

Bacterial synovitis: An unusual pathogen

M Ravish Kumar

From Associate Professor, Department of Microbiology, ESIC Medical College and Hospital, Chennai, Tamil Nadu, India

ABSTRACT

A 40-year-old male patient presented with pain and swelling in both knee joints for 2 months. On examination and investigation, the patient was diagnosed with suspected acute synovitis, and arthrotomy with synovectomy was performed. The patient's condition worsened with fever, collection of fluid in the joint, and an increase in blood leukocyte count. Upon performing culture and identification by an automated system, *Staphylococcus haemolyticus* was isolated, which was sensitive to doxycycline and vancomycin but resistant to linezolid. The patient was initiated on intravenous Vancomycin at a dosage of 1 g every 12 hours. The regimen was continued for a total duration of 7 days, after which the patient demonstrated complete clinical recovery.

Key words: *Staphylococcus haemolyticus*, Synovitis, Vancomycin

Synovial fluid is important in keeping the joint friction-free by acting as a lubricant and dividing the mechanical load equally within the joint [1]. In case of acute native joint infection, if not diagnosed early and treated rapidly, it leads to severe joint damage and potentially significant systemic complications [2]. In adults, *Staphylococcus aureus* is the most common cause of native joint septic arthritis, followed by *Streptococcus* species [3]. Coagulase-negative staphylococci (CoNS) have been considered to be low-virulent pathogens, but during the last few decades, they have emerged as a major cause of infection [4]. *Staphylococcus haemolyticus* is a part of the skin microflora and one of the main species of CoNS. This species accounts for 10–20% of clinical CoNS infections and is the second-highest species of CoNS in frequency and importance among isolates from clinical infections [5]. *S. haemolyticus* is a Gram-positive, non-motile, non-spore-forming, facultative anaerobic bacterium. In recent years, *S. haemolyticus* has demonstrated the highest level of antimicrobial resistance among the other CoNS. Glycopeptide resistance is a familiar phenomenon observed among CoNS species, which limits the use of this therapy for infections due to *S. haemolyticus*, which are severe and notoriously difficult to treat [6]. CoNS species are normal skin commensals but may also cause bacteremia. Therefore, isolating a CoNS species on blood culture often leads to a diagnostic dilemma about whether to consider the isolate as a true pathogen or not [7].

Synovial arthritis caused by *S. haemolyticus* is a very rare presentation. In fact, this may be the first case we are documenting to our knowledge.

CASE PRESENTATION

A 40-year-old male presented to the orthopedic outpatient department with a history of pain and swelling in both knee joints for 2 months. The pain was severe, sudden in onset, worsened with movement, and was accompanied by visible swelling, warmth, and redness over both joints. He was a known case of hypothyroidism and hypertension for 5 years, on thyroxine 25 mg and telmisartan 40 mg, respectively.

On general examination, he was moderately built and nourished. Pallor, icterus, clubbing, koilonychia, lymphadenopathy, and edema were negative. Blood pressure was 150/96 mmHg. Upon local examination of the knee joint, range of movement was painful, tenderness was present, and swelling was present in both knees. About 140 mL of synovial fluid was aspirated and sent for fluid examination.

Gram stain report revealed plenty of pus cells with Gram-positive cocci in clusters. The Zeihl–Neelsen stain was negative for acid-fast bacilli, and the cartridge-based nucleic acid amplification test was negative. Culture showed growth of coagulase-negative *Staphylococcus* (Fig. 1). As it was coagulase-negative *Staphylococcus*, it was reported as CoNS, and advised for clinical correlation.

On February 14, 2020, the patient underwent right-sided arthrotomy and synovectomy as the patient had

Access this article online

Received - 27 December 2025
Initial Review - 12 January 2026
Accepted - 20 January 2026

Quick Response code



DOI: 10.32677/ijcr.v12i2.8023

Correspondence to: M Ravish Kumar, Associate Professor, Department of Microbiology, ESIC Medical College and Hospital, K.K Nagar, Chennai - 600078, Tamil Nadu, India. E-mail: dr Ravish@rocketmail.com

© 2026 Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC-ND 4.0).

severe pain in the right joint with a probable diagnosis of acute bacterial synovitis and was started on injection linezolid, injection ceftriaxone, injection tramadol, and injection paracetamol. However, the patient's condition worsened with an increasing trend of total leukocyte count (February 17, 2020 – 9000, February 20, 2020 – 11,900, February 22, 2020 – 12,700 with neutrophils 84/85). Serum uric acid was normal. Liver function test and renal function test were normal.

