of the sesamoids [figure 4]. Both sesamoids were excised, with the tibial sesamoid observed to be especially soft and eroded [figure 5 and 6]. A clean margin bone biopsy of the metatarsal head and proximal phalangeal base were taken.

Intraoperative microbiology revealed one colony of *P. aeruginosa*. The clean margin bone biopsies did not reveal involvement. The patient was discharged from the hospital with a peripherally inserted central catheter and remained upon the IV Zosyn for two weeks after discharge and the oral Cipro six weeks after discharge. The patient also remained non-weightbearing to the right foot with a surgical shoe until the plantar incision was healed. The patient's incisions healed uneventfully and with no recurrence of pain, swelling, or erythema to the 1st MTPJ of the right foot.



Figure 1



Figure 2

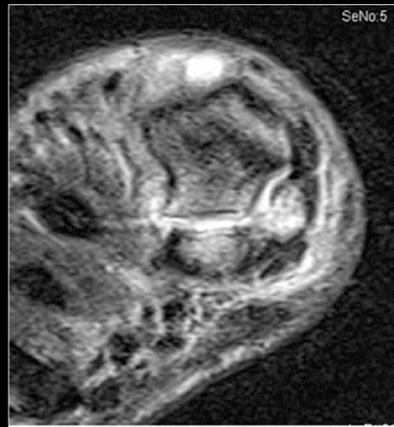


Figure 3



Figure 4



Figure 5

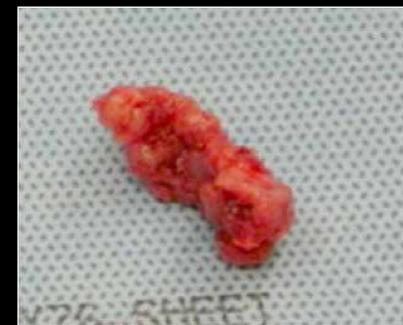


Figure 6

Discussion

The incidence of osteomyelitis has been reported at 1.8% of all puncture wounds¹. Wide variation exists in the literature regarding the percentage of these cases being caused by *Pseudomonas*, with reports ranging from 10.6% to 93%^{1,2}.

Reports of osteomyelitis in the hallux sesamoids in particular have been uncommon in the literature³⁻¹⁸. These reports have implicated both hematogenous and traumatic inoculation following puncture wounds as the modes of contraction. *Pseudomonas* has been implicated as the causal organism in the vast majority of cases involving puncture wounds^{3,5,8,9,13,14,17,18}. Hematogenous spread is commonly caused by *Staphylococcus aureus*^{6,7,10-12,15,16} and is often preceded by blunt trauma to the area^{6,11,15}.

Scant literature exists on latent *Pseudomonas* infection following puncture wounds re-emerging with the presentation of osteomyelitis and septic arthritis. A review of the content available indicated a few isolated cases involving the reactivation of latent Pseudomonal osteomyelitis, with most occurring within 2 years of the initiating event^{1,2,19,20}. In 1983, Lynch et al.¹⁹ reported a 13 month delay from time of initial injury to symptomatology of osteomyelitis. Elliott et al.² reported the isolation of *Pseudomonas* by needle aspiration from a patient with a Brodie's abscess. The patient had sustained a puncture wound 2 years prior to the admission. However, this isolation was dismissed as a contaminant. Fitzgerald et al.¹ made mention of *Pseudomonas* osteomyelitis recurrence 20 months following surgical debridement. Peterson et al.²⁰ reported a chronic case of Pseudomonal osteomyelitis which re-emerged 8 years following initial treatment of a puncture wound. The patient had undergone incision and drainage of the 3rd metatarsal 2 years following the puncture wound and had intermittent periods of symptomatology involving pain, edema and erythema surrounding the affected area. Reports of Pseudomonal osteomyelitis of the sesamoids specifically have little to no latent period with sesamoid osteomyelitis commonly being diagnosed weeks following the initial presentation of symptoms^{3,4,8,9,13,14,17,18}. The longest reported latency re-emerged 4 months following initial symptomatology, but intermittent periods of pain and swelling were reported⁸.

Conclusion

The indolent nature of the *Pseudomonas* infection often leads to difficulty in diagnosis and most commonly a delay in accurate diagnosis, with both clinical and radiographic presentation being less severe than that of osteomyelitis induced by gram positive organisms^{2,21,23}. This case is unique due to the extremely long latency of 17 years following the initial puncture wound to the area. To our knowledge, it is the longest case of latent Pseudomonal osteomyelitis in the foot and ankle by 9 or more years.

