



Case Report

Chronic Ankle Osteomyelitis Complicated by *Robinsoniella peoriensis* Infection

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Abstract

We report a case of a 65-year-old male patient who underwent multiple surgeries following a ground level fall while barefoot outside. *Robinsoniella peoreinsis* was detected in bone and tissue samples from the left tibia and talus. The bacterium was ultimately confirmed through Mayo Medical Laboratories and 16S ribosomal RNA sequencing.

Keywords: *Robinsoniella peoriensis*; *Robinsoniella*; *Osteomyelitis*; *Anaerobic Gram-Positive Bacilli*; *16S Ribosomal RNA Sequencing*.

Introduction

Robinsoniella peoriensis is a gram-positive, anaerobic spore forming bacterium initially discovered in 2009 in the feces of swine and turtles, and most recently in the gut of human neonates [1]. To date, there have been 12 cases of *R. peoriensis* causing a variety of infections in humans, including bloodstream, intraabdominal, osteomyelitis, soft tissue and prosthetic joint infections [1-4]. Its pathogenicity and epidemiology are still not completely understood. We report a case of chronic osteomyelitis caused by *R. peoriensis*. We hope to highlight the importance of clinical detection of anaerobic pathogens to prevent delayed treatment.

Case Report

A 65-year-old male with a history of non-insulin dependent diabetes mellitus type 2, hypertension, and stroke experienced a

mechanical ground level fall while barefoot outside. He sustained a left open ankle fracture in December 2021 requiring irrigation and debridement (I&D) with closure and reduction. His postoperative course was complicated by repeat surgical washouts and rotational sural flap coverage. Initial intraoperative tissue cultures grew *Enterococcus cloacae* and *Enterococcus casseliflavus* and he was treated with meropenem and then de-escalated to oral trimethoprim/sulfamethaxole and amoxicillin-clavulanate to complete a 6-week antibiotic course. Four months later, he was readmitted for a surgical site infection and underwent repeat I&D with hardware removal. His intraoperative tissue cultures isolated both mold and yeast species (*Scedosporium apiospermum* and *Candida parapsilosis*) which was treated with oral isavuconazonium sulfate for 5 months. In November 2022, he developed blisters and erythema around the edge of his skin graft over his left ankle. He was seen in the infectious diseases (ID) clinic as an outpatient in December 2022 and prescribed oral doxycycline for a superficial skin infection. His left ankle x-ray showed decreased soft tissue thickness compared to previous x-rays. He did not see much

improvement following a two-week course of doxycycline as well as topical Puracyn wound cleanser twice a day. He returned to the ID clinic and presented without fever, chills, malaise, worsening pain, erythema, or lower extremity swelling. His labs (WBC, ESR, and CRP) were unremarkable. Repeat x-rays showed soft tissue swelling with concern for a hematoma or infection. Subsequent MRI confirmed multiple soft tissue ulcerations overlying the medial malleolus with underlying sinus tracts with multiple soft tissue abscesses along the anterior and medial aspect of the ankle joint (3.5 x 1.7 x 4.5 cm) in addition to periostitis and osteomyelitis of the distal tibia (seen in Figure 1). Given the concern for recurrence of infection, he was admitted in January 2023 for a repeat surgical washout. Intraoperative findings noted multiple osteo-cutaneous fistulas moving through distal/medial aspect of flap and distal tibia/proximal talar sequestrum. External fixation was placed and intraoperative tissue cultures grew anaerobic gram-positive bacilli. Since he was hemodynamically stable, and the infection was chronic, antibiotic coverage was only initiated after bacterial sequencing was performed. *Robinsoniella peoriensis* was isolated in both bone and tissue samples. His samples were then sent to Mayo Medical Laboratories to confirm the diagnosis using 16S ribosomal RNA sequencing and to provide in vitro susceptibilities. In vitro susceptibilities demonstrated sensitivity to ertapenem, piperacillin/tazobactam, and metronidazole. The isolate was resistant to clindamycin and penicillin. The patient was eventually transitioned to oral metronidazole for a prolonged course of antibiotic therapy. He tolerated the antibiotic and saw clinical improvement. Unfortunately, the patient was re-admitted six weeks later with fever and purulent drainage around the pins of his external fixator and found to have methicillin resistant *Staphylococcus aureus* (MRSA) bacteremia. He was taken back to the operating room for an I&D of his left lower extremity. All intraoperative left tibia tissue cultures were significant for MRSA. There were no other organisms present. Therefore, the metronidazole was discontinued at that time.

