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Bilateral Gluteal Pyomyositis Caused by Citrobacter Species: A Case Report from Sudan

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Case Report

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Abstract

Background: Pyomyositis is a bacterial infection of skeletal muscle that most commonly affects tropical populations and is usually caused by *Staphylococcus aureus*. Gram-negative organisms are uncommon causes, and *Citrobacter* species are rarely reported.

Case presentation: A 27-year-old Sudanese man with no known chronic medical illness presented with an 8-day history of high-grade fever followed by severe bilateral hip pain and gluteal swelling. Initial investigations showed leukopenia, thrombocytopenia, and a positive typhoid IgM test, and ceftriaxone was initiated. During hospitalization, he developed progressive bilateral gluteal swelling, severe pain, and restricted hip movement. Magnetic resonance imaging demonstrated bilateral gluteal and peri-hip muscle inflammation with large intramuscular fluid collections consistent with pyomyositis. Image-guided aspiration yielded purulent material, from which *Citrobacter* species was isolated. Surgical drainage was recommended but declined by the patient. He was subsequently treated with repeated image-guided aspiration and two weeks of intravenous ciprofloxacin according to susceptibility testing, with marked clinical improvement and restoration of full hip movement. At three-week follow-up, he remained asymptomatic without clinical evidence of recurrence.

Conclusion: Bilateral gram-negative pyomyositis caused by *Citrobacter* species is an unusual presentation in a previously healthy young adult. MRI and microbiological examination of aspirated material were important for diagnosis and targeted therapy. This case also illustrates that repeated percutaneous aspiration combined with appropriate antimicrobial therapy may provide an alternative source-control strategy when operative drainage is declined, although surgical or percutaneous drainage remains the recommended approach for established intramuscular abscesses.

Introduction

Pyomyositis is a bacterial infection of skeletal muscle that may progress to intramuscular abscess formation. Although historically associated with tropical regions, it is increasingly recognized in temperate settings. *Staphylococcus aureus* remains the predominant causative organism, whereas gram-negative bacilli accounts for a minority of cases and are more frequently reported in patients with underlying comorbidities or immunocompromising conditions. [1-3]

Patients are commonly present with fever, localized muscle pain, swelling, and restricted movement, although early manifestations may be nonspecific. Magnetic resonance imaging (MRI) is the preferred imaging modality for establishing diagnosis, while microbiological examination of blood and abscess material is important for identifying the causative organism and guiding antimicrobial therapy. [3, 5]

Citrobacter species are gram-negative enteric organisms that can cause a variety of extraintestinal infections. Pyomyositis caused by *Citrobacter* is exceptionally uncommon. The first reported case of *Citrobacter freundii* pyomyositis was published in 1990, and only a small number of cases have subsequently been described. [4]

We report a case of bilateral gluteal pyomyositis caused by *Citrobacter* species in a previously healthy young man, presenting during an acute febrile illness. The case highlights the diagnostic challenge posed by deep muscle infection without prominent cutaneous findings and describes the clinical outcome following repeated percutaneous aspiration and targeted antimicrobial therapy.

Case Presentation

A 27-year-old Sudanese man presented to Port Sudan Teaching Hospital with an 8-day history of high-grade fever associated with headache, gastrointestinal symptoms, and generalized weakness. He subsequently developed severe pain around the right hip with progressive difficulty walking. He had no history of recent trauma, intramuscular injections, skin infection, strenuous exercise, or similar previous episodes. He worked as a hospital cleaner and occasionally performed heavy manual tasks. He had no known diabetes mellitus, immunodeficiency, chronic illness, or long-term corticosteroid or other immunosuppressive therapy.

On admission, his temperature was elevated, heart rate was 120 beats/min, respiratory rate was 30 breaths/min, and blood pressure was 118/58 mmHg. He appeared acutely ill and mildly jaundiced. Laboratory investigations showed a white cell count of 3.5 × 10^9/L, hemoglobin 12.5 g/dL, platelet count 45 × 10^9/L, erythrocyte sedimentation rate 110 mm/h, total bilirubin 9.2 mg/dL, direct bilirubin 4.2 mg/dL, and normal renal function. Malaria testing and serological tests for dengue, brucellosis, HIV, hepatitis B, and hepatitis C were negative. Typhoid IgM was positive, and ceftriaxone was initiated for a suspected acute enteric febrile illness.

