Atypical Heel Pain: Case Report

by George Alvarado, DPM\textsuperscript{1} and Gary Most, DPM FACFAS\textsuperscript{2}

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Abstract: Plantar fasciitis is the most common etiology of heel pain. When a patient fails conservative treatment, and develops an atypical presentation, a systematic approach with a broad differential is warranted. A unicameral bone cyst is one etiology that can present with atypical symptoms. The approach to treatment is varied, with the avoidance of pathological fracturing of the calcaneus.

Key words: Atypical, Heel pain, Pathological fracture, Bone tumor, Unicameral bone cyst

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treating the patient who present with heel pain is at times straightforward, especially when the patient presents with the classic symptom of post-static dyskinesia and clinical exam findings such as pain to the plantar medial tubercle of the calcaneus, a pronated foot, and tight Achilles tendon. At other times heel pain can become more of a challenge especially when the symptoms are atypical and refractory to various conservative modalities. The challenge stems from the broad etiology of heel pain. In these cases, it is helpful to have a systematic approach and a wide differential that includes such etiologies as; mechanical, neurologic, arthritic, traumatic, infectious, neoplastic, vascular, and systemic causes. A complete history is always of utmost importance, along with a thorough physical examination and appropriate weight bearing radiographs as starting points. Although the literature is replete with case reports of atypical heel pain, with varied surgical approaches for the treatment of bone cysts in particular, it is important to continue presenting these cases for the benefit of the patient and the advancement of medical knowledge.

Case Report

22-year-old Amish female initially presented for left heel pain greater than two years duration. The pain was worse with walking, standing, and with the first step of the day. She had previously been treated with over the counter inserts and a night splint. Review of systems and history was unremarkable. Physical exam revealed pain on palpation of the left plantar medial calcaneal tubercle but no pain with medial to lateral compression of the calcaneus. She had 5 degrees of ankle dorsiflexion with her knee extended. Dermatological, neurological, and vascular exams were unremarkable. She was diagnosed with left plantar fasciitis and gastrocnemius equinus. Treatment consisted of recommendations for more supportive shoes, refraining from bare foot walking and excessive

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activity, continued use of over the counter inserts, left great toe numbness, low dye strapping, and follow up in 1-2 weeks. Given that low dye strapping had alleviated some of the pain, on follow up she was casted for orthotics which were provided to her 3 weeks after her initial presentation. She followed up in 2 months with improved left heel pain but without complete resolution. She complained of new pain to the plantar lateral arch and calcaneal tubercle in the region of the intrinsic musculature and lateral band of the plantar fascia. Prescription for a Medrol dose pack was provided. She continued to follow up periodically without complete resolution of her heel pain, presenting with new pain over the plantar calcaneal cuboid joint as well as with pain upon medial to lateral compression of the calcaneus. She was subsequently treated with corticosteroid injections, a walking boot, and nonsteroidal anti-inflammatories. She responded positively at times but without complete resolution. An MRI was obtained revealing a talar contusion. A second provider assumed care after failure of conservative treatments for what was believed to be left plantar fasciitis with gastrocnemius equinus. The review of systems was unchanged but further exploration of the patient’s family history revealed that two of her first cousins had died of malignant neoplastic diseases in their early 20’s. On physical exam she continued to present with pain to the left plantar heel and a gastrocnemius equinus. Patient had new areas of pain located deep to the plantar lateral midfoot and at the calcaneonavicular joint. She also had pain with hindfoot range of motion in the frontal plane and with forced heel eversion. Dermatological, neurological, and vascular exam remained unremarkable. A diagnostic local anesthetic block was administered to the calcaneonavicular joint. It provided relief but the plantar heel pain was still present. Left calcaneonavicular bar was added to her diagnosis. Surgical options were discussed, which consisted of; calcaneonavicular bar resection, gastrocnemius recession, and plantar fascial release. A CT scan was obtained which revealed sclerosis of the plantar margin of the calcaneus and a well corticated cyst measuring 1.5 cm at the plantar lateral calcaneus.

Figure 1. Preoperative coronal and axial CT images of the left calcaneus showing the presence a bone cyst.