References

- Fitzgerald RH, Cowan JDE: Puncture Wounds of the Foot. *Orthopedic Clinics of North America* 6:965-972, 1975.
- Elliott SJ, Aronoff SC: Clinical Presentation of Management of Pseudomonas Osteomyelitis. *Clinical Pediatrics* 24:566-570, 1985.
- Rahn KA, Jacobson FS: Pseudomonas Osteomyelitis of the Metatarsal Sesamoid Bones. *The American Journal of Orthopedics* 26:365-367, 1997.
- Lavery LA, Haase K, Krych SM: Hallux Hammee Toe Secondary to Pseudomonas Osteomyelitis. *Journal of the American Podiatric Medical Association* 81:608-612, 1991.
- Browne TM, RF: Pseudomonas osteomyelitis of the metatarsal sesamoid. A case report. *Orthopaedic Review* 17:601-604, 1988.
- Colwill M: Osteomyelitis of the Metatarsal Sesamoids. *The Journal of Bone and Joint Surgery* 51B:464-468, 1969.
- Freund K: Haematogenous Osteomyelitis of the First Metatarsal Sesamoid: A Case Report and Review of the Literature. *Archives of Orthopaedic and Trauma Surgery* 108:53-54, 1989.
- Gordon SL, Evans C, Greer RB: Pseudomonas Osteomyelitis of the Metatarsal Sesamoid of the Great Toe. *Clinical Orthopaedics and Related Research* 99:188-189, 1974.
- Rimoldi RLG, William J: Pseudomonal Osteomyelitis of the Medial Sesamoid Bone. *Southern Medical Journal* 84:800-801, 1991.
- Rowe M: Osteomyelitis of Metatarsal Sesamoid. *British Medical Journal* 1:1071-1072, 1963.
- Brock J, Meredith H: Case Report 102: Osteomyelitis of the First Metatarsal Sesamoid. *Skeletal Radiology* 4:236-239, 1979.
- Cartilage I, Gillespie W: Haematogenous osteomyelitis of the metatarsal sesamoid. *British Journal of Surgery* 66:214-216, 1979.
- Conway WF, Hayes CW, Murphy WA: Case Report 568: Total resorption of the lateral sesamoid secondary to *Pseudomonas aeruginosa* osteomyelitis. *Skeletal Radiology* 18:483-484, 1989.
- Nuber GWA, Proctor R: Acute Osteomyelitis of the Metatarsal Sesamoid. *Clinical Orthopaedics* 167:212-213, 1982.
- Smith R: Osteitis of the Metatarsal Sesamoid. *British Journal of Surgery* 29:19-22, 1941.
- Torgerson WR, Hammond G: Osteomyelitis of the Sesamoid Bones of the First Metatarsophalangeal Joint. *The Journal of Bone and Joint Surgery* 51A:1420-1422, 1969.
- Gallo JJ: Pseudomonas Osteomyelitis Secondary to Puncture Wound of the Foot. *Journal of Family Practice* 27:529-532, 1988.
- Gray PF: Osteomyelitis of the metatarsal sesamoid. *American Family Physician* 24:131-133, 1981.
- Lynch M, Dorgan J: A case of *Pseudomonas Aeruginosa* Osteomyelitis of the tarsal cuboid following a penetrating wound of the foot in childhood. *Injury: The British Journal of Accident Surgery* 14:354-356, 1983.
- Peterson HA, Tressler HA, Lang AG, et al: Puncture Wounds of the Foot. *Minnesota Medicine* 56:787-794, 1973.
- Niall D, Murphy P, Fogarty E, et al: Puncture Wound Related Pseudomonas Infections of the Foot in Children. *Irish Journal of Medical Science* 166:98-101, 1997.
- Norden CW, Keleti E: Experimental Osteomyelitis Caused by *Pseudomonas aeruginosa*. *The Journal of Infectious Diseases* 141:71-75, 1980.
- Finkelstein R, Raz R, Stein H, et al: Bone and Joint Infections Due to *Pseudomonas Aeruginosa*: Clinical Aspects and Treatment. *Israel Journal of Medical Sciences* 25:123-126, 1989.