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Case Report

Streptococcus lutetiensis as a cause of calcaneal osteomyelitis, an unusual etiology: a case report

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Abstract

Streptococcus bovis is a well-known cause of endocarditis and joint infections, but is not commonly known as a cause of osteomyelitis. A patient with suspected calcaneus osteomyelitis was evaluated via magnetic resonance imaging and laboratory studies. Debridement was performed, and the result was chronic osteomyelitis caused by *Streptococcus bovis (lutetiensis)*, according to microbiological culture and pathology studies. A literature review of this microorganism as a cause of osteomyelitis has been conducted. Confirmation of a case of chronic osteomyelitis of the calcaneus caused by *Streptococcus lutetiensis* at approximately four months of evolution from the initial symptomatology was obtained, and patient was treated with surgery and antibiotics, resulting in resolution of the infection process. The American Orthopaedic Foot and Ankle Society (AOFAS) score improved from a preoperative value of 33 to 89 at six months after surgery. Osteomyelitis caused by *Streptococcus bovis* is a rare condition, and even less common in the *Streptococcus lutetiensis* subgroup.

Level of evidence IV; Therapeutic studies - investigating the results of treatment.

Keywords: Osteomyelitis; Streptococcus bovis; Calcaneus.

Introduction

Streptococcus bovis is a group of gram-positive bacteria strains associated with infections in animals and humans. The most frequently associated conditions are endocarditis, meningitis, septicemia, urinary and biliary tract infections, and, to a lesser extent, osteoarticular infections (including septic arthritis, spondylodiscitis, and osteomyelitis)[1].

This group of bacteria (*Streptococcus bovis/equinus*) has been reclassified based on phenotypic and genotypic differences as follows: a) *Streptococcus gallolyticus* subsp. *gallolyticus*, which was formerly known as *S. bovis* biotype I; b) *Streptococcus lutetiensis*, which was renamed from the previously known *S. infantarius* subsp. *coli,* which corresponded to biotype II; and finally, c) *Streptococcus gallolyticus* subsp. *pasteurianus*, which was previously known as biotype II/2.

The new classification is relevant because of the association between bacteremia/endocarditis and the presence of digestive tract cancer, which is subspecies-selective[2].

This microorganism can be identified in 10%-50% of patients with colon carcinoma[3].

In relation to osteomyelitis, the most frequent presentation is in the lumbosacral, cervical, dorsal, and iliac locations, in which symptoms may vary by an average of two months prior to diagnosis, with pain being the most frequently reported symptom[1].

Study performed at the Hospital Zambrano Hellion, Nuevo León, México.

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Case description

A healthy 65-year-old male with no known diseases frequently presented with oral cavity and gum infections, as confirmed by his sisters and father, which were reported as "aggressive" by patient. These infections caused the loss of most of the patient's teeth despite the treatments offered. Last dental extraction procedure was performed in August 2023, with good outcomes after the procedure.

In October 2023, patient went to his first contact physician complaining of swelling and pain in his left leg and foot, without previous trauma. Venous thrombosis was ruled out, and patient was referred to orthopedics. In his first evaluation at another institution, in November 2023, the main complaint was mild, diffuse pain in the left rearfoot during daily activities, self-medicated with non-steroidal anti-inflammatory drugs (NSAIDs). Patient's initial radiographs (Figures 1, 2, and 3) revealed mild subtalar and talonavicular arthrosis, marginal osteophytes, and increased volume of the soft tissues. The attending physician requested various laboratory studies and a magnetic resonance imaging (MRI) scan; however, patient preferred to be seen by another doctor and, initially, did not undergo the requested tests.

In January 2024, patient came to us for a second consultation, still presenting with swelling and pain in his left foot and ankle. On physical examination, patient experienced erythema and increased local temperature in the midfoot and ankle, increased pain in the medial ankle over the deltoid ligament and posterior tibial tendon, considerably increased soft tissue volume, positive fovea sign at the dorsum of midfoot and anterior aspect of the distal tibia, and diminished ankle range of motion due to pain. No bruises or scars were observed. Preoperative American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot score was 33.

