

Diabetic Pyomyositis

An uncommon cause of a painful leg

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Pyo-myositis is a pyogenic infection of the skeletal muscle that can lead to abscess formation (1,2). It commonly occurs in the tropics, but is also recognized in temperate climates, with HIV infection and diabetes being the main predisposing factors (3,4). The diagnosis of pyomyositis is difficult due to its vague clinical presentation and poor localizing signs. Early in its course, the differential diagnosis includes musculoskeletal aches, osteomyelitis, septic arthritis, muscle hematoma, muscle rupture, thrombophlebitis, or deep venous thrombosis. A delay in diagnosis may result in compartment syndrome, sepsis, and death. The long-term sequelae of pyomyositis include osteomyelitis of adjacent bones, muscle scarring, prolonged hospitalization, and significant functional impairment (5). We report a patient with diabetes who presented with a painful leg and was diagnosed with pyomyositis.

RESEARCH DESIGN AND METHODS

A 63-year-old man with type 2 diabetes presented with a 1-week history of increasing pain and swelling over his left lower limb. He was unable to weight-bear and had systemic features of malaise, fever, and rigors. There was no history of trauma. Comorbidities included ischemic heart disease, hypertension, and hyperlipidemia. He had an episode of olecranon bursitis 3 months previously and an aspirate grew methicillin-sensitive *Staphylococcus aureus* (MSSA) treated with 1 month of oral flucloxacillin. At the current presentation,

physical examination revealed a febrile man in pain, hemodynamically stable with a tender, tense, and swollen left thigh. There was no erythema or lymphadenopathy present.

RESULTS— Laboratory results showed a mild leucocytosis ($11.8 \times 10^9/l$), neutrophilia ($8.97 \times 10^9/l$) with left shift, C-reactive protein >250 mg/l, and creatinine kinase 655 units/l. Blood glucose was 13.5 mmol/l and HbA_{1c} 7.7%. Two sets of blood cultures grew MSSA within 24 h, and intravenous flucloxacillin and gentamicin were started. There was no deep venous thrombosis on Doppler ultrasound. Computerized tomography (CT) showed a large heterogenous collection throughout the left vastus intermedius muscle, which was confirmed on magnetic resonance imaging (MRI). MRI also showed myositis involving the medial gastrocnemius muscle. Surgical exploration was promptly organized, and repeated debridement and washouts were performed. The tissue samples grew MSSA initially and then methicillin-resistant *S. aureus* (MRSA) and *Pseudomonas*, leading to a change in antibiotics to vancomycin and ciprofloxacin. He had a prolonged stay in hospital of 133 days and received antibiotics until his discharge to respite care.

CONCLUSIONS— The pathogenesis of pyomyositis is multifactorial. Transient bacteremia with concomitant muscle damage may be a causative factor. The earlier episode of septic bursitis may

have been the source of bacteremia in this case. Diabetes is an important contributing factor to pyomyositis by predisposing the skeletal muscle to damage (6,7) and increasing susceptibility to infections. Review of the pyomyositis literature suggests that its incidence in diabetes has increased from 8% of cases in 1971–1991 (1) to 31% of cases in recent reports (2).

As shown in this case, pyomyositis usually involves the large muscle groups of the pelvic girdle and lower extremities, with the quadriceps muscles most commonly affected (5). *S. aureus* is the usual pathogen, but rarer infectious agents include *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Escherichia coli*, *Mycobacterium avium*, and gram-negative bacteria (5).

Pyomyositis progresses through three clinical stages (8). The initial invasive stage begins with cramping and aches and progressive pain in the affected area associated with a low-grade fever. It may be 1–2 weeks before the correct diagnosis is made. By stage 2, muscle abscesses have formed and local and systemic manifestations are present. The affected area becomes fluctuant and tender, and the overlying skin is mildly erythematous. Needle aspiration yields purulent material. If pyomyositis is not treated in the second stage, it progresses to stage 3, which is characterized by signs of toxicity and septic shock.

Routine laboratory investigations are rarely helpful. Inflammatory markers such as C-reactive protein may be elevated (1), and 50% of patients have a leucocytosis with a left shift (9). Muscle enzyme levels are variable. Blood cultures are positive in 5–31% of cases (5,9). Plain radiography is often unremarkable and mainly used to rule out primary bone lesions. MRI is the imaging modality of choice, especially in the initial stages. It demonstrates diffuse muscle inflammation and abscess formation. Ultrasonography and CT are useful in localizing intramuscular abscesses and guiding needle aspiration.

The treatment of pyomyositis during the initial stage is with intravenous anti-

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Abbreviations: MRI, magnetic resonance imaging; MSSA, methicillin-sensitive *Staphylococcus aureus*.

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biotics alone. As *S. aureus* is the most common pathogen, empirical treatment with flucloxacillin is appropriate. Addition of an aminoglycoside achieves a synergistic effect and should be instituted in patients with diabetes or during the septic stage. With abscess formation, drainage of the purulent collection with concurrent use of antibiotic therapy is required. Drainage of the abscess may be performed under radiological guidance, otherwise surgical exploration and debridement of necrotic tissue may be necessary. