Case Report

Vajira Med J
Journal of Urban Medicine

Concomitant *Streptococcus Suis* Septic Arthritis and Gouty Arthritis: A Case Report

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ABSTRACT

Septic arthritis, when occurring together with crystal-induced arthritis such as gout, can make the diagnosis more difficult and increase the risk of complications compared with septic arthritis without concomitant gout. *Streptococcus suis*, a common pathogen in swine, can be transmitted from animals to humans. Human infections are rare. Patients often have a history of contact with or consumption of undercooked pork. Most patients present with meningitis, septicemia, endocarditis, and septic arthritis. A 71-year-old man presented with bilateral knee pain, swelling, and fever. Synovial fluid aspiration from the knee revealed intracellular urate crystals and *Streptococcus suis* on the culture. He was diagnosed with septic arthritis due to *Streptococcus suis* with concomitant gouty arthritis. The patient was treated with intravenous ceftriaxone and bilateral knee arthrotomy. After clinical improvement, he was switched to oral amoxicillin and completed a total of 4 months of antibiotics. At the 1-year follow-up, his function was near pre-infection levels. This is the first reported case of septic arthritis due to *Streptococcus suis*, an uncommon pathogen, in a patient with gouty arthritis. Concurrent septic arthritis and gouty arthritis can make the diagnosis more difficult. A high index of suspicion for septic arthritis with gouty arthritis is important for the accurate diagnosis and appropriate treatment in order to minimize complications.

KEYWORDS: gouty arthritis, septic arthritis, *Streptococcus suis*

INTRODUCTION

Septic arthritis is a serious medical condition characterized by infection and inflammation within a joint, typically resulting from the invasion of the joint by microorganisms. Prompt diagnosis and treatment are essential, as delayed identification can lead to severe complications. Although septic arthritis is not typically conducive to crystal formation in the joint, it can, on rare occasions, occur alongside crystal-induced arthritis, such as gouty arthritis. Gouty arthritis occurs when monosodium urate (MSU) crystals accumulate in the joint, where they are recognized and phagocytosed by neutrophils. This process initiates and modulates an inflammatory cascade, leading to an intense inflammatory response within the affected joint or tissue. Diagnosing concomitant septic arthritis and gouty arthritis is challenging, and there is limited literature reporting on the incidence of these conditions occurring together, with only scattered case reports. A high index of suspicion is necessary for accurate diagnosis, as untreated cases of combined septic and gouty arthritis are associated with an increase in intensive care unit (ICU) admissions, longer hospital stays, and a higher risk of limb amputation compared to septic arthritis alone[1,2].

Streptococcus suis is a gram-positive cocci bacterium commonly found in swine, which can

Corresponding author: Chalat Jaruwan, dr.chalat@gmail.com
Received: 5 September 2024
Revised: 4 December 2024
Accepted: 16 December 2024
Vajira Med J 2025;69(1):e270954
http://dx.doi.org/10.62691/vmj.2024.270954

be transmitted to humans. It causes a range of significant human diseases, including meningitis, sepsis, septic shock, infective endocarditis, and septic arthritis. Although most human infections manifest as meningitis and sepsis, with hearing loss being a frequent complication, septic arthritis, due to *Streptococcus suis,* accounts for only 2.9% of all infections. The mortality rate for these infections is 9.5-19.5%[3]. The first documented human case occurred in Denmark in 1968[4], and the first cases in Thailand were reported in 1987, both involving patients with meningitis[3]. *Streptococcus suis* is primarily found in Southeast Asia, where pig farming is widespread, and Thailand has the second-highest incidence of these infections globally, following China[5,6]. Risk factors for infection include occupations involving direct contact with pigs or pork products and the consumption of undercooked pork[3]. However, isolating *Streptococcus suis* from synovial fluid cultures remains exceedingly rare[5].