At this point she was 29 weeks from initial presentation to the clinic and had developed point tenderness at the inferior lateral heel. Discussion was shifted to biopsy and removal of the bone cyst with possible graft, along with some of the previously discussed procedures. After preoperative evaluation was obtained, the patient underwent surgery. The patient received a popliteal block and general anesthesia. She was given two grams of ancef and repositioned to a lateral decubitus position on her right side. The left lower leg was prepped and draped in the usual standard aseptic orthopedic technique. The gastrocnemius recession was performed first, which provided excellent reduction of the equinus deformity. Attention was then directed to the lateral aspect of the left heel. The extremity was elevated, and a thigh tourniquet was inflated to 275 mmHg. A lateral extensile incision was performed along the inferolateral aspect of the left heel. A full thickness flap was raised and retracted. With the flap elevated, a bony prominence was noted along the plantar lateral tuberosity of the calcaneus. It was resected with an osteotome and sent for pathologic evaluation. The bone beneath was noted to be firm and healthy. Next, a prominent and hypertrophied peroneal tubercle was
noted so it was removed with an osteotome as well. Upon removal, a fatty appearing type cyst with abnormal bone marrow was noted. The contents of the cyst were removed with a curette and sent for pathologic evaluation along with a culture swab for microbiology. The cyst measured 1 cm in diameter and 1.7 cm in depth, that extended posterior medially along the internal surface of the calcaneus. The cyst was curetted to healthy bone, irrigated with sterile saline, and the void was packed with a mixture of demineralized bone matrix (DBM) and cancellous chips. With the aid of intraoperative fluoroscopy, the plantar lateral surface of the calcaneus was buttressed with a Write Medical naviculocuneiform arthrodesis plate.

Figure 2. Intraoperative image revealing a cystic bony defect in the lateral calcaneus post curettage.

Figure 3. Intraoperative image of the lateral calcaneus. Defect has been packed with DBM and cancellous chips and the lateral cortex was supported with a buttress plate and screws.

The wound was then closed in layers. The tourniquet was released with good capillary refill time noted. A sterile dressing was applied to the wound and the left lower extremity was well padded for a posterior splint. The patient was awakened from anesthesia, noted to have an increased temperature and tachycardia which stabilized in the PACU. Later that same day, she was discharged home with instructions to follow up in the clinic. At her second post-operative visit, she was doing well and had no complaints. Stable heel and calf incision sites were noted. Radiographs demonstrated intact hardware without evidence of a calcaneal pathological fracture. She was encouraged to remain non-weight bearing in the CAM boot and scheduled for subsequent follow up visits to the clinic. Surgical pathology was negative for neoplastic disease but reported findings of woven and lamellar cancellous bone.

Discussion

The microscopic identification of woven versus lamellar bone is helpful in determining the various pathologies. Bone matrix can be classified as woven or lamellar based on predominant collagen fiber orientation. Lamellar bone has a layered appearance, along with a parallel orientation of osteoblasts. After three years of age, lamellar bone is the predominant form in both cortical and cancellous bone. Woven bone, which has a more random distribution of collagen fibers and osteoblasts, is found where rapid bone production is occurring, such as in the fetal skeleton, growing parts of the infant and adolescent skeleton, neoplastic, and non-neoplastic conditions.

Tumors of the foot are rare, with the majority being benign. The most common locations for a pedal tumor is in the hindfoot and forefoot. Research by Ozer et al, found pain and swelling to be the most common symptoms of bone tumors. Unicameral bone cyst or simple bone cyst, a benign fluid filled lesion, comprise about 3% of primary bone tumors. The calcaneus is the most commonly affected tarsal bone. Though not always symptomatic, some individuals affected will complain of pain and problems with ambulation. There is a wide variety of approaches to treating unicameral bone cysts, ranging from observation to the more common approach of open curettage and bone grafting (2). Levy et al. conducted a systematic review on the treatment of unicameral bone cysts. They found that open curettage with autograft or allograft had statistically significant greater resolution of heel pain and radiographic outcomes than non-operative treatments. No complications of pathologic
fracturing were reported in the study. This is an interesting finding as the literature sites pathologic fracturing as a complication that is well recognized in orthopedic surgeries when cortical strength is compromised due to a defect in the bone. Defects could be secondary to a tumor, biopsy, or internal fixation. Clark et al. demonstrated on a cadaveric femur that the size and shape of bony defects have varying effects on the strength. They also concluded that the ideal shape for a bone biopsy would be round with smooth ends, and an increase in length is less detrimental than an increase in width. Edgerton et al. concluded that defects less than or equal to 10% of the outer bone diameter cause no significant torsional strength reduction. In our case, prophylactic fixation was employed in the form of a buttress plate and screws to lend support to the cortical shell, along with filling the defect with a mixture of DBM and cancellous bone chips.

Plantar fasciitis is by far the most common etiology of heel pain. A review of the literature shows numerous case studies in which heel pain was treated as plantar fasciitis but later determined to be a different pathology. It is important to continue to report cases of atypical heel pain to make it easier for practitioners to direct their treatment plan to the appropriate cause. Providing a detailed patient history such as recent trauma, age, gender, location of the lesion, along with pertinent imaging are always more helpful in avoiding a misdiagnosis of a neoplasm (1). Thus, lessening the chances of a late diagnosis of a malignant tumor which could be fatal.

References