On hospital day 3, he developed severe right hip pain and swelling. His white-cell count increased to 10.1 × 10^9/L and C-reactive protein was 171 mg/L. His platelet count had normalized; however, his hemoglobin had fallen to 6.1 g/dL. The blood film showed a leukoerythroblastic picture with toxic neutrophil changes. Vancomycin was added because of concern for an evolving deep bacterial infection.

By hospital day 5, swelling had developed in both gluteal regions with severe restriction of hip movement. The overlying skin remained intact without erythema, ulceration, or obvious fluctuance (Figures 1 and 2). Doppler ultrasonography demonstrated extensive soft-tissue inflammation, while plain radiographs and abdominal ultrasonography were unremarkable.

Pelvic MRI demonstrated extensive bilateral gluteal and peri-hip muscle inflammation with large intramuscular fluid collections, consistent with bilateral pyomyositis and intramuscular abscess formation. Image-guided aspiration yielded purulent material. Culture grew *Citrobacter* species; species-level identification was not available. The isolate was reported as susceptible to ciprofloxacin. Vancomycin was therefore discontinued and intravenous ciprofloxacin was administered for two weeks.

Blood cultures were obtained after ceftriaxone had already been initiated and showed no growth. Surgical drainage was recommended because of the extent of the intramuscular collections; however,

the patient declined operative intervention. He was instead managed with aspiration, targeted antimicrobial therapy, analgesia, and close clinical observation.

The patient's condition improved progressively. The left gluteal swelling resolved, the right-sided swelling markedly decreased, and full hip movement was restored. Inflammatory markers normalized. He was discharged in good clinical condition. At three-week outpatient follow-up, he remained asymptomatic with no clinical evidence of recurrence or residual functional impairment.

Discussion

This case describes an unusual presentation of bilateral gram-negative pyomyositis caused by *Citrobacter* species in a young adult without known chronic immunocompromise. Gram-negative pyomyositis is uncommon; a review of published cases identified approximately 130 cases reported between 1979 and 2011, with many occurring in patients with underlying medical or immunocompromising conditions. [3]

Only a small number of *Citrobacter* pyomyositis cases have been described. Fincher et al. reported the first recognized case of *C. freundii* pyomyositis in a 72-year-old man, while subsequent literature has described additional cases in patients with significant underlying disease [3, 4]. The present case differs in the patient's young age, absence of known chronic comorbidity, bilateral involvement, and isolation of *Citrobacter* species from deep intramuscular collections.

The pathogenesis of pyomyositis is thought to involve hematogenous seeding of skeletal muscle. Healthy muscle is relatively resistant to infection, whereas trauma, vigorous exercise, or other forms of local muscle injury may increase susceptibility to bacterial implantation [5, 7]. In this patient, occasional heavy manual work could theoretically have produced minor muscle injury; however, there was no history of definite trauma, and this proposed association remains speculative. His marked thrombocytopenia at presentation may also have theoretically increased the risk of minor intramuscular bleeding, but no hematoma was demonstrated on imaging. These factors therefore cannot be established as causes of infection in this individual.

The patient's gastrointestinal symptoms and positive typhoid IgM raised the possibility of an acute enteric infection occurring concurrently with pyomyositis. However, the diagnosis of typhoid fever was not microbiologically confirmed, and blood cultures were obtained only after ceftriaxone had been started. Therefore, neither typhoid fever nor gastrointestinal bacterial translocation can be established as the source of the *Citrobacter* infection. The relationship between the systemic febrile illness and subsequent pyomyositis should consequently be regarded as a clinical association rather than a demonstrated causal pathway.

The diagnosis of pyomyositis can be difficult when infection involves deep muscles and external inflammatory changes are absent. The initial symptoms may resemble musculoskeletal injury or other inflammatory conditions. MRI is the preferred imaging modality because it provides detailed assessment

of muscle inflammation, abscess formation, and adjacent structures [3, 5]. In our patient, the absence of obvious skin changes initially obscured the extent of infection, whereas MRI demonstrated extensive bilateral intramuscular disease. Definitive microbiological diagnosis was achieved by aspiration of the collections.

