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Traumatic Compartment Syndrome of the Foot: A Case Report

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Introduction

Compartment syndrome of the foot is a rare but limb threatening condition that is often difficult to diagnose. It is usually caused by traumatic injuries and the diagnosis requires a high clinical suspicion and timely management. Clinically, patients will present with an acute traumatic event followed by physical exam findings of non-palpable pulses, paralysis, pallor, pain out of proportion, and paresthesias. The foot contains nine compartments, which should be assessed independently for elevated pressures. The diagnostic threshold for each compartment is 30 mmHg. Pressures above this threshold require emergent fasciotomy to preserve the anatomical structures and thus the function of the foot.

Objective

We present a traumatic case of compartment syndrome and discuss the clinical presentation, diagnosis, and management of this condition.

Figure 1: Clinical presentation of the right foot 4 hours after the injury

Figure 2: A Centurion® Compass used for digital pressure reading of compartment syndrome

Case Presentation

A 31-year-old male was involved in a work injury where a 10,000 lb beam fell on his right foot after the beam slipped off the forklift from a height of 2 feet. Patient was wearing steel toed shoes at the time. He was transferred to Inspira Vineland Emergency department with a chief complaint of severe right foot pain and swelling.

Upon initial evaluation, he was unable to move his foot or bear any weight. He also had extreme pain upon palpation of the dorsal foot, mildly palpable pulses with doppler, and decreased sensation to light touch. Foot compartments were measured using a Centurion® compass revealing pressures of the medial compartment of 52 mmHg and lateral compartment of 62 mmHg.

Radiographs revealed displaced fracture deformities involving the 2nd, 3rd, and 4th metatarsal heads. The patient was emergently scheduled for surgery for a fasciotomy to relieve the compartment pressures.

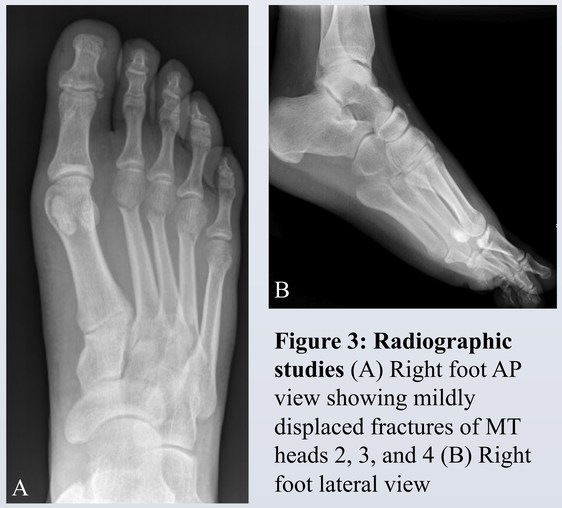

Figure 3: Radiographic studies (A) Right foot AP view showing mildly displaced fractures of MT heads 2, 3, and 4 (B) Right foot lateral view

Surgical Procedure

Patient was placed on the operating room table in the supine position. Two incisions were made dorsally – one over the 1st interspace and one over the 3rd interspace. A third incision was made medially, immediately posterior to the 1st metatarsal.

Surgical Procedure (continued)

The incisions were carried down at the level of the capsule using sharp and blunt dissection. Utilizing blunt dissection, all compartments of the foot were opened releasing pressure and exsanguinating hematomas. Incisions were flushed with copious amounts of sterile saline and packed open with quarter inch iodoform packing and covered with dry sterile dressings.

Figure 4: Clinical image of the right foot with 2 dorsal incisions (left) and 1 medial incision posterior to the 1st metatarsal (right)

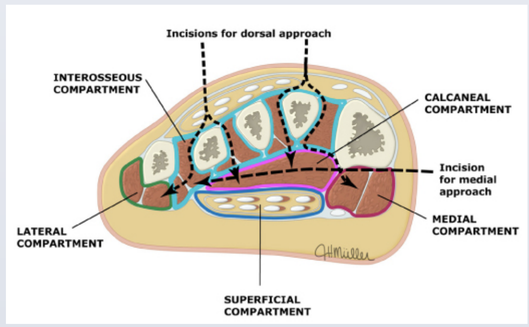

Figure 5: Fasciotomy of the foot
Two dorsal longitudinal incisions are made to access the foot compartments. Each of the four sub-compartments of the interosseous compartment (turquoise) are opened between the metatarsal bones through the dorsal incisions. The calcaneal compartment (pink), which lies beneath the metatarsals, is opened directly. The lateral compartment (green) is decompressed through the lateral dorsal incision. The medial compartment (red) may be accessed by dissecting medial to the second metatarsal. Alternatively, the medial compartment can be accessed through another incision along the medial foot, posterior to the first metatarsal.[1]

Post-operative Management

The patient was admitted for pain control and neurological checks. A CT scan was also ordered which ruled out a Lisfranc injury or any comminuted fractures. After close monitoring for 48 hours, the patient was taken to the operating room for percutaneous pinning of the metatarsal fractures and closure of the fasciotomy sites. Patient was stable to be discharged in a posterior splint with strict non-weight bearing to the right foot.

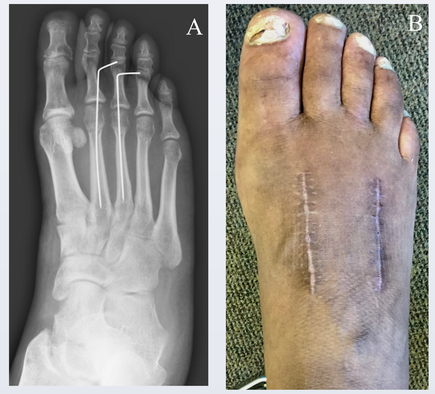

Figure 6: (A) Medial oblique view of the right foot 5 weeks s/p ORIF (B) clinical image of the dorsal foot 9 weeks after fasciotomy

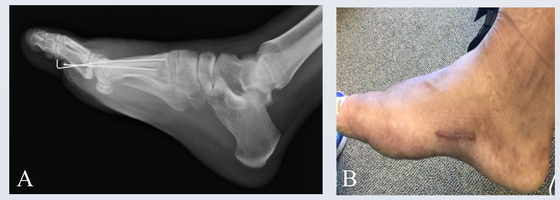

Figure 7: (A) Right foot lateral view 5 weeks s/p ORIF (B) clinical image of the medial foot after 9 weeks

Conclusion

This case illustrates the prompt and accurate diagnosis of traumatic compartment syndrome of the foot. It is a surgical emergency that is difficult to diagnose, however, early diagnosis can lead to successful patient outcomes. Definitive management with fasciotomies can prevent long-term complications.

References

1) Modrall, G. (2017, April 25). Lower extremity fasciotomy techniques (J. L. Mills Sr. & J. F. Eidt, Eds.). Retrieved May, 2018, from https://www.uptodate.com/contents/lower-extremity-fasciotomy-techniques?search=compartment syndrome of the foot&source=search_result&selectedTitle=2~150&usage_type=default&display_rank=2#H548658789

2) Towater, L. J., & Heron, S. (2013). Foot Compartment Syndrome: A rare presentation to the emergency department. *The Journal of Emergency Medicine,44*(2), 235-238.