CASE REPORT

This case report was published after receiving ethical approval (COA No. SO21hc/67_NA). A 71-year-old Thai male presented after falling down the stairs 10 days prior to hospital admission. He experienced bilateral knee pain, inability to bear weight, and pain with knee flexion and extension. He had occasional acute knee and foot pain but did not seek treatment. His symptoms did not improve, and 2 days before admission, his knee pain worsened, causing him to seek medical attention. The patient denied any underlying medical conditions, alcohol consumption, or smoking.

The initial physical examination revealed: body temperature: 38.2°C, blood pressure: 137/60 mmHg, pulse rate: 79 beats/min, respiratory rate: 20 breaths/min, both knees were swollen, warm, and tender with positive joint effusion, particularly more in the right knee. No tophi were observed at the elbows or feet. Investigations showed complete blood count: white blood cell (WBC) 13,090 cells/μL (neutrophils 79.7%), uric acid: 4.4 mg/dL, high-sensitivity C-reactive protein (hsCRP): 324.66 mg/L, blood culture: pending, synovial fluid analysis (right knee): yellow-turbid fluid 20 ml, WBC 54,481 cells/mm^3 (polymorphonuclear cell (PMN) 95%), Gram stain: negative, crystals: not found, synovial fluid culture: pending, plain radiograph of both knees: moderate degenerative changes.

The patient was treated with intravenous fluids and antibiotics (ceftriaxone 2 g IV once daily). On the second day, left knee arthrocentesis was performed, revealing yellow-turbid fluid (10 ml), WBC 43,402 cells/mm^3 (PMN 94%), Gram stain negative, and intracellular urate crystals were observed, marking the first diagnosis of gout in this patient. He was started on colchicine (0.6 mg) once daily after meals and naproxen (250 mg) twice daily after meals. Synovial fluid culture from the left knee grew *Streptococcus suis*, confirmed by molecular identification. The patient denied risk factors for *Streptococcus suis* infection such as working with pigs or pork products or consuming undercooked pork. The organism was sensitive to ampicillin, cefotaxime, ceftriaxone, vancomycin, and levofloxacin. After IV antibiotics therapy, his pain decreased but he had a low-grade fever. He exhibited no neurological symptoms, hearing loss, or cardiac problems. Blood cultures showed no organism growth. On the ninth day of hospitalization, he underwent bilateral knee arthrotomy and lavage. Post-surgery, his fever subsided; he began physical therapy and was discharged after a total hospital stay of 16 days. Upon discharge, he was prescribed oral amoxicillin (500 mg), 2 tablets twice daily, colchicine (0.6 mg) once daily, and naproxen (250 mg) as needed for pain.

The patient's condition and hsCRP levels were monitored monthly. His joint pain decreased, mobility improved, and he was able to walk more. The total duration of antibiotic therapy was 4 months (discontinued once hsCRP levels normalized for 2 consecutive measurements). After stopping antibiotics, hsCRP levels remained normal, and he was able to walk with minimal pain.

At the 1-year follow-up, he had occasional mild pain and his functionality was near pre-infection levels.

This case report presents the key clinical findings of a patient who presented with bilateral knee pain and fever. On examination, both knees were swollen, warm, and tender with positive joint effusion. Synovial fluid analysis revealed a positive Gram stain, and culture identified *Streptococcus suis*. Intracellular urate crystals were also observed. The patient was diagnosed with *Streptococcus suis* septic arthritis along with gouty arthritis. Treatment included colchicine, naproxen, intravenous ceftriaxone, and bilateral knee arthrotomy. After one year of treatment, the patient's knee function was close to pre-infection levels.

DISCUSSION

Currently, there are few studies on concomitant septic arthritis with crystal-induced arthritis. In this case, the patient had gouty arthritis along with *Streptococcus suis* septic arthritis, which is an uncommon pathogen. To the author's knowledge, this is the first reported case of *Streptococcus suis* septic arthritis occurring concurrently with gouty arthritis. Septic arthritis is not typically conducive to crystal formation within the joint. In this case, the clinical presentation of acute gouty arthritis was atypical, as the patient had no clear prior history of gout, which further complicated the diagnostic process. Alternatively, it is possible that monosodium urate crystals were found concurrently with septic arthritis, rather than being the primary cause of joint inflammation from acute gouty arthritis.

