CASE REPORT

An uncommon case of acute rheumatic fever with migratory polyarthritis, caused by *Shewanella putrefaciens*: A case report

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Abstract

Shewanella putrefaciens is a gram-negative, halophilic opportunistic pathogen. Infections are uncommon but have been reported, particularly in warmer climates. This case highlights a rare instance of Acute Rheumatic Fever (ARF) with migratory polyarthritis caused by *S. putrefaciens*, emphasizing the importance of considering rare pathogens. A 31-year-old male presented with fever, chills, myalgia, and joint pain. Initial treatment with piperacillin-tazobactam provided temporary relief, but an idiosyncratic reaction necessitated a switch to amoxicillin and clavulanate potassium. The addition of steroids significantly reduced symptoms. Joint fluid culture revealed *S. putrefaciens*, leading to a diagnosis of ARF with migratory polyarthritis, carditis, and acute kidney injury. This case documents a novel association of *S. putrefaciens* with ARF and migratory polyarthritis. Successful management with targeted antibiotics and steroids underscores the importance of early detection and appropriate treatment for rare infections. It highlights the need for stringent infection control practices to prevent nosocomial infections caused by opportunistic pathogens like *S. putrefaciens.*

Keywords: Acute rheumatic fever, Group A *Streptococcus* infection, migratory polyarthritis, *Shewanella putrefaciens*

Introduction

Shewanella putrefaciens is a gram-negative, halophilic opportunistic pathogen and can produce hydrogen sulfide. Although infections caused by this organism are uncommon, they have been reported in regions with warmer climates [1]. *Shewanella* species can transmit infections by contact transmission, and have been reported to cause bloodstream infections. *Shewanella* species have been identified in patients suffering from peritonitis and meningitis, as well as in cases involving cardiovascular, pancreatic, intra-abdominal, and chest infections [2]. Infections caused by *Shewanella* species can be influenced by factors like poor hygiene and environmental pollution. These microorganisms are widely distributed in aquatic environments and are also associated with nosocomial infections [2], highlighting the importance of hospital surveillance. In this case, we present a rare instance of a patient with Acute Rheumatic Fever (ARF) and migratory polyarthritis, where *S. putrefaciens* was identified as the causative organism. ARF is an immune-mediated response to Group A Streptococcus (GAS) infection, which can lead to Rheumatic Heart Disease (RHD), and carditis [3]. The most common initial sign of ARF is arthritis, typically in children but also affecting other age groups [3]. It involves inflammation of one or more joints, where the pain moves to different joints as it eases, and hence termed "migratory polyarthritis" [4]. We report a rare case of rheumatic fever with migratory polyarthritis caused by *S. putrefaciens*, a novel

finding not previously documented in literature. The current case emphasizes the significance of considering rare pathogens as they can lead to severe health complications despite their infrequent occurrence.

Case Report

A 31-year-old male presented with a three-hour history of high-grade fever, chills, severe myalgia, and mild throat dryness. Initial evaluation revealed elevated renal parameters (creatinine 2.1 mg/dL), C-reactive protein (CRP) 220 mg/L, and white blood cell count (27,250 cells/μL). The patient also reported decreased urine output and was referred to a tertiary care hospital where the patient received empiric antibiotics. The fever subsided, and urine output improved, but serum creatinine remained elevated (1.5 mg/dL). On day three, he developed persistent myalgia and bilateral knee joint pain, with more pronounced swelling in the right knee. Two weeks later, the patient was discharged with antibiotics and paracetamol, but the symptoms relapsed within four days, experiencing worsened joint pain, especially in the right knee, and high-grade fever. Upon re-admission at our hospital, the patient reported joint pain, walking difficulty, sore throat, cough, dyspnea, palpitations, and persistent headaches. Clinical examination revealed a high-grade fever (103°F), dehydration, and swelling with tenderness in both knees. Bilateral basal crackles were noted in the respiratory system, along with a soft systolic murmur in the cardiovascular system, tachycardia, and pharyngeal congestion. Migratory joint pain began in the right knee and spread to the left knee, ankles, and shoulders. MRI findings depicted in Figures 1 and 2 show swelling in the left and right knee.

