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Candida Osteomyelitis of the Midfoot: A Case Report

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Abstract: *Candida albicans* has been regarded as a rare infecting organism to cause osteomyelitis. It is most commonly seen as an opportunistic pathogen in immunocompromised hosts. *Candida* osteomyelitis is most frequently a sequela of hematogenous dissemination during a period of candidemia. *Candida* osteomyelitis is a slow progressing, nonspecific, chronic infection that has a low complete response rate and a high relapsing rate in terms of treatment.

Key words: Osteomyelitis, *Candida albicans*

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Staphylococcus aureus is the most frequent infecting organism to cause osteomyelitis, while *Candida* is one of the least frequent infecting species to cause osteomyelitis [(1)]. The most common infecting candida organism to cause osteomyelitis is *Candida albicans* [(6)]. *Candida albicans* is a saprophytic microorganism that is ubiquitous in nature and can reside on hair or mucus membranes in healthy individuals. Osteomyelitis due to *Candida* and other fungal species is mainly seen in immunocompromised patients who are receiving broad-spectrum antibiotics or central parenteral nutrition [(2)]. Factors that increase the chances of candidemia include: intravenous drug use, indwelling arterial/venous catheters, diabetes mellitus, corticosteroids, myeloperoxidase deficiency, hospitalization and surgery [(2)].

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Candida osteomyelitis is most commonly a result of hematogenous dissemination but it can also be due to direct inoculation or contiguous infection [(4)]. When hematogenously disseminated, *Candida* may seed bone instantaneously or osteomyelitis may present as a late manifestation [(5)]. In most cases, the diagnosis of *Candida* osteomyelitis is delayed from one month up to a year [(3)]. Virtually any bone can be infected when candidemia is present, but the most commonly infected bones in adults are the lumbar vertebra, ribs and sternum [(4)]. Below, an unusual presentation of *Candida albicans* osteomyelitis in a patient's left midfoot is presented along with a review of the published literature concerning this topic.

Methods

A search of the literature was conducted in regards to *Candida* osteomyelitis until February 2017. References from the appropriate articles were also reviewed to find all reports and outcomes of *Candida* osteomyelitis in the literature.

Case Report

49-year-old female presented to the emergency department for left foot swelling, redness and pain that had been gradually worsening over the past couple of weeks. Injury or trauma to the left foot was denied. Patient's past medical history included: systemic lupus erythematosus, immunosuppression with cellcept, plaquenil and prednisone, hypertension, chronic kidney disease stage one, type two diabetes mellitus, obstructive sleep apnea, aortic regurgitation, hyperlipidemia, osteomyelitis, left ankle fracture, peripheral neuropathy, pedal amputation and pedal ulceration. Patient's systemic lupus erythematosus was treated with chemotherapy and steroids and she admitted to being in remission, but the patient developed steroid induced diabetes and subsequently developed peripheral neuropathy. Patient admits to collapse of both her feet about two years ago, which led to the development of a plantar ulceration on her left foot. She states that the ulceration healed uneventfully with conservative care and custom foot orthotics.

Upon examination, pulses were palpable and sensation was diminished bilaterally up to the ankles. Joint effusion was observed at the first tarsometatarsal joint on the left and edema was noted diffusely to the midfoot with overlying erythema and calor. On palpation, a fluctuant mass was felt overlying the first tarsometatarsal joint on the left. The first tarsometatarsal joint and medial column on the left were noted to be hypermobile on manipulation. With manipulation, diastasis between the left first tarsometatarsal joint could be palpated along with midfoot crepitus and instability. The left foot had a decreased medial arch when weight bearing and non-weight bearing. Cicatrix was noted to be overlying the distal aspect of the left fibula. Distal tuft amputation was noted to the right second digit.

