

TRAUMATIC IMPLANTATION OF METALLIC FOREIGN BODY IN THE LEG: A Case Report

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INTRODUCTION

Puncture wounds of the foot and lower extremity are common injuries seen in the emergency room (ER). Statistics suggest that these injuries may account for 0.81% of all visits to the ER (1). Any foreign object that can be stepped on and which is hard enough to penetrate the skin may be a threat. However, the most common foreign materials seen in the foot are toothpicks, sewing needles, glass, and metal (1). One of the biggest obstacles in treating these injuries comes from the inherent risk of infection from introduced foreign bodies. It has been reported that infection rates associated with puncture wounds can range from 6-11% (2). The infectious complications seen with puncture wounds involving foreign bodies range from superficial infections such as cellulitis and abscess, to deep infections such as osteomyelitis and septic arthritis (1). For this reason, it is extremely important to identify and remove any foreign bodies in a timely manner. Here we will discuss the case of a patient presenting to the ER for treatment of a foreign body wound sustained the previous evening while intoxicated.

CASE PRESENTATION

The patient is a 26-year-old male, on vacation in Miami, who was seen in the ER reporting left anterior leg pain. The patient stated that he sustained a traumatic injury the night before while walking to his hotel from a wedding. The nature of the injury was a slip and fall onto a sprinkler head of a fountain. At the time of the incident, the patient noticed a wound to the anterior aspect of his left leg with minimal bleeding. The patient did not notice anything out of the ordinary at that time. The patient went to sleep and when he woke up the next morning, he was in severe pain

in his left leg. The patient was unable to bear weight to the left leg. The patient also noticed that the sheets in his hotel bed were saturated with blood. During examination, the patient says that his tetanus status was up to date. The patient denied any other complaints at that time. The past medical and surgical history for this patient was non-contributory. The patient denied any drug allergies. His social history was positive only for alcohol consumption.

Laboratory testing performed in the ER was unremarkable, although the patient did have a white blood cell count of 10.6. On physical examination, there was a superficial laceration noted to the anterior aspect of the patient's left leg (Figure 1). No erythema or edema was noted. No purulence was noted. There was pain on palpation noted to the skin along the laceration. There was no palpable or visible foreign bodies noted to the left leg. No exposed bone or tendon was noted within the



Figure 1. Clinical appearance of the patient's wound.



Figure 2. Anterior-posterior radiograph showing metallic foreign body in patient's anterior leg.

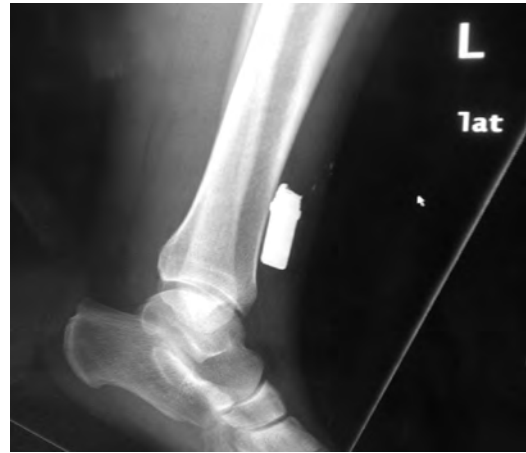


Figure 3. Lateral view.

laceration. There were no other open wounds or lesions noted to the bilateral lower extremities at the time. The left dorsalis pedis artery was weakly palpable and the left posterior tibial pulses was palpable. Skin temperature was warm to warm, proximal to distal to bilateral lower extremities. The capillary refill time was less than 3 seconds to all digits. Epicritic and protective sensation was intact to both lower extremities. There was 5/5 muscle strength noted to all muscle groups in both lower extremities. Active and passive range of motion of all pedal joints was normal and non-painful. Radiographic examination of the patient revealed a large metallic foreign body noted within the pretibial soft tissues of the distal left leg (Figures 2, 3). Small foreign body fragments were identified just above this level. There was no evidence of acute fracture or dislocation bony destructive process. Upon receiving the results of the patient's radiographs, immediate surgical intervention was discussed with the patient.

Surgical Procedure

After identification of the foreign body under fluoroscopy, attention was directed to the patient's left leg at the distal aspect of anterior distal lower leg of the left and a 5 cm incision was made at the level of the wound into the distal aspect of the anterior left leg and distal leg. The

incision was deepened distally and all the soft tissues and neurovascular structure were retracted and ligated. The foreign object was located and isolated. A hemostat was used to remove the foreign object along with all the particles at the surgical site (Figures 4-6). Six liters of normal sterile saline on a pulse lavage were used to irrigate the surgical site. Interrupted fluoroscopy was used to confirm the removal of all the remaining metal particles in the patient's leg. The wound was packed with quarter-inch iodoform and then dry sterile dressings were applied.

Postoperative Course

After a 2-day stay at Mercy Hospital in Florida, the patient returned to his home town in Washington, DC where he was to follow up at Medstar Washington Hospital Center for wound care and closure. He presented with a nonpalpable left dorsalis pedis artery, which was audible on Doppler with a monophasic wave sound. The left posterior tibial artery was palpable. An arterial duplex was performed and revealed that there was retrograde flow at the dorsalis pedis artery filling from the plantar arch. At this time, wound care consisted of a portable negative pressure wound therapy until depth was restored then Promogran Prisma Matrix, then silver silvadiene. The wound was successfully closed within an 8 week period (Table 1) (Figures 7,8).



Figure 4. Clinical appearance in the operating room.

