

A Rare Case of Osteomyelitis in the Distal Tibia and Calcaneus Stemming from a Urinary Tract Infection

Shruti A. Patel DPM, MS, AACFAS¹, Ana M. Pimentel, DPM, AACFAS²

1. Attending Physician, Riverside Medical Group, Secaucus, NJ
2. Attending Physician, Active Orthopedics and Sports Medicine, Hackensack, NJ

Purpose

To show a rare presentation of a ESBL E. coli in multiple Brody's abscess in the calcaneus and distal tibia with unclear etiology, after a Urinary Tract Infection.

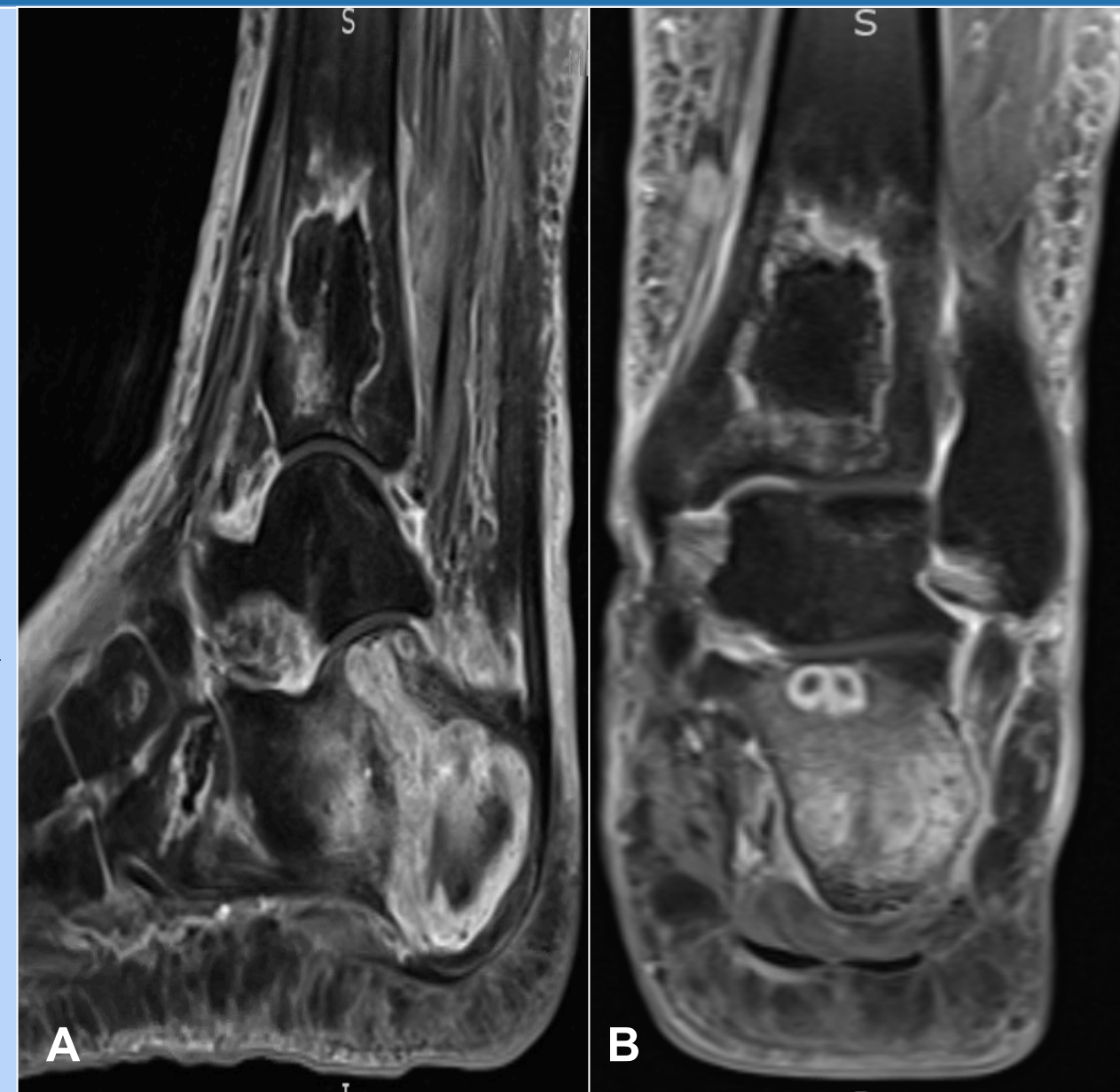
Case Study

66 year old female with past medical history of Diabetes Mellitus Type 2 (H_gA_{1c}: 5.8), Breast Cancer, and history of multiple UTIs presented with increased pain and swelling of left heel for 3-4 weeks. Patient stated prior to this she never had any ulcerations until one week ago. She had a WBC: 13.4, Sed: 14, CRP: 3.8. Patient has a history of urinary tract infections with the last