Left-sided arthrotomy and synovectomy were done on February 22, 2020, and sent for culture. The same treatment was continued till February 27, 2020, following which, the patient started developing fever (101.6° F). A microbiologist's opinion was sought regarding antibiotic treatment. The microbiologist opined that coagulase-negative *Staphylococcus* had

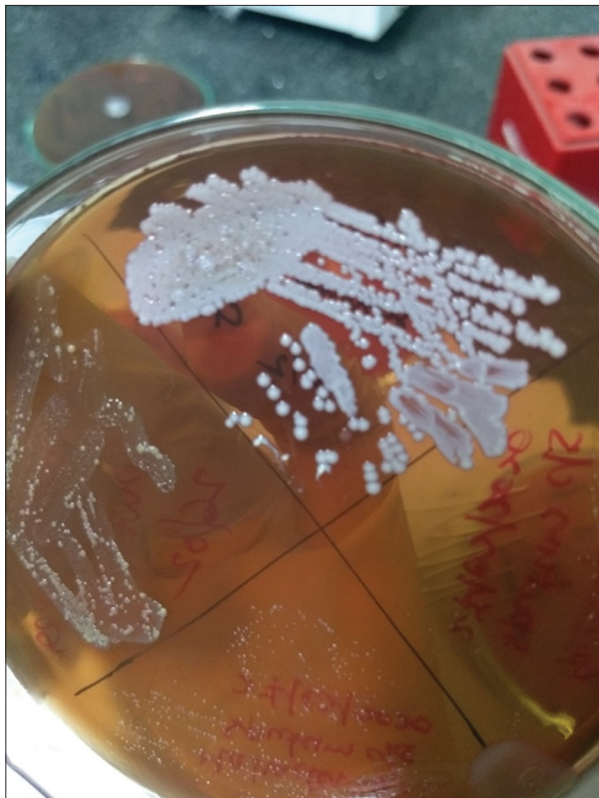


Figure 1: Culture showed growth of coagulase-negative *Staphylococcus*



Figure 2: Growth of coagulase-negative *Staphylococcus* in a culture sensitive to doxycycline and azithromycin and resistant to linezolid

grown in culture, which was sensitive to doxycycline and azithromycin and resistant to linezolid (Fig. 2). For further confirmation and testing, the culture growth was sent for VITEK-2 biosystem automated identification and antimicrobial susceptibility testing. In the meantime, azithromycin/doxycycline was started, which had shown marginal improvement. The VITEK-2 report revealed the organism as *S. haemolyticus*, which was resistant to linezolid and sensitive to doxycycline and vancomycin.

Vancomycin 1 g intravenous injection 12th hourly was administered for 7 days, and the symptoms started reducing, the total leukocyte count decreased, and the patient recovered.

DISCUSSION

Infections of the synovial fluid can manifest as prosthetic implants or native infections. Septic arthritis is commonly caused by *S. aureus*, *Streptococcus species*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*. Collection of synovial fluid for rapid diagnosis and early initiation of treatment is essential because a delay in diagnosis can lead to permanent loss of the joint [8]. *S. haemolyticus*, like most CoNS isolates, can cause several infections such as sepsis, bacteremia, native and prosthetic valve endocarditis, prosthetic joint infections, soft tissue or skin infections, and meningitis. Septic arthritis must be distinguished from several other causes of acute joint pain and swelling, including crystal-induced arthritis, reactive arthritis, trauma, and inflammatory conditions such as rheumatoid arthritis.

S. haemolyticus, like other CoNS, can cause severe infections and is resistant to antibiotic treatment, carrying several important resistant genes, thus acting as a reservoir for the distribution of antibiotic resistance to other CoNS isolates [9]. To promote antimicrobial stewardship and improve patient care significantly, the prime requisite is prompt and correct microbiological testing. The automated VITEK 2system is known for its efficacy in identifying and differentiating *S. aureus* and other commensal species [10].

In the present study, the patient presented with pain and swelling in both knee joints for the last 2 months. On examination, swelling, tenderness, and local rise of temperature were observed, suggesting synovitis. Laboratory examination of synovial fluid revealed the presence of polymorphonuclear cells, and in culture, it grew *S. haemolyticus*, whose pathogenicity is uncertain and known to cause infection in prosthetic joints. In our present case, the patient had an infection of native joints.

The microbiology culture report showed growth of coagulase-negative *Staphylococcus* resistant to many antibiotics and advised clinical correlation. The patient had completed the course of tablet amoxycillin clavulanic acid 625 mg for 7 days with no improvement. As the patient had symptoms for 2 months with joint pain, an arthrotomy and synovectomy were done to relieve the pain and reduce the swelling, but the condition worsened

with the appearance of fever, swelling, and pain in the left knee joint because the root cause was not identified and treated. The culture report for the fluid showed growth of *Staphylococcus* species other than *S. aureus*, which was resistant to linezolid, cephalosporins, and oxacillin and sensitive to doxycycline and vancomycin. The isolate was confirmed as *S. haemolyticus* by the Vitek automated bacterial identification and antibiotic susceptibility system. After checking the renal parameters, injection of vancomycin 1g intravenous route 12th hourly dose administered for 7 days was able to cure the synovitis. The patient was followed up for the next 6 months, and he did not develop any recurrence of joint pain and swelling. A retrospective cohort study on native joint septic arthritis from Italy has documented 20 cases caused by CoNS affecting the shoulder joint among adults [11]. Multiple cases of severe *S. lugdunensis* infections in the course of hemodialysis have been previously reported. In most of these patients, the presumed portal of entry is the vascular access device [12]. To our knowledge, septic arthritis of the knee caused by *S. haemolyticus* is very rare, and we were unable to find any published case reports. This suggests that *S. haemolyticus* is an extremely uncommon or possibly undocumented cause of septic arthritis in humans.