Figure 1. Foot radiograph on weight-bearing, dorso-plantar view. Generalized decrease in bone density. Loss of definition of the margins of the talus, suggesting focal osteopenia. No evidence of fracture. Marginal osteophytes. Increased soft tissue volume.

Figure 2. Foot radiograph on oblique view. Generalized decrease in bone density. Loss of definition of the margins of the talus, suggesting focal osteopenia. No evidence of fracture. Marginal osteophytes. Increased soft tissue volume.

Figure 3. Foot radiograph on weight-bearing, lateral view. Generalized decrease in bone density. Loss of definition of the margins of the talus, suggesting focal osteopenia. No evidence of fracture. Marginal osteophytes. Increased soft tissue volume.

Blood tests and MRI scans were requested, and the following results were obtained: Hemoglobin: 7.94 mmol/L; Platelets: 466 x 10^9/L; Leukocytes: 7.77.7 x 10^9/L; Erythrocyte sedimentation rate: 50 mm/h; Ultra-sensitive C-reactive protein: 88.4 mg/L; Procalcitonin: 0.00006 mg/L; Glucose: 5.17 mmol/L; Albumin: 34 g/L; Lactate Dehydrogenase: 5.16 μkat/L.

At MRI, navicular bone showed increased signal intensity, more evident post-gadolinium, with erosion of its posterior margin, suggesting osteolysis. Talus bone exhibited increased signal intensity, more prominent post-gadolinium, with erosion of its anterior and inferior margins, suggesting osteolysis. Calcaneus bone displayed increased signal intensity, more evident post-gadolinium, with erosion of its superior margin at the sinus tarsi, suggesting osteolysis, as detected via T2-weighted MRI (Figures 4, 5, and 6).

Poorly defined inflammatory phlegmon adjacent to the superior and medial margins of the calcaneus, behind the long flexor tendon of the big toe, was identified, accompanied by marked inflammatory changes and edema of the soft tissues in the hindfoot, with thickening of the overlying skin and without evidence of gas. The presence of apparent abscesses in the calcaneus (Figures 7 and 8) and bone edema at talus, which is compatible with rearfoot osteomyelitis of apparent focus int he calcaneus, was further observed in comparative T1 and T2 images.

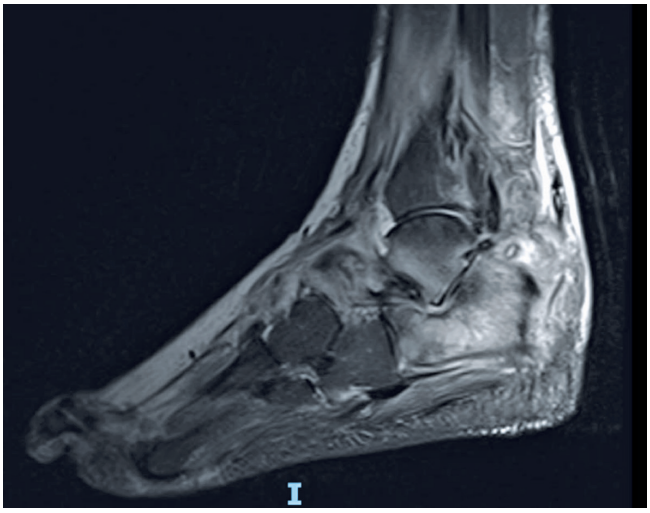

Figure 5. Mid-sagittal view magnetic resonance imaging scan. Navicular bone showing increased signal intensity, more evident post-gadolinium, with erosion of its posterior margin, suggesting osteolysis. Talus bone exhibiting increased signal intensity, more prominent post-gadolinium, with erosion of its anterior and inferior margins, suggesting osteolysis. Calcaneus bone displaying increased signal intensity, more evident post-gadolinium.

