

Arthroscopy of septic ankle and subtalar joints: A case report

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Infection of the ankle and subtalar joints is a serious and potentially debilitating condition. Of the few reported cases, results have varied. Traditionally open procedures have been performed, some of which even led to amputation. In the case presented, the authors demonstrate a successful result utilizing arthroscopic techniques in combination with intravenous antibiotic therapy. At two-year follow-up the patient has remained infection free.

Keywords: arthroscopy, infection, osteomyelitis, septic joint, pyarthrosis

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Joint sepsis is a severe condition with an annual incidence of 2-10 per 100,000 individuals per year [1]. Possible morbidity following joint sepsis includes chronic pain, irreversible joint damage, dysfunction, disability and a mortality rate in 11.5% of cases [2]). The prognosis is directly influenced by the promptness of the diagnosis and initiation of antibiotics [3]. Although administration of culture specific antibiotics with joint decompression are the cornerstones of treatment in a septic joint, debate in the literature exists between open versus arthroscopic approaches.

Larger, over smaller, joints seem to have a predilection, with the hip and knee constituting the majority (60%) of all septic joints [4]. Several risk factors are associated with the development of a septic joint: history of joint prostheses, rheumatoid arthritis, intravenous drug abuse, alcoholism, diabetes, previous intra-articular corticosteroid injection, immunosuppression therapy, among others [5].

Interestingly, the false perception is that pyarthrosis is overwhelmingly monoarthritic, as the literature

supports polyarticular sepsis 22% of the time [6]. Pyarthrosis has also been reported within the ankle [7,8], metatarsal-phalangeal joints [9], and interphalangeal joints [10]. The presence of joint sepsis in the subtalar joint is extremely rare, as only two other cases have been recorded in the medical literature [5,11]. To the authors' knowledge, the case presented is the only polyarticular septic arthritis report in which arthroscopic methods were utilized in successful treatment of the subtalar joint.

Case Study

A 68-year-old female presented to the author's clinic, in May 2016, for evaluation of a tender and swollen left foot and ankle. She reported 9 days prior to arrival, while living in her retirement home in Florida, she suffered a severe and sudden amount of pain to her left foot and ankle while attempting to stand. As a result of the pain, she then fell to the ground. She denied a history of trauma as the inciting event, as the pain occurred prior to her fall. Due to her inability to bear weight, the patient presented to an urgent care clinic, in which radiographs were noted

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to be negative for fracture. She was placed in a supportive ankle brace and was given non-steroidal anti-inflammatories. She states over the next several days it was difficult to bear weight while her ankle became more edematous. She states she was concerned about her condition and elected to drive back to her permanent residence. Seven days following her first episode of pain she stopped en route to Michigan at a major university hospital in Ohio due to increased pain during her travels. Standard repeat ankle radiographs were negative and she was started on an oral methylprednisolone course. A venous Doppler was negative for deep venous thrombosis.

Upon arrival in the office, the patient was non-diaphoretic, afebrile and in pain. Her past medical history was pertinent for rheumatoid arthritis, treated with bi-weekly injections of adalimumab. Physical examination revealed a mildly edematous foot and ankle, without calor or erythema. Neurovascular status was intact. Range of motion to her ankle and midtarsal joints was severely painful and limited. There was diffuse tenderness of her entire foot and ankle, with maximum tenderness to her lateral foot and posterior ankle. As a result, a lower extremity magnetic resonance image (MRI) was ordered for the patient.

Two days after her MRI, she reported a dramatic increase in pain and presented to her closest emergency department. The patient was afebrile, and her vitals and lab markers revealed no findings of sepsis or leukocytosis. The emergency department physicians' primary differential diagnosis was continued pain due to ankle sprain. She was discharged from the hospital and was sent directly to our office again as the MRI report was still pending. Upon review of the MRI the radiologist was unable to determine if the large joint effusions were infectious or aseptic due to lack of contrast in the imaging study (Figure 1). There were joint effusions and reactive synovium noted at the ankle, as well as the subtalar joint, with a large expansion noted at the posterior recess (Figure 2). As a result, a joint aspiration was performed from the anterior aspect of the ankle joint. Greater than 3 cc of yellow purulent material was aspirated and the patient was directly admitted to the hospital upon findings of a septic joint.