one being 5 months ago. After the last urinary infection patient started experiencing to the left ankle pain without trauma or injury to the area. Clinically patient had a left heel draining ulceration with X-rays showing a radiolucency in the posterior aspect of the calcaneus (**Fig. 1**). Initial MRI revealed multifocal Brody's abscess in the distal tibia, calcaneus, and cuboid (**Fig. 2A-B**). Medical and vascular clearance was obtained prior to surgical intervention.

Figure 1: Initial Lateral Left Foot X-Ray



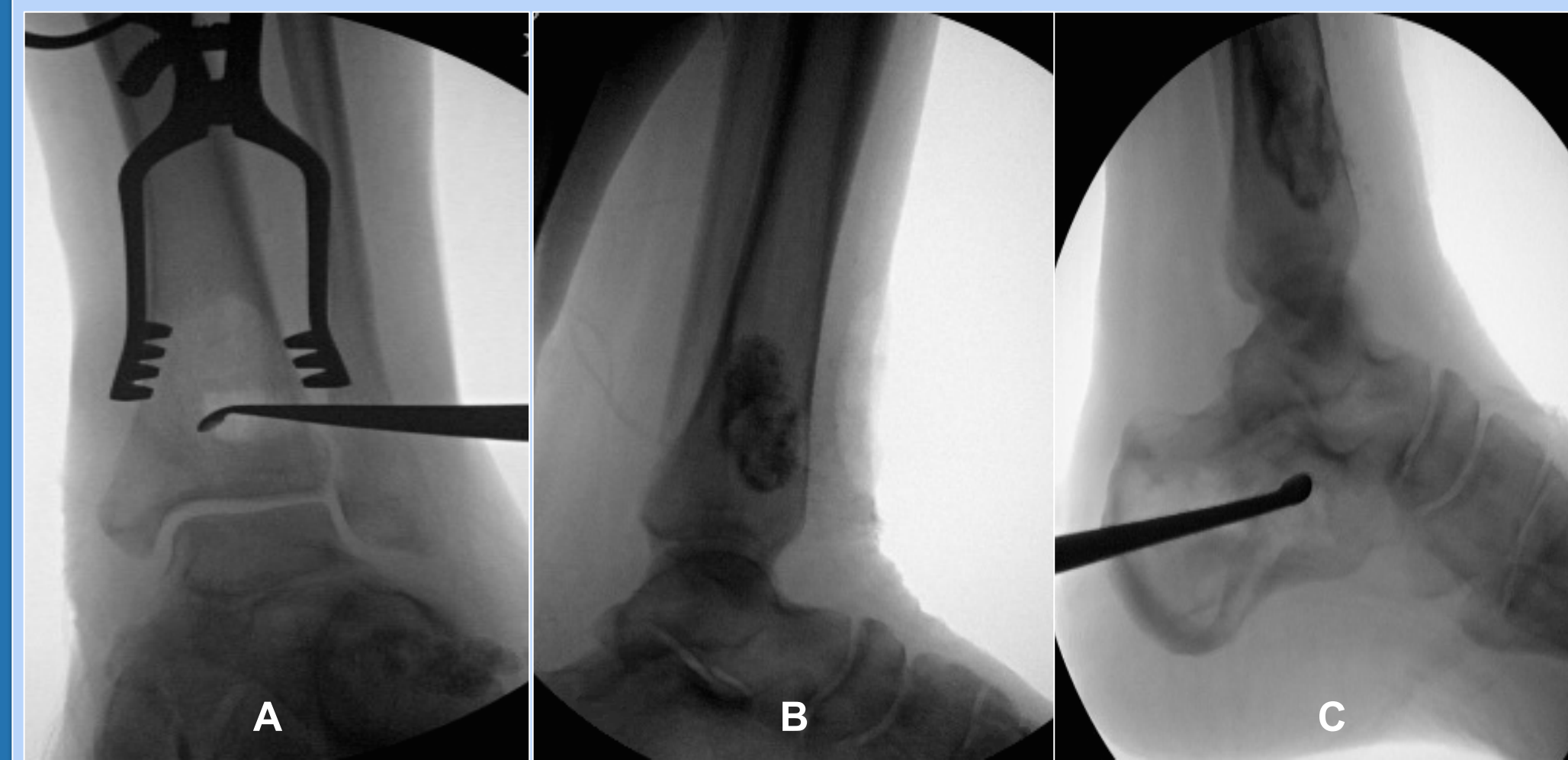
Figure 2 (A)-(B): MRI Images showing a 3.2 x 2.1 cm lesion in the distal tibia compatible with a Brodie's abscess. Extensive bone marrow edema is present in the calcaneus of a broad-based abscess measuring 3.5 x 4.6 cm. There is cortical disruption laterally involving the posterior calcaneus with indication with the abscess. Suspected brody's abscess of cuboid.