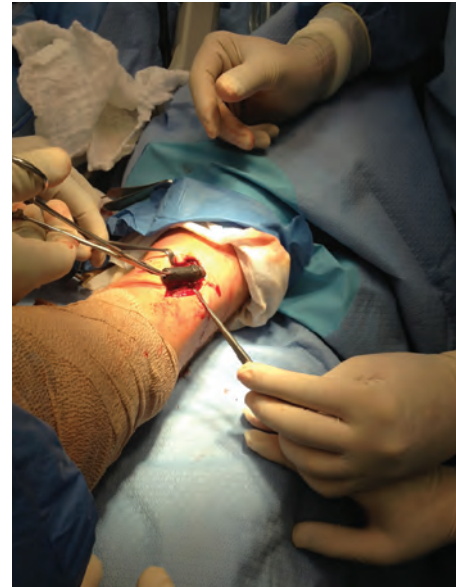


Figure 5. Removal of metallic foreign body.



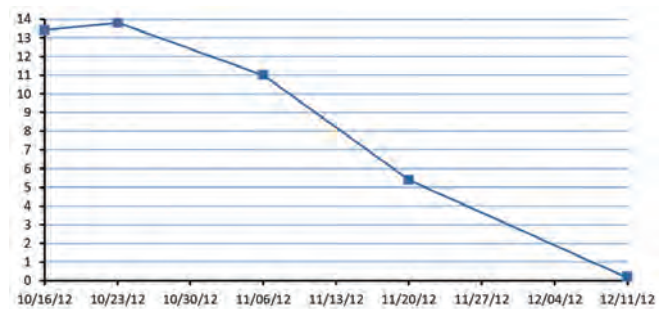
Figure 6. Foreign body.

DISCUSSION

The case presented demonstrates the importance of proper treatment protocol for patients with puncture wounds and suspected foreign bodies. A high clinical suspicion needs to be present because these injuries often appear benign (3). Studies have shown that conservative management of these injuries have late infection rates as high as 12% (1). For this patient, the only sign of trauma was a small puncture wound to the anterior leg; there was no palpable foreign body noted. Due to the patient's previous night of drinking; he did not notice or think about the possibility that the foreign body could have possibly been retained in his leg. Thus, after

Table 1

AREA OF WOUND VERSUS TIME OF HEALING



obtaining a thorough history and physical, plain film radiographs should be ordered in all patients suspected of having retained foreign bodies with a puncture wound. Objects such as lead or large wood fragments will be visible on radiographs. Ultrasound can be used to visualize objects that cannot be seen on radiographs (3).

As part of the thorough history and physical, it is important to ascertain the tetanus status of the patient. It is recommended that patients presenting with puncture wounds receive a tetanus booster if they are unable to recall when their last immunization was performed, or if longer than 7-10 years has passed since their last immunization (3). Once the foreign body is identified,



Figure 7. Appearance of wound during first postoperative visit.

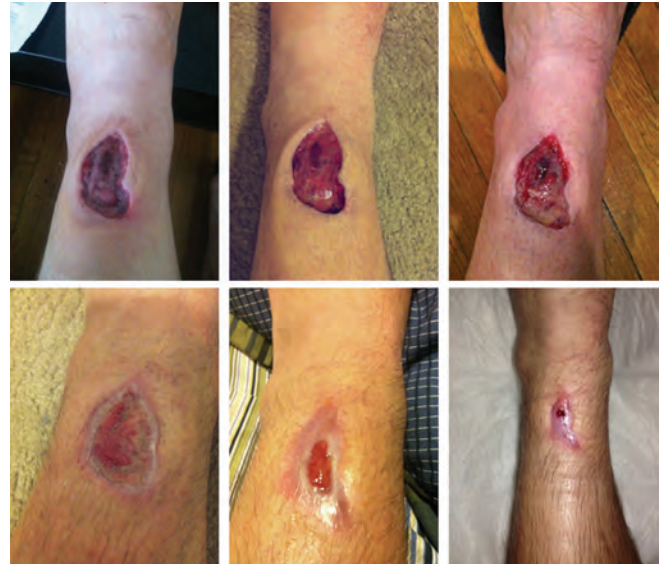


Figure 8. Progression of wound during postoperative course using wound-vac therapy.

appropriate debridement and irrigation of the puncture wound with the removal of the foreign body is indicated for a successful outcome (2). The literature suggests that this procedure is best performed under general anesthesia. The procedure involves debridement of all non-viable bone and soft-tissue, removal of the foreign body, deep cultures of bone and soft-tissue, and, finally, irrigation with copious amounts of sterile saline (2). The wound is often left open and packed, but new literature fails to show any contraindications to primary closure of these wounds (2).

Vascular assessment is an important factor to consider in the treatment of puncture wounds specifically in and around anatomical regions of major arteries. In the case of this patient, with consideration to his overall health, age, and physical examination, a vascular consultation was not warranted. However, he may have suffered an anterior tibial artery injury during the trauma. The arterial duplex revealed that he had adequate blood flow to the dorsalis pedis not by means of the anterior tibial artery but via retrograde flow from the posterior tibial through the plantar arch and the deep perforating artery. According to Attinger et al (4), blood flow to the foot and ankle is redundant, because the three major arteries feeding the foot have multiple arterial-arterial connections.

Puncture wounds with retained foreign bodies are common lower extremity injuries seen in the emergency setting. Proper identification and treatment of these injuries is vital in preventing more severe complications such as soft tissue or bone infection.



Figure 9. Fountain where the incident occurred. Note missing sprinkler head.

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