In conclusion, the isolation of commensal organisms from a sterile fluid needs to be confirmed by repeated samples, and the organism needs to be identified accurately to the species level; the pathogenicity needs to be ascertained. Organisms such as *S. haemolyticus*, known for multidrug resistance, need to be tested for antimicrobial susceptibility with a proper method for initiating treatment.

CONCLUSION

Coagulase-negative *Staphylococcus* should not be neglected as a commensal organism. They are known to cause various kinds of infections, which can be reconfirmed by repeat culture. Only after culture sensitivity testing, antibiotics have to be started, and if empirical treatment has been started and found resistant in the culture report, then escalation can be done with an antibiotic that is sensitive. The present study highlights the role of an automated culture system in diagnosing, which is very helpful in detecting microorganisms to the species level, and also helps in initiating the correct drug

based on minimum inhibitory concentration. Hence, this test may be advised for any kind of invasive infections.

REFERENCES

1. Giarritiello F, De La Motte LR, Drago L. Viscosupplementation and synovial fluid rheology: A hidden risk for bacterial biofilm formation in joint infections? *Microorganisms* 2025;13:700.
2. Rabitsch L, Luger M, Lötsch F, Starzengruber P, Thalhammer F, Windhager R, *et al.* Rapid pathogen detection in synovial fluid of acute native joint infections in adults: A clinical evaluation of a novel automated multiplex polymerase chain reaction (mPCR) system. *J Bone Jt Infect* 2025;10:437-46.
3. Earwood JS, Walker TR, Sue GJ. Septic arthritis: Diagnosis and treatment. *Am Fam Physician* 2021;104:589-97.
4. Falcone M, Campanile F, Giannella M, Borbone S, Stefani S, Venditti M. *Staphylococcus haemolyticus* endocarditis: Clinical and microbiologic analysis of 4 cases. *Diagn Microbiol Infect Dis* 2007;57:325-31.
5. Eltwisy HO, Twisy HO, Hafez MH, Sayed IM, El-Mokhtar MA. Clinical infections, antibiotic resistance, and pathogenesis of *Staphylococcus haemolyticus*. *Microorganisms* 2022;10:1130.
6. Daniel B, Saleem M, Naseer G, Fida A. Significance of *Staphylococcus haemolyticus* in hospital acquired infections. *J Pioneer Med Sci* 2014;4:119-125.
7. Verma A, Kumar S, Venkatesh V, Jain P, Kalyan R, Reddy H. *Staphylococcus hemolyticus*: The most common and resistant coagulase-negative *Staphylococcus* species causing bacteremia in north India. *Cureus* 2024;16:e51680.
8. Belanger CR, Locher K, Velapattino B, Charles MK. Detection of bacterial pathogens directly from synovial fluids using digital PCR: A proof of concept study. *Diagn Microbiol Infect Dis* 2025;112:116749.
9. Azimi T, Mirzadeh M, Sabour S, Nasser A, Fallah F, Pourmand MR. Coagulase-negative *Staphylococci* (CoNS) meningitis: A narrative review of the literature from 2000 to 2020. *New Microbes New Infect* 2020;37:1-15.
10. Vinshia JJ, Padmavathy K, Sathyapriya B. Comparison of the VITEK® 2 system with conventional methods for species identification and antimicrobial susceptibility pattern of *Staphylococcal* carrier isolates. *Int Res J Multidiscip Scope* 2024;5:940-8.
11. Cimatti P, Ciaffi J, Dallari B, Amicucci F, Trisolino G, Storni E, *et al.* Ten-year experience with native joint septic arthritis: A retrospective cohort study from a tertiary center. *J Clin Med* 2025;14:6403.
12. Wery AR, Taghavi M, Nortier J, Mahadeb B, Raftakis I, Maillart E, *et al.* *Staphylococcus lugdunensis*: An unusual cause of relapsing hematogenous septic arthritis of a native knee. Case report and review of the literature. *Front Med (Lausanne)* 2024;11:1494449.

Funding: Nil; Conflicts of interest: Nil.

How to cite this article: Kumar MR. Bacterial synovitis: An unusual pathogen. *Indian J Case Reports*. 2026;12(2):117-119.