Prior-Español et al. reported a retrospective study that collected data from 1985 to 2015 on 25 patients with coexisting septic and crystal-induced arthritis, with a mean age of 67 years. The most commonly involved joint was the knee, with the most frequent crystals being monosodium urate (68%), calcium pyrophosphate dihydrate (20%), and hydroxyapatite (12%). The most common pathogens were methicillin-sensitive Staphylococcus aureus (48%), methicillin-resistant Staphylococcus aureus (12%), and Mycobacterium tuberculosis (12%). Arthrotomy was performed in 36% of cases. Complications included infected wounds (8%), septic shock (8%), mortality (8%), and no complications (36%)[2]. In comparison, the patient in this case report underwent arthrotomy on the ninth day after admission due to the difficulty of diagnosing septic arthritis initially, pending synovial fluid culture results, negative Gram stain, and the patient's initial refusal of surgery.

Yu et al. conducted a retrospective study that collected data from 1987 to 2001 on 30 patient with concomitant septic arthritis and gouty arthritis. The mean age was 52.8 years, and one-third of the patients did not have a fever. Normal WBC counts were seen in 30% of patients, and 10% had a synovial fluid WBC count of less than 6,000/mm^3. The knee was the most commonly affected joint, followed by the ankle, shoulder, and wrist. Staphylococcus aureus was the most common pathogen. Fourteen patients underwent surgical debridement, with 2 requiring arthrodesis and 1 undergoing above-knee amputation. Two patients died. The study by Yu et al. found that the knee is the most common site for concomitant septic and gouty arthritis, consistent with the current case[1].

Hong et al. reported a retrospective study from 2011 to 2016 on 13 patients with concurrent septic arthritis and gouty arthritis. The mean age was 60.8 years. Ankle involvement was more common in concomitant septic arthritis and gout compared to septic arthritis without gout, in which the knee joint was more commonly involved. Patients with concomitant septic arthritis and gouty arthritis had higher risks of ICU admission, longer hospital stays, and limb amputation than those with septic arthritis alone. Hong et al.'s study underscores the need for a high index of suspicion for concomitant septic arthritis and gout due to the higher risk of severe symptoms and complications[7].

A study in Thailand by Wangsomboonsiri et al. in Nakhon Sawan Province found that among 66 patients with *Streptococcus suis* infection, most were diagnosed with meningitis (52%), sepsis (27%), septic shock (12%), and endocarditis (8%), with septic arthritis occurring in only 1%[8]. However, in the present case report, the patient had *Streptococcus suis* infection confined to the joint without systemic involvement.

Evidence from a Thai study by Wangkaew et al. shows that *Streptococcus suis* is sensitive to penicillin[9], differing from Nakaranurack et al. who reported that *Streptococcus suis* in 6 out of 11 Thai patients was not sensitive to penicillin, but was sensitive to cefotaxime and vancomycin[10]. Nonetheless, the study by Kerdsin found that β-lactam antibiotics are still widely used globally and that *Streptococcus suis* remains largely sensitive to this class of antibiotics[3]. In the present case report, the patient was initially treated with ceftriaxone, due to its broad-spectrum coverage before culture results were available. After confirming the sensitivity of *Streptococcus suis* to penicillin, the patient was switched to oral amoxicillin before discharge.

CONCLUSION

Concomitant septic arthritis and gouty arthritis are rare. The present case report is the first to document septic arthritis caused by *Streptococcus suis* alongside gouty arthritis. The coexistence of septic arthritis and gouty arthritis can complicate the diagnosis, emphasizing the need for a high index of suspicion and awareness of the potential for both conditions to occur together. Early recognition of concurrent infections is essential for accurate diagnosis and effective treatment, which can help prevent any serious complications and improve outcomes in arthritis cases, particularly in regions where zoonotic infections like *Streptococcus suis* are prevalent, in order to ensure comprehensive patient management.

ACKNOWLEDGEMENT

None

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