Serum creatine kinase was not available in this case and therefore concomitant biochemical muscle injury or rhabdomyolysis could not be assessed. Importantly, however, CK is often normal in hematogenous pyomyositis involving a single muscle group, and a normal CK would not have excluded the diagnosis [3]. The diagnosis in this patient was instead established by the combination of clinical findings, MRI abnormalities, purulent aspiration, and positive deep-tissue culture.

Management of established pyomyositis generally requires antimicrobial therapy together with drainage of purulent collections. Current guidelines recommend MRI for diagnosis, culture of blood and abscess material, early drainage of purulent material, and approximately 2–3 weeks of antimicrobial therapy in uncomplicated cases. [5]

In our patient, operative drainage was recommended but declined. Repeated aspiration provided percutaneous source control alongside targeted ciprofloxacin therapy. Evidence supporting this approach comes from a prospective randomized study of 25 patients with Chiedozi grade II tropical pyomyositis, in which patients were randomized to open drainage or percutaneous drainage in combination with antibiotics. The percutaneous group had shorter hospital stays and shorter antibiotic courses, and the authors concluded that percutaneous drainage was an effective treatment approach for grade II disease [8]. However, that study predominantly involved *S. aureus* infection and did not specifically evaluate *Citrobacter* pyomyositis. Therefore, its findings support the feasibility of percutaneous source control but do not establish equivalence between percutaneous aspiration and surgical drainage for this case.

The patient's favorable clinical response following repeated aspiration and targeted antimicrobial therapy is encouraging but should not be interpreted as evidence that drainage can routinely be omitted in established pyomyositis. Rather, this case demonstrates a practical alternative when operative drainage is declined or is not immediately feasible, provided that adequate percutaneous source control and close clinical monitoring can be achieved.

Limitations

This report has several limitations. Species-level identification of the *Citrobacter* isolate was unavailable, limiting comparison with previously reported *C. freundii* infections. Blood cultures were obtained after ceftriaxone had been initiated and therefore could not reliably establish or exclude bacteremia. The concurrent diagnosis of typhoid fever was based on positive IgM serology without microbiological confirmation and should therefore be considered suspected rather than proven. The marked decline in hemoglobin during hospitalization was not fully explained, and creatine kinase was unavailable, preventing assessment of concomitant biochemical muscle injury or rhabdomyolysis. Follow-up imaging

was not performed, so radiological resolution of the abscesses could not be confirmed. Finally, the possible contributions of occupational muscle strain, thrombocytopenia-related microhemorrhage, and gastrointestinal bacterial translocation remain speculative and cannot be established from a single case.

Conclusion

Bilateral pyomyositis caused by *Citrobacter* species is an unusual diagnosis in a previously healthy young adult. Deep muscle infection should remain in the differential diagnosis of persistent fever with progressive muscle pain or swelling, even when cutaneous inflammatory signs are absent. MRI and aspiration for microbiological diagnosis are particularly valuable in such presentations. Although drainage remains an important component of treatment for established intramuscular abscesses, repeated image-guided aspiration combined with targeted antimicrobial therapy may provide effective percutaneous source control when operative drainage is declined.

Declarations

Authors' Contributions

M.K.O. and D.M: Conceptualization. M.K.O and T.A.M: Data curation; Investigation; Methodology. D.M, M.K.O and O.M: Writing – original draft. O.M, A.B: Writing – review & editing.

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Conflict of interest

The authors declare no conflicts of interest.

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Ethics approval and consent to participate

This case report was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent for participation and publication was obtained from the patient. Institutional approval was not required, as per local policy for single case reports.

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Figures



Figure 1

Clinical photograph of the right gluteal region demonstrating diffuse swelling with intact overlying skin and mild scaling.



Figure 2

Clinical photograph of the left gluteal region demonstrating diffuse swelling with intact overlying skin and mild scaling.