Method

Patient's UTI culture yielded ESBL E. Coli, matching initial culture results of the Brody's abscess in the distal tibia and calcaneus. Multiple serial debridements were needed. Cultures and sensitivities were obtained with each surgery and yielded no growth prior to final surgery. Inflammatory markers were monitored and trended down to normal by Infectious Disease.. Bone allograft and/or cement was used to back fill bone voids in the distal tibia and calcaneus.

Figure 3: Intraoperative Fluoroscopy showing Tibial defect (A)-(B) and Calcaneal defect (C) due to Brody's Abscess.



Results

Initial surgery consisted of a cuboid biopsy, distal tibia corticotomy (**Fig. 3A-B**). with curettage with application of PMMA antibiotic beads, incision and drainage of calcaneus with application of PMMA antibiotic beads. In the initial surgery PMMA beads were impregnated with Tobramycin and Vancomycin powder. Once biopsy cultures were obtained from each Brody's abscess site antibiotic beads were then impregnated with Tobramycin and Meropenem. Cuboid biopsy was negative for bacterial growth. Patient was treated with long term IV Meropenem per Infectious Disease. Since about 90% of calcaneus was involved resulting in a hollow eggshell (**Fig. 3C**). extensive bone allograft/ cement mixed with Meropenem was used to fill defect in the final surgery. Patient was kept non-weightbearing, but was clinically healed with good incorporation of bone allograft and cement six months out from final surgery (**Fig. 4A-D**) . Patient is ambulating in diabetic shoes..

Figure 4: Clinical Pictures of healed surgical site and ulceration (A)-(B). X-Rays over 6 months status post operative final surgery (C)-(D).



Discussion

This is an unusual and rare presentation of ESBL E. coli Brody's abscess in the distal tibia and calcaneus with an unclear etiology, but authors believe it seeded from her history of chronic urinary tract infections. Diabetics are at a high risk for enterobacter infections and is increasing worldwide (1). Although, osteomyelitis due to a urinary tract infection is rare, but a case report was reported in the spine (2). Hematogenous osteomyelitis is rare and more commonly seen in pediatrics and of ages over 50. Impregnating Meropenam into PMMA beads has been shown to be effective in treating bacterial infections with easy handling of creating the beads (3). The addition of Meropenam is effective when used with bone cement as it ensures mechanical and antibacterial requirements (4). In conclusion, patient's left lower extremity was ultimately salvaged and treated with the use of Meropenem locally and through use of IV antibiotics without the need for amputation or a calcanectomy.

References

1. Varaiya AY, Dogra JD, Kulkarni MH, Bhalekar PN. Extended-spectrum beta-lactamase-producing Escherichia coli and Klebsiella pneumoniae in diabetic foot infections. Indian J Pathol Microbiol 2008;51:370-2
2. Lee, C., Su, L., Lin, W., Tang, Y. and Liu, J. (2010). Refractory vertebral osteomyelitis due to CTX-M-14-producing Escherichia coli at ertapenem treatment in a patient with a coexisting urinary tract infection caused by the same pathogen. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6117850/>.
3. Kubrusly, Fernando, et al. "Efficacy of Antibiotic-Impregnated Bone Cement Beads Against Organisms Found in Abdominal Vascular Graft Infections." Journal of Vascular Surgery, vol. 57, no. 5, 2013, doi:10.1016/j.jvs.2013.02.196.
4. Baleani, Massimiliano, et al. "Biological and Biomechanical Effects of Vancomycin and Meropenem in Acrylic Bone Cement." The Journal of Arthroplasty, vol. 23, no. 8, 2008, pp. 1232-1238., doi:10.1016/j.arth.2007.10.010.