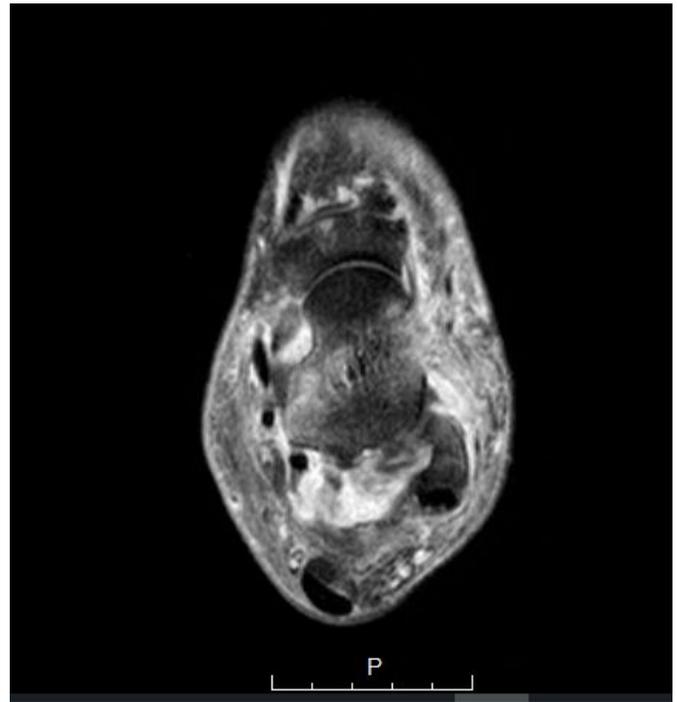


Figure 1 Axial MRI T2 weighted image displaying posterior abscess.



Figure 2 Sagittal MRI image which displays reactive bone marrow edema consistent with early osteomyelitis, large posterior fluid collection adjacent to subtalar and ankle joint consistent with abscess.

Upon arrival at the hospital, broad spectrum antibiotics were initiated with previous cultures pending. Infectious disease was consulted for management of antibiotics. Pertinent laboratory findings revealed a white blood count (WBC) of 9,300 WBC/mcL, a C-reactive protein (CRP) of 11.1 mg/L, and an erythrocyte sedimentation rate (ESR) of 47

mm/hr. Except for a small abrasion to her index finger two weeks prior, the patient did not have any other portals of infection. Blood cultures were taken upon presentation and were negative. Due to the patient's immunosuppression on adalimumab, the medication was stopped indefinitely as this was thought to have predisposed the patient to the infection. She was taken to the operating room the next day for an arthroscopic debridement of the septic joints.

Initial Surgery

After general anesthesia was administered, a well-padded thigh tourniquet was placed. The ipsilateral thigh was placed in a thigh holder and the limb was held in a gravity dependent position. The limb was prepped, draped, and the tourniquet was inflated to 325 mmHg. The subtalar joint was first approached with aspiration to confirm the presence of joint sepsis in this location. An 18-gauge needle was placed on a leur-locked syringe, and the subtalar joint was first accessed for aspiration. The subtalar joint was approached from the sinus tarsi, upon which purulent fluid was aspirated (Figure 3). We traced the distal aspect of the fibula posteriorly, and the 18-gauge needle was placed from posterior to anterior just lateral to the Achilles tendon. Approximately 5 mL of purulent fluid was extracted from the posterior recess of the subtalar joint. Arthroscopic portals were then established, two to the lateral hindfoot at the level of the sinus tarsi, with a third at the posterior recess for an auxiliary suction portal. Upon initial evaluation, the joint was cloudy with purulent material. The joint had elements of infected synovium which was debrided. After establishing a view of the interosseous ligament, the debridement then continued from anterior to posterior and into the posterior facet. There was noted to be loose and degraded cartilage, which exposed the underlying subchondral bone. All loose material was debrided, and the subchondral bone was noted to be firm without obvious signs of infection. After a thorough debridement, 3 liters of fluid was used for irrigation until the joint fluid appeared translucent.

Attention was then directed to the ankle joint for arthroscopy. Anteromedial and anterolateral portals

were established and a standard 21-point examination ensued.



Figure 3 Subtalar joint aspiration with purulence; the accessory portal during arthroscopic irrigation and debridement placed in the same posterior recess.

The joint fluid was initially cloudy, with a lesser degree of loose bodies as the subtalar joint. The ankle cartilage was largely intact, and less irrigation was needed than the subtalar joint to establish a lucent joint and a clear picture with the arthroscopic equipment. Following the thorough irrigation, debridement, and removal of infected synovium, all equipment was removed from the ankle. The portals from the subtalar and ankle joints were left open to allow for joint decompressions and continue to drain.

On postoperative day one, the patient reported an immediate reduction in pain and no postoperative events recorded. The patient remained improved on post-operative day two as well. Culture results from the initial aspiration yielded a Methicillin-resistant *Staphylococcus aureus* (MRSA) pathogen which was sensitive to vancomycin. She reported a mild increase in pain on postoperative day three and as a result a repeat MRI was ordered with and without contrast to further scrutinize the septic joints. There was noted contrast enhancement of the synovium of the ankle and subtalar joints was noted with joint effusion, with new findings of marrow edema and contrast enhancement of the joint surfaces of the subtalar and ankle joints indicative of acute osteomyelitis. Following a lengthy discussion with the patient regarding possible limb salvage potential with

a conversation regarding further arthroscopic versus an open approach, the patient agreed to a second arthroscopic approach to her ankle and subtalar joints.

Second Surgery

The subtalar joint was again approached first with an attempted aspiration. No fluid or purulence was able to be extracted from the sinus tarsi nor the posterior recess of the joint. Arthroscopic equipment was re-introduced in the similar approach, with the posterior drainage portal established as well. There was continued loose cartilage and infected synovium, and an aggressive debridement was performed to the joint. Following copious irrigation, the equipment was removed and the ankle was inspected as well. The joint fluid remained relatively clear, and the cartilage was intact. Following an aggressive synovectomy and irrigation all instrumentation was removed. The portals were again left open to decompress the joint.

