Atypical Case of Calcaneal Osteomyelitis with Pathologic Fracture Secondary to Corticosteroid Injection

David V. Tran, DPM[1]; Justin J. Singh, DPM[1]; Ryan C. Kish, DPM FACFAS[2]

[1]Resident, Mercy St. Vincent Medical Center | Toledo, OH

[2]Attending, Mercy St. Vincent Medical Center | Toledo, OH

Statement of Purpose

Plantar fasciitis (PF) is one of the most ubiquitous pathologies treated by foot and ankle specialists. We present a case of a rare and potentially life changing complication highlighting the importance of non-complacency, regardless of how routine the pathology may seem.

Literature Review

Over one million patients present for treatment of PF annually.[1,9] Corticosteroids (CS) have been shown be a safe and effective form of conservative treatment.[2-3] The reported complication rate following CS injection are quite low, most recently reported at 1.3%.[4] Fat pad atrophy is a known complication following CS injection, which can increase ground reactive forces on the plantar calcaneus. The combination of fat pad atrophy and direct extension to the outside environment can lead to deep infection of the bone.[5] As this pathology progresses, pathologic fracture is a potentially devastating sequalae. At this point in time, pathologic fracture secondary to CS injection has not been described in the literature.

Fig 1: MRI reveals osteomyelitis and pathologic fracture of the calcaneus

Case Study

A 72-year-old male was referred to our facility from a tertiary center for pathologic fracture of left calcaneus secondary to osteomyelitis. History revealed that patient received a series of two CS injections to the left heel for PF three months prior.

Within **one month** the patient developed a non-healing heel wound to the CS injection site which was complicated by cellulitis of the left lower extremity requiring hospital admission. During his hospital admission he was found to have severe peripheral arterial disease (PAD) requiring a femoral-popliteal artery bypass.

Three months after CS injections, he presented to the emergency department for left heel pain after hearing an audible “pop” while ambulating. Radiographs revealed an extra-articular fracture of the calcaneus (Fig 2A). MRI imaging demonstrated osteomyelitis of the calcaneus with pathologic fracture (Fig 1).

Treatment

Surgical intervention was staged with an initial incision and drainage of the wound with bone biopsy of the left calcaneus. Pseudomonas aeruginosa, Group B streptococcus and Candida species were isolated from the bone biopsy. A repeat debridement with delayed primary closure was performed and the patient was initiated on an 8-week course of intravenous antibiotics. The patient was kept non-weight bearing for 8 weeks and then transitioned to partial weight bearing in a pneumatic walking boot, eventually progressing back into normal shoes. Wound completely healed at 3 months from initial presentation. At 12 month follow up the calcaneus fracture has healed radiographically and the patient’s wound remains epithelialized (Fig 3).

Fig 2: 2A demonstrates pathologic fracture of calcaneus. 2B demonstrates healed calcaneal fracture.

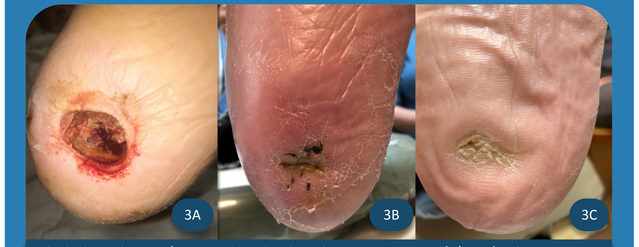

Fig 3: 3A = 3 months post CS Injection. 3B = status post delayed primary closure. 3C = 1 year follow up, wound remains healed

Analysis & Discussion

Corticosteroid injection for plantar fasciitis is a frequently utilized treatment modality by foot and ankle specialists.[9] While not commonly encountered, limb threatening complications may arise from routine conservative treatment. **Corticosteroid injections may preclude a pathologic mechanism that results in a progressive triad of complications: Fat pad atrophy, osteomyelitis, pathologic fracture.**

The step-wise progression begins with **fat pad atrophy** which increases exposure risk of the calcaneus to the outside environment and leads to increased ground reactive forces to the plantar calcaneal tuberosity. The exposed bone is then subject to infective pathogens resulting in **osteomyelitis** which compromises cortical integrity. Eventual **pathologic fracture** develops due to increased ground reactive forces.

References

1. Goff, J.D., Crawford, R. (2011) Diagnosis and treatment of plantar fasciitis. *American Family Physician*, 84, 676–682.
2. David, J.A., Sankarapandian, V., Christopher, P.R., Chatterjee, A., Macaden, A.S. (2017) Injected corticosteroids for treating plantar heel pain in adults. Cochrane Database of Systematic Reviews Issue 6.
3. Celik, D., Kuş, G., & Sırma, S. Ö. (2016). Joint Mobilization and Stretching Exercise vs Steroid Injection in the Treatment of Plantar Fasciitis: A Randomized Controlled Study. *Foot & Ankle International*, *37*(2), 150–156.
4. Grice, J., Marsland, D., Smith, G., & Calder, J. (2017). Efficacy of Foot and Ankle Corticosteroid Injections. *Foot & Ankle International*, *38*(1), 8–13.
5. Gidumal, R., Evanski, P. (1985). Calcaneal Osteomyelitis following Steroid Injection: A Case Report. *Foot and Ankle International*, 6(1), 44-6.
6. Wronka, K. S., & Sinha, A. (2012). Calcaneal Osteomyelitis Following Steroid Injection for Plantar Fasciitis: A Case Report. *Foot & Ankle Specialist*, *5*(4), 253–255.
7. Whittaker, G.A., Munteanu, S.E., Menz, H.B., Bonanno, D.R., Gerrard, J.M., Landorf, K.B. (2019). Corticosteroid injection for plantar heel pain: a systematic review and meta-analysis. BMC Musculoskeletal Disorders, 20(1), 1-22.
8. Kim, C., Cashdollar, M.R., Mendicino, R.W., Catanzariti, A.R., Fuge, L. (2010) Incidence of plantar fascia ruptures following corticosteroid injection. *Foot & Ankle Specialist*. (3), 335–337.
9. Acevedo, J. I., & Beskin, J. L. (1998). Complications of Plantar Fascia Rupture Associated with Corticosteroid Injection. *Foot & Ankle International*, *19*(2), 91–97.
10. Riddle, D. L., & Schappert, S. M. (2004). Volume of Ambulatory Care Visits and Patterns of Care for Patients Diagnosed with Plantar Fasciitis: A National Study of Medical Doctors. *Foot & Ankle International*, *25*(5), 303–310.
11. Sabater-Martos, M., Sigmund, I. K., Loizou, C., & McNally, M. (2019). Surgical Treatment and Outcomes of Calcaneal Osteomyelitis in Adults: A Systematic Review. *Journal of bone and joint infection*, *4*(3), 146–154. doi:10.7150/jbji.34452
12. Kim, Y., Inori, F., Yamanaka, K. (2018). A Case of Osteomyelitis after Calcaneal Fracture Treated by Antibiotic-Containing Calcium Phosphate Cements. Orthopedics. 1-4.

MERCYHEALTH Podiatric Medicine and Surgery Residency
Mercy St. Vincent Medical Center

Financial Disclosures: MiMedix[2]