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Case Report

Shewanella Septic Arthritis in an Elderly Returning Traveller

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Abstract

We describe a rare case of septic arthritis caused by *Shewanella* species in an 80-year-old male who had recently returned from a trip to the Galapagos Islands and mainland Ecuador. He presented with a 1-day history of fever and rigors, preceded by two syncopal episodes and ongoing left shoulder pain. A shoulder aspiration yielded turbid yellow fluid, and subsequent cultures grew *Shewanella* species on enrichment media.

Keywords: *Shewanella*; Septic joint

Shewanella is a rare, marine-associated Gram-negative bacillus infrequently implicated in human infections. Although typically affecting skin and soft tissue, it can cause severe invasive disease, particularly in older adults with comorbidities. This case highlights the importance of considering uncommon marine pathogens in returning travellers presenting with septic arthritis, especially following aquatic exposure. Early diagnosis, targeted antimicrobial therapy, and surgical intervention are key to successful outcomes. Increased global travel and environmental changes may lead to a rise in such atypical infections.

Background

This case presents a unique occurrence of *Shewanella* septic joint in an elderly gentleman returning from South America. *Shewanella* species are rare Gram-negative, facultative anaerobic bacilli primarily found in marine and brackish environments.

Although more than 50 species have been identified, *Shewanella* algae and *Shewanella* putrefaciens are the only strains known to cause human disease, typically presenting as skin and soft tissue infections following seawater exposure or marine injuries [1, 2].

Invasive infections such as bacteraemia, osteomyelitis, and septic arthritis are exceedingly rare, particularly in temperate climates [3, 4].

Septic arthritis due to *Shewanella* has been documented in isolated case reports, most commonly involving the knee joint and associated with direct inoculation via wounds or prosthetic joints [5]. Risk factors include advanced age, immunosuppression, and degenerative joint disease. However, joint infection without clear traumatic exposure remains poorly understood.

This case is unique due to the organism's rarity, the involvement of the shoulder joint, and the absence of obvious inoculation. It illustrates the importance of considering emerging and atypical pathogens in returning travellers with joint infections, particularly as global travel and recreational water exposure increase.

Case Presentation

An 80-year-old male, who had recently returned from the Galapagos Islands and mainland Ecuador, was admitted with a 1-day history of fever accompanied by rigours. In the days leading up to his admission, he had two syncopal episodes. During the first episode, he fell on his left shoulder which had been painful even

before the injury. With his second syncopal episode, he hit his head with no obvious injuries. Along with these symptoms he also noted a decrease in his appetite, and mild oliguria. There was no new rash, neck stiffness, photophobia, or headache on presentation.

He had a background of hypercholesterolemia and hypertension, for which he was taking Ramipril, Atorvastatin, and Ezetimibe. He had no surgical history. He was independent in his activities of daily living and lived alone.

On initial examination, he was afebrile, with the rest of his vital signs being within normal limits. He was fully awake and orientated, had normal heart sounds, a clear chest, soft and non-tender abdomen, an essentially normal physical examination. He was admitted for fever in a returning traveller.

Initial blood tests revealed an acute kidney injury and markedly elevated inflammatory markers; with a Creatinine of 269, Urea of 12.6, White Cell Count (WCC) of 23.4, and a C-Reactive Protein (CRP) of 264.2. Cultures and further tests were sent out and he was treated with empiric antibiotics (Piperacillin-Tazobactam) and intravenous hydration.

Virology testing eventually came back negative for various plausible causes, including Leptospirosis PCR, Leptospira antibody, Dengue virus antibody, Chikungunya virus antibody, HIV, Borrelia antibody, Hepatitis B surface antigen, and Hepatitis C antibody. A Comprehensive Immunologic testing revealed Rheumatoid Factor 17.1 (elevated), IgG 4.04 (low), IgM 0.24 (low), and Anti-CCP 1 (negative).