Figure 1: MRI showing swelling in the left knee

Figure 2: MRI showing swelling in the right knee

Investigations

Blood tests showed elevated WBC (27,250 cells/µL), with 90% neutrophils, CRP (220 mg/L), and Erythrocyte Sedimentation Rate (ESR) (81 mm/hr). Renal function was mildly impaired (urea 59.7 mg/dL, creatinine 1.24 mg/dL), and liver enzymes were elevated, Serum Glutamic Pyruvic Transaminase (SGPT) value of 529 U/L and Serum Glutamic Oxaloacetic Transaminase (SGOT) value of 359 U/L. The ASO (Antistreptolysin O) titer was elevated (358 IU/mL), indicating a recent infection. Joint fluid culture revealed Gram-positive cocci and *S. putrefaciens*, along with a positive Streptococcal titer.

Diagnosis and treatment

The patient was initially diagnosed with bilateral septic arthritis and started on piperacillin-tazobactam, which gave mild symptomatic relief. However, an idiosyncratic reaction leading to a significant increase in liver enzymes necessitated the discontinuation of this therapy. The final diagnosis was ARF with migratory polyarthritis, carditis, and acute kidney injury. The patient was switched to intravenous amoxicillin and clavulanate potassium. After five days, steroids were added, resulting in a significant reduction of joint pain and swelling. At discharge, CRP, liver enzymes, ESR, and blood counts improved but were not fully normalized. The patient was prescribed oral antibiotics for 10 days and advised to follow up.

Outcome and follow-up

A few weeks later, the patient showed significant improvement, with normalization of blood parameters and renal function. WBC count decreased to 11,120 cells/µL, and the neutrophil count decreased to 69%. Additionally, the serum creatinine level normalized at 0.96 mg/dL. Liver enzymes reduced (SGPT 39 U/L, SGOT 19 U/L), CRP dropped to 9 mg/L, and ESR decreased to 19 mm/hr. At the follow-up, the patient's symptoms improved steadily, with mild left shoulder pain and minimal right knee swelling at follow-up. Prophylactic treatment for rheumatic fever was continued, with gradual tapering of steroids.

Discussion

ARF causes multisystem inflammation, particularly involving the cardiac system, leading to complications such as arrhythmias, RHD, and premature mortality [5]. It primarily affects children under 15 years, with a higher prevalence in low-income countries due to inadequate socio-economic conditions and overcrowding [3,5,6]. In this case, a patient diagnosed with ARF and migratory polyarthritis was found to have *S. putrefaciens* as the causative organism. Although *S. putrefaciens* infections are not associated with rheumatic fever, prior cases have reported it as the cause of septic monoarthritis and ventilator-associated pneumonia [1,7]. These findings suggest that *Shewanella* can be transmitted through contaminated medical devices or objects, emphasizing the importance of proper sterilization to prevent nosocomial infections. *Shewanella* species are known to cause infections in immunocompromised individuals [2], leading to complications like sepsis and hepatic disorders [3,8]. Antibiotic resistance has also been increasing at an alarming rate and fast becoming one of the most common causes of morbidity and mortality in the modern age [9,10]. In this case, the patient also developed acute kidney injury, likely a consequence of the infection. Initially treated with piperacillin-tazobactam, the

patient showed only temporary improvement. However, oral amoxicillin and clavulanate potassium led to significant recovery, demonstrating the effectiveness of targeted antibiotic therapy. This case highlights the need for innovative antibiotic strategies and an open-minded approach to treat rare infections.

Conclusion

This report highlights a rare case of ARF with migratory polyarthritis in a 31-year-old male, where *S. putrefaciens*, an uncommon pathogen, was identified in the joint fluid aspirate. Initially managed with piperacillin-tazobactam, treatment was switched to oral amoxicillin and clavulanate potassium, leading to significant symptomatic relief. The case underscores the importance of early detection, proper hygiene, sterilization, and infection control practices in hospital settings to prevent rare and nosocomial infections.

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