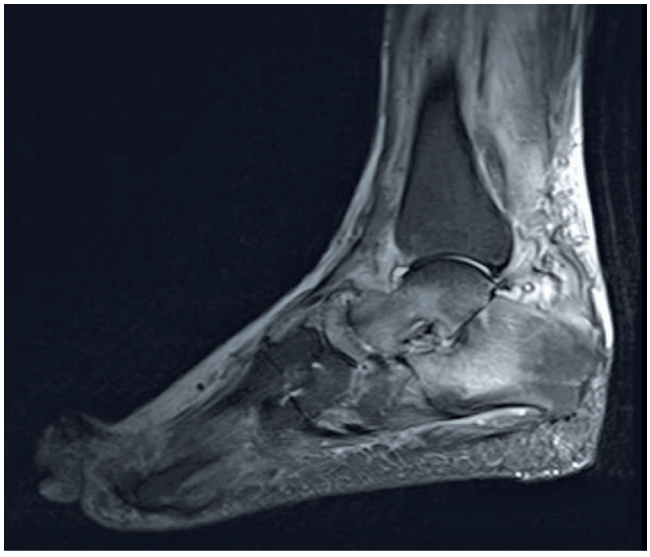

Figure 4. Mid-sagittal view magnetic resonance imaging scan. Navicular bone showing increased signal intensity, more evident post-gadolinium, with erosion of its posterior margin, suggesting osteolysis. Talus bone exhibiting increased signal intensity, more prominent post-gadolinium, with erosion of its anterior and inferior margins, suggesting osteolysis. Calcaneus bone displaying increased signal intensity, more evident post-gadolinium, with erosion of its superior margin at the sinus tarsi, suggesting osteolysis.

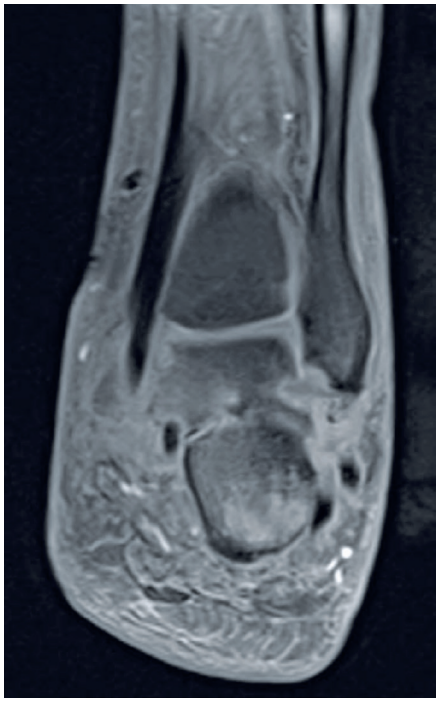

Figure 6. Coronal view magnetic resonance imaging scan. Talus bone exhibiting increased signal intensity, more prominent post-gadolinium, suggesting osteolysis. Calcaneus bone displaying increased signal intensity, more evident post-gadolinium, with erosion of its superior margin at the sinus tarsi, suggesting osteolysis.

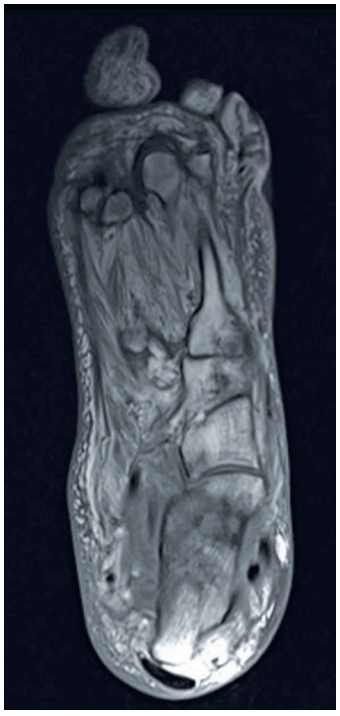

Figure 7. Axial view magnetic resonance imaging scan. Comparative T1 and T2 images, as well as the presence of apparent abscesses in the calcaneus.