The presumptive diagnosis for this patient was Charcot arthropathy but to rule out an infection, the patient's left first tarsometatarsal joint and overlying fluctuance were aspirated. Infectious disease initially started the patient on zosyn 3.375g IV q6h and vancomycin 1.5gm IV q12h while cultures from her joint aspiration were pending. The patient's inflammatory markers were elevated upon presentation (CRP 5.3 mg/dL and ESR 68 mm/hr) but her white blood cell count and vitals were within normal limits. Upon CT examination of the left foot, charcot changes including deformity, destruction and debris were noted at the first through third tarsometatarsal joints. Erosions at the base of the first metatarsal and medical cuneiform were found to be suspicious of osteomyelitis. Muliti-loculated fluid collections were noted to be surrounding the left first and second tarsometatarsal joints, tibialis anterior tendon and extensor hallucis longus tendon.

Three days after aspirating the patient's left first tarsometatarsal joint, the culture grew *candida albicans.* At this point, vancomycin and zosyn were discontinued and the patient was started on ceftaroline 600 mg IV q12h and fluconazole 400 mg PO q24h for six weeks by infectious disease. The patient was then scheduled for a left foot incision and drainage with bone biopsy and culture. Intraoperatively, the multi-loculated fluid that was seen on the CT was a lobulated soft tissue mass that was overlying the left first tarsometatarsal joint. Upon further dissection, the mass was noted to be stemming from the first tarsometatarsal joint and encompassing the tibialis anterior tendon and extensor hallucis longus tendon. The soft tissue mass and necrotic bone were sent to pathology and microbiology.

Post-operatively, conservative and surgical treatment options were discussed with the patient. The patient did not want a CROW boot for long term conservative care so limb salvage and charcot reconstruction of the left foot were discussed and decided upon. The patient was discharged from the hospital one day post-operatively and was instructed to follow-up out patient.

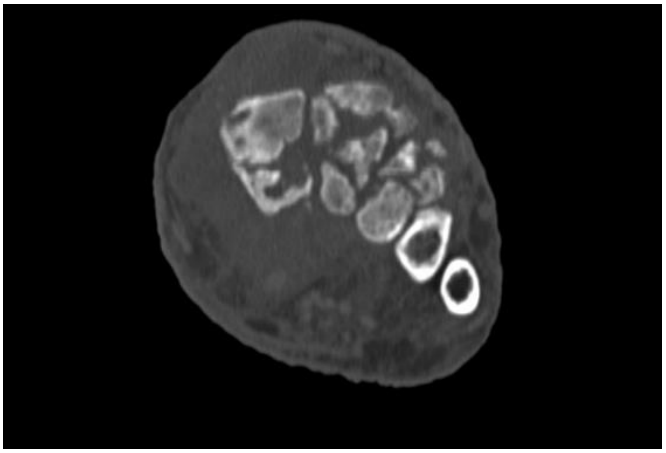

Figure 1. CT L foot without contrast demonstrating extensive deformity, destruction, dislocation and debris at the bases of the first through third metatarsals.

One month postoperatively, the patient followed up in the outpatient setting. The tissue and bone biopsy cultures obtained from her incision and drainage grew and confirmed *candida albicans*. The pathology of the soft tissue mass read as reactive synovitis and the pathology of the bone read as chronic and acute inflammation. She admitted to remaining non-weightbearing to the left lower extremity, following up with infectious disease and being compliant with her antibiotic and antifungal regime. The patient still desired surgical intervention to her left foot, so a charcot reconstruction consisting of a: left first and second tarsometatarsal joint arthrodesis and naviculocuneiform arthrodesis with application of an external fixator and gastrocnemius recession were decided upon.

Post-operatively, the patient completed the full course of her antibiotic and antifungal therapy. Repeat cultures that were obtained intraoperatively did not grow any bacteria or fungus. The patient remained in the external fixator for six weeks until proximal pin instability, pin site irritation and pain developed. Once the external fixator was removed, the patient was placed in a below knee cast for one week and is to remain in a CAM walker for another three weeks before transitioning into regular shoe gear.

