

Septic knee arthritis caused by *Streptococcus agalactiae*

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Abstract

We present the case of a 40-year-old patient from the Marrakech region who suffered a traumatic injury to the left lower limb in 2024. The injury led to a femoral shaft fracture treated with intramedullary nailing and a tibial plateau fracture treated with plate osteosynthesis. The patient subsequently developed a septic knee arthritis caused by *Streptococcus agalactiae* one year post-surgery. The patient was admitted to the emergency department with acute knee swelling, severe pain, and functional impairment. Joint aspiration revealed purulent fluid, and microbiological analysis confirmed the presence of *Streptococcus agalactiae*. The patient was treated with intravenous amoxicillin-clavulanate, and surgery for material removal and joint lavage was performed. This case underscores the importance of early diagnosis and treatment of joint infections following orthopedic surgery.

Keywords: Septic arthritis; *Streptococcus agalactiae*; Knee joint; Infection

1. Introduction

Septic arthritis is a severe infection of a joint, often resulting from hematogenous spread or following trauma or surgery. While *Streptococcus agalactiae* (Group B Streptococcus, GBS) is typically associated with neonatal infections, it can also cause infections in adults, particularly in patients with predisposing factors such as recent orthopedic surgery. Septic arthritis caused by GBS is rare but can lead to significant morbidity if not promptly diagnosed and treated. This case report discusses a patient who developed septic arthritis of the knee due to *S. agalactiae* following orthopedic surgery for complex fractures of the lower limb.

2. Case Report

A 40-year-old male patient, originally from the Marrakech region, without significant pathological history, was admitted in 2024 following a traumatic injury to his left lower limb. He sustained a femoral shaft fracture treated with intramedullary nailing and a tibial plateau fracture treated with plate osteosynthesis. One year post-surgery, the patient presented to the emergency department with sudden-onset knee swelling, severe spontaneous pain, and nocturnal pain exacerbated by the slightest movement. He was unable to walk or actively move the joint, exhibiting nearly complete functional impairment.

On clinical examination, the patient was alert, febrile, and hemodynamically and respiratory stable. His knee was swollen, erythematous, warm, and tense, indicating significant intra-articular effusion. Palpation was acutely painful, with restricted mobility. Initial laboratory tests revealed a white blood cell count of 35,500/ μ L, predominantly neutrophils (PNN), and an elevated C-reactive protein (CRP) level of 30 mg/L. An arthrocentesis was performed,

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yielding purulent synovial fluid, which was sent for microbiological analysis. Initial analysis of the synovial fluid revealed high cellularity, predominantly neutrophils, and an elevated protein level. Gram staining revealed Gram-positive cocci in chains (Figure 1).

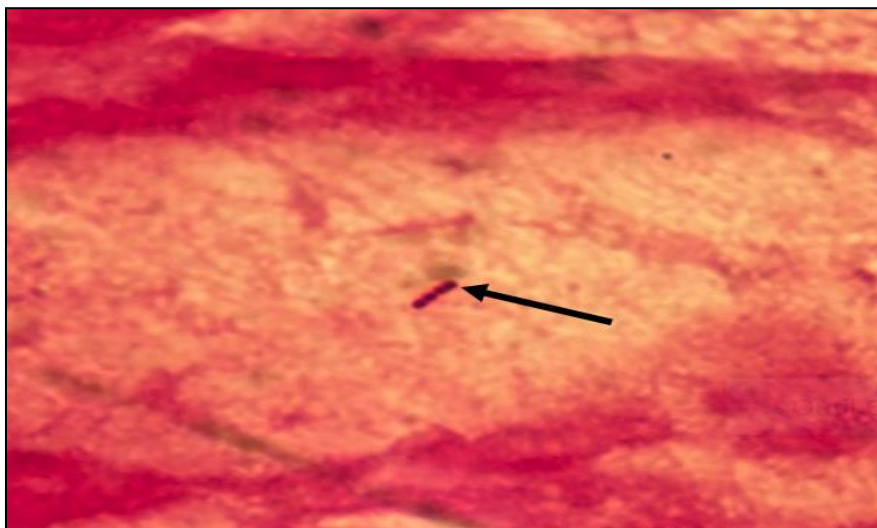


Figure 1 Direct microscopic examination showing Gram-positive cocci in chains in synovial fluid, stained by Gram (arrow)

The patient was hospitalized, with the knee immobilized, and underwent removal of the osteosynthesis hardware along with joint lavage. Empiric antibiotic therapy with intravenous amoxicillin-clavulanate was initiated.

Cultures grew small to medium-sized, round, well-defined, smooth, and shiny white colonies (Figure 2). Bacterial identification and antibiogram were performed using the Phoenix™ automated system, identifying *Streptococcus agalactiae* (Group B Streptococcus) as the causative organism. The strain was found to be fully susceptible to commonly used antibiotics.



Figure 2 Culture showing small to medium-sized, round, well-defined, smooth, and shiny white colonies of *Streptococcus agalactiae*

The final diagnosis was septic arthritis of the left knee due to *Streptococcus agalactiae* following orthopedic surgery for a complex lower limb fracture. The patient responded well to intravenous antibiotics, and his knee function gradually improved after the removal of the hardware and joint lavage.