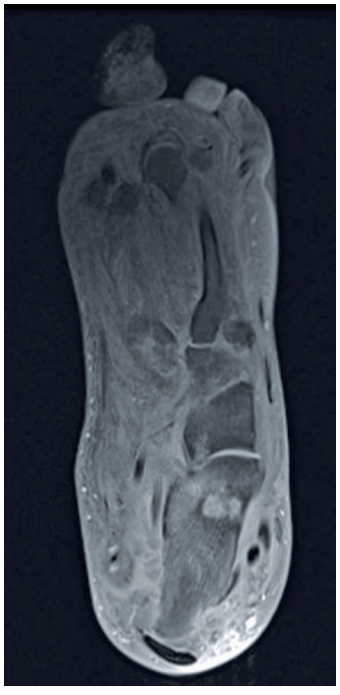

Figure 8. Axial view magnetic resonance imaging scan. Comparative T1 and T2 images, as well as the presence of apparent abscesses in the calcaneus.

Two days after hospital admission, patient was taken to the operating room for bone curettage and debridement of the calcaneus, along with biopsy and collection of bone tissue samples for culture through a direct lateral approach at the level of the anterior process of the calcaneus (sinus tarsi approach). A focus of osteomyelitis was identified due to changes in the consistency and coloration of the bone (necrotic bone and small purulent discharge) using fluoroscopic control. Curettage and irrigation of the area with sterile saline were performed. This was supplemented with a plantar-medial approach along the course of the posterior tibial tendon for exploration of the area due to local symptoms, revealing the posterior tibial tendon and flexor hallucis longus in good condition, with no signs of collections or infectious processes in this region. Irrigation was conducted and closure of this approach proceeded. The lateral approach was partially closed and prepared for placement of a negative pressure wound therapy (NPWT) system to temporarily manage the infection. Vacuum settings were adjusted at -125 mmHg (standard protocol).

Patient was initially treated with intravenous (IV) cefuroxime (750 mg every 8 hours) by an infectious disease specialist. After four days, the result of the calcaneal culture was obtained, and the growth of *Streptococcus lutetiensis* was reported. The antibiogram approved by the Clinical & Laboratory Standards Institute (CLSI) is shown in Table 1.

Given this result, antibiotic therapy was adjusted to IV ceftriaxone 1 g every 12 hours.

Seven days post-initial curettage, patient was re-evaluated in the operating room for removal of the NPWT system. Examination revealed improved local conditions of the calcaneus: improvement in the consistency of the surrounding cancellous bone around the initial infectious focus, presence of bone with active bleeding, absence of purulent material, and soft tissues demonstrating the presence of granulation tissue. A new irrigation procedure was performed, and a bone sample was obtained for control culture. The bone cavity resulting from curettage was then filled with calcium sulfate beads in combination with ceftriaxone powder. Finally, surgical incision was closed and covered with an ambulatory NPWT system.

Seven days after the first surgical procedure, result of the pathological biopsy was obtained, revealing presence of necrotic trabecular bone fragments and fibrous connective

Table 1. Antibiogram (calcaneal culture)

Antibiotic	MIC (mcg/ml)	Susceptibility
Amoxicillin	**≤ 0.25**	Susceptible
Clindamycin	**≤ 2**	Intermediate
Cefotaxime	**≤ 0.5**	Susceptible
Cefepime	> 2	Resistant
Penicillin	0.0625	Susceptible
Vancomicyn	**≤ 0.5**	Susceptible

MIC: Minimum inhibitory concentration.

tissue exhibiting dense inflammation and abscess formation. The inflammatory infiltrate consists of neutrophils, plasma cells, and lymphocytes. Negative for malignancy in relation to the presence of chronic osteomyelitis.