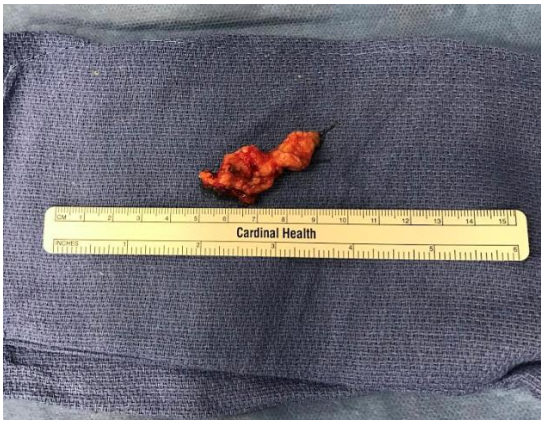

Figure 2. 4.0 x 2.0 x 1.0 cm soft tissue mass consisting of reactive synovitis was found to be stemming from the first tarsometatarsal joint and encompassing the extensor hallucis longus and tibialis anterior tendons.

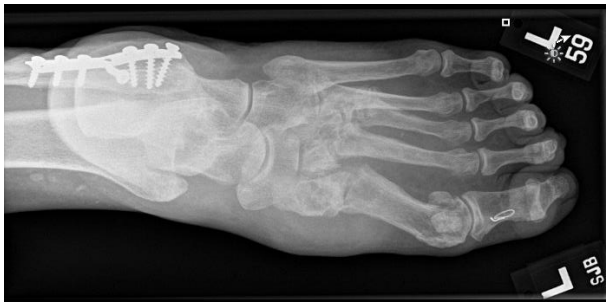

Figure 3. Preoperative radiograph of the left foot demonstrating erosions, deformity, debris, and dislocation at the first through third tarsometatarsal joints. Prior ORIF of a fibular fracture

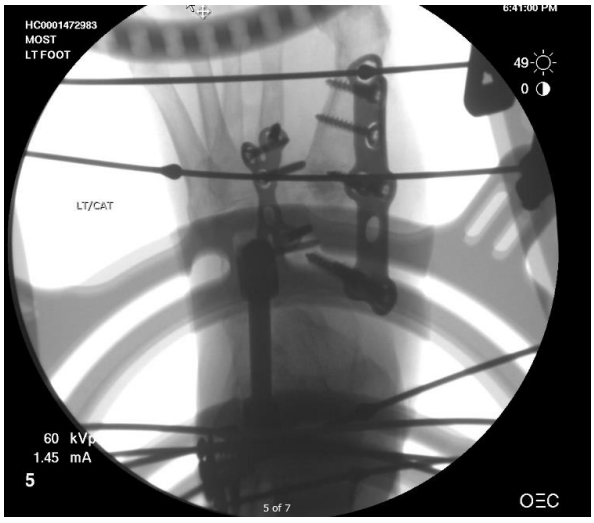

Figure 4. Postoperative radiograph of the left foot with a Salvation 3Di plate from Wright Medical along the medial column, a 2-hole Beta MAXLOCK Extreme plate from Wright medical and a 160 mm Salvation external fixator from Wright Medical

Discussion

The most common presenting symptom in patients with *Candida* osteomyelitis is local pain [5]. When patients at risk or with a past medical history of candidemia complain of bone pain, a thorough and prompt work up for osteomyelitis is warranted to improve potential outcomes [2]. A complete work up for osteomyelitis should include: laboratory evaluation, advanced imaging and an aspiration, culture or biopsy. Inflammatory markers in most patients with *Candida* osteomyelitis are moderately to minimally elevated while their white blood cell counts are mildly elevated [4]. Osteomyelitis on radiographs presents as lytic lesions, erosions, rarefaction or cortical destruction [5]. On MRI, osteomyelitis will have a decreseased signal intensity of T1-weighted images and an increased signal intensity of T2-weighted images. Due to the multifocal nature of *Candida* osteomyelitis, a radionuclide bone scan may be needed in addition to an MRI. Once the diagnosis has been made conservative or surgical treatment should be decided upon. When it comes to conservative treatment, *Cadida* osteomyelitis has been shown to be effectively treated with prolonged antifungal therapy alone in non complicated cases. Per the IDSA 2009 guidelines for *Candida* osteomyelitis, fluconazole 400 mg daily for 6-12 months or lipid formulation of amphotericin B, 3-5 mg/kg daily for several weeks followed by fluconazole for 6-12 months is recommended. In more complicated cases, surgical intervention, along with antifungal therapy, may be warranted for successful eradication, and structural stability [4].

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