3. Discussion

Septic arthritis is a severe and potentially devastating infection of a joint that demands prompt diagnosis and treatment to prevent irreversible damage. It is most commonly caused by *Staphylococcus aureus*, but a variety of other pathogens, including *Streptococcus species*, can also be responsible. Among the Streptococci, *Streptococcus agalactiae* (Group B Streptococcus, GBS) is traditionally recognized as a leading cause of neonatal infections, but its role in adult infections, particularly in those with underlying risk factors such as trauma, surgery, or immunosuppression, is increasingly acknowledged [1].

The pathophysiology of septic arthritis typically involves the direct inoculation of the joint by bacteria through hematogenous spread, post-traumatic implantation, or following surgical procedures. Although the most frequent pathogens in septic arthritis are *Staphylococcus aureus* and *Streptococcus pyogenes*, *S. agalactiae* is less commonly encountered but can present with significant morbidity, especially when associated with implanted foreign bodies or recent orthopedic interventions [2].

Late infection after osteosynthesis occurs months or even years after surgery and is most often due to hematogenous spread of bacteria from a distant infectious focus. The most common entry sites include dental or oral infections, urinary tract infections, respiratory tract infections, skin or soft tissue infections, and occasionally infected intravenous catheters. These infections are typically caused by low-virulence microorganisms, capable of forming a biofilm on the implant surface, which complicates both diagnosis and treatment [3].

The clinical presentation of septic arthritis can be variable, ranging from mild joint pain and swelling to severe, incapacitating pain with fever. In this case, the patient presented with sudden and intense knee pain, swelling, and an inability to move the joint, which were all hallmark signs of septic arthritis. The acute onset of symptoms, including fever and the marked restriction of joint mobility, should raise suspicion for an infectious cause [4]. Furthermore, the presence of a significant intra-articular effusion, as evidenced by the clinical exam, is a typical finding in septic arthritis, often requiring joint aspiration for definitive diagnosis.

In terms of microbiological analysis, synovial fluid aspiration and subsequent Gram stain and culture are essential to identify the causative organism. In this case, Gram staining revealed Gram-positive cocci in chains, which suggested a Streptococcal etiology. The culture results confirmed the presence of *Streptococcus agalactiae* (Group B Streptococcus), a pathogen that is known for its sensitivity to penicillin and related antibiotics [5]. In accordance with current guidelines, the initial empirical treatment should consist of broad-spectrum antibiotic therapy covering the most commonly involved pathogens, followed by targeted therapy based on culture and antibiotic susceptibility results. [6].

The treatment of septic arthritis due to *S. agalactiae* typically includes intravenous antibiotics. In this case, the patient was treated successfully with intravenous amoxicillin-clavulanate, which is highly effective against *S. agalactiae*. Other potential treatments may include third-generation cephalosporins or vancomycin in case of resistance, though such resistance remains uncommon for *S. agalactiae* [7]. The clinical response to antibiotic therapy was favorable in this case, and the patient's symptoms began to improve after surgical debridement and joint lavage, a procedure that is often necessary when a foreign body or prosthetic material is involved [8]. Removal of infected hardware is critical in these cases, as the presence of foreign material can provide a nidus for ongoing infection and complicate the healing process.

Moreover, it is important to note that *S. agalactiae* infections in adults, although less frequent, can lead to severe and potentially life-threatening complications, particularly when the infection is not diagnosed and treated early. Septic arthritis due to *S. agalactiae* can lead to long-term joint damage, chronic pain, and functional impairment if not adequately managed. Therefore, early detection and a combination of appropriate antibiotic therapy and surgical intervention are essential to prevent permanent disability [9].

One of the challenges in diagnosing septic arthritis caused by *S. agalactiae* is the variability in its clinical presentation. As seen in this case, the infection can occur many months after a surgical procedure, making it easy to overlook the possibility of infection. This emphasizes the need for vigilance in patients who have undergone orthopedic surgery, particularly when they present with new joint pain, swelling, or fever [10]. Early suspicion and prompt management

are crucial for improving patient outcomes. Additionally, the rarity of *S. agalactiae* as a causative agent of septic arthritis in adults highlights the importance of microbiological testing to confirm the diagnosis and guide treatment.

Finally, septic arthritis caused by *S. agalactiae* following orthopedic surgery, though rare, should be considered in the differential diagnosis of post-surgical joint pain, especially in patients with a history of complex fractures or implanted hardware. Proper diagnosis, early empirical treatment, and surgical intervention are essential for achieving optimal clinical outcomes.

4. Conclusion

Septic arthritis due to *Streptococcus agalactiae* is a rare but serious complication that can occur after orthopedic surgery, even months after the procedure. Timely diagnosis through joint aspiration, microbiological analysis, and appropriate antibiotic therapy is crucial for successful management. Surgical intervention to remove infected hardware and lavage the joint may also be necessary to prevent long-term joint damage.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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