Given these advances and results, hospital discharge was decided. Management with amoxicillin 1 g orally every 8 hours was indicated, as well as daptomycin 400 mg orally every 24 hours for three weeks, initially; however, during follow-up with the infectious disease specialist, it was decided to extend antibiotic therapy to four weeks in total and that a new ultra-sensitive C-reactive protein test should be performed.

During the period of antibiotic management, patient reported considerable improvement in edema and pain and better function, without requiring assistance to ambulate or perform daily activities.

An ultra-sensitive C-reactive protein detection test was performed six weeks after antibiotic therapy was finished, and normal parameters were reported (3.2 mg/L).

As a complementary measure, a control colonoscopy was indicated considering the age and presence of the causal pathogen of osteomyelitis and its relationship with carcinomas of the digestive tract. No alterations or lesions suggestive of digestive tract cancer were reported.

The AOFAS score at six months was 89. Patient lost follow-up for living in another city.

Discussion

Osteoarticular infections caused by *Streptococcus bovis* are very infrequent, and the importance of their treatment is not only due to the identification of the specific causal microorganism but also due to its frequent association with digestive tract cancer (in up to 67% of cases)[4]. There is a high correlation between these subgroups and colon cancer or the presence of endocarditis[2], which is why the treatment does not focus only on osteomyelitis itself but also on the complete assessment of the patient. Sometimes, osteoarticular infections can be accompanied by infection at other sites without production of symptoms that would allow early management to be initiated.

With respect to the presentation of this group of pathogens, most musculoskeletal infections are related to spondylodiscitis, followed by joint infections either in native joints or with a history of prosthesis. Typically, this kind of infection is correlated with some type of cancer, most frequently in the digestive tract[2].

An interesting finding in our study is the identification of an association between biotype II of the *S. bovis* group (*S. lutetiensis*) and bacteremia with endocarditis in 18% of cases, as well as bacteremia with colon cancer in 17% of cases. Given this correlation, our case was performed through a multidisciplinary approach to rule out these conditions, which can often go undetected.

In summary, calcaneal osteomyelitis is exceedingly rare, particularly when caused by this microorganism. As few symptoms are presented, it leads to a chronic evolution of the infection; consequently, the treatment typically requires a combination of surgery and antibiotic therapy. An interesting aspect of this pathogen is its high sensitivity to antibiotics, as most cases can be treated with beta-lactams[5,6] and up to 50% of cases respond to management within less than six weeks, with a very low recurrence rate. However, once this microorganism is confirmed, it is essential to conduct additional complementary studies across various specialties due to its strong association with gastrointestinal cancer, where long-term follow-up is critical for achieving early-stage detection.

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References

1. García-País MJ, Rabuñal R, Armesto V, López-Reboiro M, García-Garrote F, Coira A, et al. Streptococcus bovis septic arthritis and osteomyelitis: a report of 21 cases and a literature review. Semin Arthritis Rheum. 2016;45(6):738-46.
2. Campo-Moreno RD. [Is it necessary to identify the isolates of the Streptococcus bovis group correctly at subspecies level?] Enferm Infecc Microbiol Clín. 2012;30(4):173-4. Spanish
3. Robbins N, Wisoff HS, Klein RS. Case report: vertebral osteomyelitis caused by streptococcus bovis. Am J Med Sci. 1986;291(2):128-9.
4. Klein RS, Recco RA, Catalano MT, Edberg SC, Casey JI, Steigbigel NH. Association of *Streptococcus bovis* with carcinoma of the colon. N Engl J Med. 1977;297(15):800-2.
5. Romero-Hernández B, del Campo R, Cantón R. Streptococcus bovis, situación taxonómica, relevancia clínica y sensibilidad antimicrobiana. Enferm Infecc Microbiol Clín. 2013;31(Suppl 1):14-9.
6. Pompilio A, Di Bonaventura G, Gherardi G. An Overview on *Streptococcus bovis/Streptococcus equinus* Complex Isolates: Identification to the Species/Subspecies Level and Antibiotic Resistance. Int J Mol Sci. 2019;20(3):480.