Recovery

The patient recovered well following the second arthroscopic procedure, and was prescribed a 6-week course of intravenous vancomycin. Two days following the second procedure, the patient was discharged home with a peripherally inserted central catheter (PICC) line for continued antibiotic administration. Inflammatory lab markers were followed on a weekly basis. Four weeks after discharge, her CRP and ESR normalized and did not re-elevate following her course of antibiotics. Her skin incisions healed without complications by three weeks succeeding the second surgery.

The patient was gradually able to increase her weight bearing status, first with a fixed walking boot for 4 weeks following her hospitalization, and transitioning to an ankle brace thereafter. The patient was sent for extensive physical therapy to aid in her recovery back to full weight bearing. She was eventually able to forego any bracing or assistance 6 months following her hospitalizations with mild pain which was treated with oral NSAIDs. Upon most recent follow-up at fourteen months, she was able to return to all pre-injury activities. No continued signs of infection were noted on clinical exam.

Discussion

The subtalar joint is a highly complex articulation of the talus and calcaneus. There are usually three distinct facets (anterior, middle, posterior) which may differ in the context of a tarsal coalition. There is a degree of variability in the ligamentous contents and joint capsular attachments as well. Arthroscopic evaluation of the subtalar joint remains a lesser utilized procedure, likely due to the complexity of the joint and the relatively small surface area which may be difficult for an unfamiliar arthroscopist to visualize.

To the authors' knowledge, no other cases have been reported in the literature in the successful arthroscopic treatment of a septic subtalar joint. Two other cases were identified in the literature but utilized an open approach in combination with antibiotic therapy. A Danish report displayed an isolated septic subtalar joint caused by *Neisseria gonorrhoeae* [5]. A second, more recent case study depicted an open approach to an infection caused by *Mycoplasma hominis* [12]. In both cases the infection was rapidly identified, treated, and the patients recovered fully. In the present case, two major risk factors were identified which likely predisposed the patient to her septic joint: rheumatoid arthritis and concomitant immunosuppression therapy. Patients with RA are more likely to develop joint sepsis both due to the disease process itself and due to the immunosuppressive therapy that they receive. Dissimilar to the previous reports is the fact that the patient was successfully treated with an arthroscopic approach, which did not require an open method with antibiotics, to cure the infection.

A joint aspiration of a joint is considered the gold standard in diagnosis of a septic joint, and should be performed with a low threshold when pyarthrosis is considered as a differential diagnosis. Once the diagnosis has been confirmed, rapid initiation of antibiotics should be employed. Arthroscopic and open approaches are useful tools in the irrigation and debridement of the septic joint. Advantages are inherent to an arthroscopic versus open approach: decreased soft tissue damage, which may lead to a shorter hospital stay, possible overall faster patient recovery. Repeat open versus arthroscopic lavage and debridement may be required until the infection has

been controlled. This especially holds true when there has been a delay in the diagnosis and initiation of antibiotics from time of initial presentation, such as the case presented.

Conclusion

Due to the proximity of the ankle and subtalar joint, which share a capsular connection, the authors advocate that the subtalar joint may be affected more commonly than previously thought when a septic ankle is encountered. Prognosis of a septic ankle shows probable infection of the subtalar joint, causing a septic subtalar joint. The pyarthrosis of the septic ankle can be polyarthritic [6]. The infection can spread from the septic ankle to the subtalar joint through the sinus tarsi, causing infection of the subtalar joint. Performing a procedure to prevent infection transmission through the sinus tarsi may hinder the ease of the infection to spread; the procedure would counteract the close proximity of the ankle and subtalar joints, preventing a monoarthritis diagnosis from developing into a polyarthritic case.

Given the case encountered, an arthroscopic approach may be beneficial over an open approach when a septic subtalar joint is encountered. An arthroscopic approach is less invasive, leading to a less cumbersome recovery and quicker recovery time for the patient. Arthroscopic aspiration of purulent fluid is more effective in comparison to an open approach. A late diagnosis of a septic subtalar joint is more effectively combated by an arthroscopic approach, as multiple open lavages and debridements are required to accomplish what could be completed by a single arthroscopic approach. Although the literature does not have copious studies regarding open irrigation vs. arthroscopic irrigation, when comparing both methods used during treatment of acute native knee septic arthritis, 71% of the open treatment group required repeat irrigation compared to 50% in the arthroscopic treatment group [12]. Lowered chance of repeated irrigation serves as an assuring factor that an arthroscopic approach would withhold the need of multiple joint irrigations, leading to a quickened overall patient recovery.

The septic subtalar joint cases described in the literature used a combination of an arthroscopic and open procedure to eradicate infection. This is the first

described case of a 68-year-old patient with a septic ankle and subtalar joint that was successfully treated with an arthroscopic approach alone. Open procedures are not necessary for proper treatment of septic arthritis. An open procedure combined with antibiotic therapy will likely lead to a more arduous path for patient recovery. Although up to physician preference, research is spreading the belief that arthroscopic procedures are less invasive and more efficient for patient recovery.

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