Imaging studies immediately after admission include CT-Scans of his Chest, Abdomen, and Pelvis to identify a source of infection. It revealed chronic-looking changes in his lungs, an enlarged prostate, degenerative changes on both shoulders, but no active pathology. A CT-Scan of his head was also done and showed no acute intracranial pathology but showed changes within the right cerebellar hemisphere which warranted further investigation with an MRI. The MRI of his head showed that this area of his brain was normal and further confirmed the absence of acute intracranial pathology.

His hospital admission was complicated by a fall. This was preceded by an episode of melaena the night prior, likely to be from an upper gastrointestinal bleed, this is supported by a haemoglobin drop from 144 to 100 overnight. Further evidenced by bleeding ulcers seen on gastroscopy, the patient was treated with high dose Omeprazole followed by a continuous infusion, along with Sucralfate, as the patient tested negative for H. pylori. He had no further issues with bleeding.

As there were ongoing concerns with regards to his shoulder an ultrasound was performed. It showed 1. Diffuse subscapularis tendinosis. 2. Full-thickness, full width tears of the supraspinatus and infraspinatus tendons with retraction of the torn tendon margins. 3. Severe subacromial bursitis. 4. Moderate shoulder joint effusion with active synovitis in the posterior joint recess. 5. Mild Acromioclavicular (AC) joint osteoarthritis without synovitis.

Due to suspicions of septic arthritis, he was tried with IV Flucloxacillin He underwent an aspiration of the joint which identified 6mLs of turbid yellow fluid that was sent for analysis. Despite the aspiration, his left shoulder pain persisted. This prompted a repeat aspiration of the glenohumeral (GH) joint effusion and further samples were sent to the laboratory for analysis.

These grew *Shewanella* species on the enrichment culture. He was switched to intravenous Ceftriaxone. He underwent a left shoulder arthroscopic wash-out and synovial biopsy; the biopsy showed acute synovitis, with possible causes listed as infection, crystal deposition disease, or trauma injury. Correlating the results clinically it most likely fits with an infectious cause. The patient continuously improved with antibiotic treatment with no further complications.

Discussion

Septic arthritis is a medical emergency requiring urgent diagnosis and intervention to prevent irreversible joint damage and systemic spread. While Staphylococcus aureus remains the most common cause, Gram-negative bacteria are increasingly recognised as important pathogens, particularly in atypical presentations and specific risk groups [6]. Among these, marine-associated bacteria such as *Shewanella* species are emerging as rare but significant causes of infection, especially in returning travellers with recent aquatic exposure.

Shewanella is a genus of Gram-negative, facultatively anaerobic, oxidase-positive bacilli, predominantly found in marine, freshwater, and brackish environments [2]. Although over 50 species of *Shewanella* have been described, only a few, notably *Shewanella* algae and *Shewanella* putrefaciens, are pathogenic to humans [1]. S. algae is considered the more virulent species, better adapted to human body temperature, and more often implicated in invasive infections.

In terms of epidemiology, *Shewanella* infections are relatively rare. A review of reported cases indicates that *Shewanella* species account for less than 1% of all Gram-negative infections [2]. However, their prevalence appears to be rising, likely due to increased awareness, improved diagnostic techniques, and more widespread recreational and occupational exposure to marine environments [4]. Most cases have been reported from tropical and subtropical regions, including Southeast Asia, the Caribbean, and the southern United States. Infections are typically sporadic, although outbreaks associated with contaminated water sources

have occasionally been documented.

Shewanella is commonly found in seawater, sediment, and marine animals such as fish and shellfish [2]. It can survive in a wide range of temperatures and salinities, making it a resilient environmental organism. Contact with contaminated water, either through open wounds, surgical sites, or puncture injuries (e.g., fish spine injuries or coral cuts), is the usual route of transmission. Consumption of undercooked seafood has also been implicated in gastrointestinal infections, although this is less common.

The clinical spectrum of *Shewanella* infections is broad, ranging from mild otitis externa to life-threatening bacteraemia, necrotising fasciitis, and soft tissue infections [3]. Septic arthritis caused by *Shewanella* is extremely rare but well-documented in case reports.