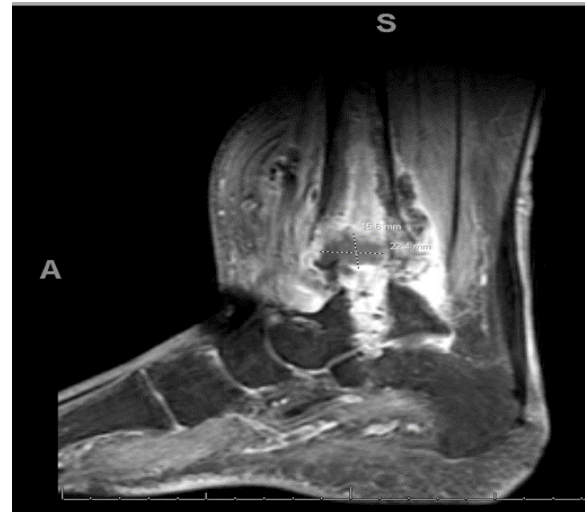


Figure 1: MRI of left ankle.

Discussion

This case highlights a rare and unusual anaerobic pathogen (*Robinsoniella peoriensis*) as the cause of chronic osteomyelitis secondary to an exposed open fracture requiring multiple surgical procedures. *R. peoriensis* was initially identified biochemically and genetically in 2009 by Cotta et al and subsequently by advanced molecular techniques such as 16S rRNA gene sequencing [1]. *Robinsoniella* has been identified as the causative pathogen in a variety of human infections. It has been isolated from intestinal flora of animals (turtles, porpoises, mice) and humans (including healthy premature neonates), as well as environmentally in the soil and swine manure [5-6]. This patient's medical history is notable for well-controlled diabetes on farxiga. While on his farm in rural South Carolina, he slid barefoot down an embankment resulting in an open ankle fracture with soil contamination. He reported no domestic livestock on his farm, but had wild deer and chickens on

his neighbors' property ~100 yards away. He denied any recent hunting trips, or exposure to pigs including wild boars. The patient reported his son owned a horse that would visit their property and provide them manure for filling up holes and plant fertilization. We suspect that *R. peoriensis* was introduced into our patient directly when his mechanical fall occurred in December 2021, however it was not recognized as the causative agent for his impaired wound healing until many months later. Typically, this pathogen is resistant to penicillin and clindamycin and the preferred treatment is with either metronidazole or carbapenems. This may explain why the patient temporarily improved with meropenem prior to the initial isolation of this pathogen, but subsequently relapsed after transitioning to oral amoxicillin-clavulanic acid. The isolation of *Robinsoniella* in both the patient's bone and tissue samples one year after initial accident explains his complicated postoperative course. Based on available literature for review and microbiological susceptibilities, he was placed on six weeks of oral metronidazole with both clinical and radiographic response [7-12].

Conclusion

Chronic osteomyelitis is often caused by gram-positive organisms via direct trauma or contiguous spread. We reported a case of severe soft tissue infection with chronic osteomyelitis due to *Robinsoniella peoriensis*. As noted, this patient experienced a prolonged course of infection starting from the initial injury that was complicated by multiple bacterial and fungal organisms causing delayed healing, resulting in numerous debridement procedures, and requiring many months of different antimicrobial agents. On follow up in the ID clinic, the patient was clinically stable with normal laboratory findings. Despite this, a high clinical suspicion for recurrent infection prompted an outpatient MRI, which ultimately led to additional debridement and microbiologic isolation of *R. peoriensis*. This case underscores the importance of maintaining a high clinical suspicion for alternative organisms by evaluating conditions in the patient's medical history and potential environmental exposures that may predispose them to rare pathogenic organisms. In this case, the patient's diabetes was well controlled, and he did not have any direct domestic farm animal exposures. However, it is possible that there was soil contamination allowing for bacterial entry following his mechanical fall. This pathogen is difficult to identify in microbiology labs and may require additional molecular techniques that may not be readily available at most institutions, as such, delayed identification can result in prolonged infection. This case highlights the need for earlier detection and further understanding of the transmission and consequences of *Robinsoniella peoriensis* infection in immunocompetent individuals.

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Conflict of Interest: The authors whose names are listed on this publication certify that they have no affiliations or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript. They also certify all information presented is their own opinion and not of their employers.

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