The clinical presentation typically mirrors that of septic arthritis caused by more common organisms: acute onset of joint swelling, pain, warmth, erythema, and restricted movement. Fever and systemic symptoms may or may not be present. Monoarticular involvement, especially of weight-bearing joints like the knee, is the most frequent pattern, although polyarthritis has occasionally been reported.

Older adults appear to be at increased risk for severe *Shewanella* infections. Several factors may contribute to this vulnerability. Firstly, older patients often have comorbidities such as diabetes mellitus, chronic liver disease, or immunosuppression, which predispose them to more severe infections [7]. Secondly, degenerative joint diseases like osteoarthritis are more common with aging, potentially providing a "*locus minoris resistentiae*" - a weakened site where infection can establish more easily. Thirdly, the presence of prosthetic joints, which is higher among elderly populations, has been identified as a risk factor for atypical joint infections, including those caused by marine organisms [5].

Importantly, the clinical course of *Shewanella* infections in older adults can be more aggressive. Cases of rapid joint destruction, delayed wound healing, and higher rates of systemic dissemination have been reported [4]. Furthermore, the atypical nature of the pathogen may lead to diagnostic delays, especially if a detailed history of environmental exposure is not obtained. This underlines the importance of maintaining a high index of suspicion in returning travellers and individuals with recent aquatic activities presenting with joint symptoms.

The diagnosis of *Shewanella* septic arthritis relies on synovial fluid analysis and culture. Gram stain may reveal Gram-negative rods, but culture is definitive. On standard laboratory media, *Shewanella* may produce a brownish pigment due to iron reduction [1]. However, misidentification is possible, especially as *Shewanella* can resemble Pseudomonas species on initial biochemical testing. Advanced techniques such as MALDI-TOF mass spectrometry or 16S rRNA sequencing improve diagnostic accuracy.

Management of *Shewanella* septic arthritis requires a combination of antimicrobial therapy and prompt joint drainage. Empirical treatment should cover common Gram-negative organisms, and once *Shewanella* is identified, antibiotics should be tailored based on susceptibility patterns. Typically, *Shewanella* species are sensitive to third- and fourth-generation cephalosporins (e.g., ceftriaxone, cefepime), fluoroquinolones, aminoglycosides, and carbapenems [5]. They are intrinsically resistant to penicillin and may exhibit resistance to first-generation cephalosporins and some beta-lactams.

Duration of therapy is generally guided by clinical response, but most guidelines recommend a minimum of 4 to 6 weeks of antibiotics for septic arthritis [6]. Early and adequate joint washout either by arthroscopic or open surgical drainage is crucial to limit cartilage damage and ensure rapid clinical recovery.

Given the organism's environmental reservoir, preventive measures should also be discussed with at-risk patients, especially older individuals and those with comorbidities. These include avoidance of swimming with open wounds, prompt cleaning and disinfection of minor injuries, and cautious handling of marine animals.

In summary, although *Shewanella* septic arthritis remains a rare entity, it should be considered in returning travellers presenting with acute monoarthritis following aquatic exposure, particularly in the elderly or immunocompromised. Early recognition, combined with targeted antibiotic therapy and surgical intervention, is vital for a favourable outcome. This case underscores the critical role of comprehensive history-taking, including environmental exposures, in identifying unusual pathogens in clinical practice. With increasing global travel, recreational water activities, and climate change potentially expanding the geographic range of marine pathogens, awareness of organisms like *Shewanella* will likely become even more important for clinicians worldwide.

Conclusion

This case highlights *Shewanella* as a rare but important pathogen in septic arthritis, particularly in elderly individuals with aquatic exposure during travel. Early recognition, prompt joint drainage, and appropriate antimicrobial therapy are critical to successful outcomes. As global travel and exposure to marine environments increase, clinicians should maintain a high index of suspicion for atypical organisms in returning travellers with septic arthritis.

Conflicting interests

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Ethical approval

Ethical approval was not required.

Contribution

The authors state equal contribution in the elaboration of this manuscript.

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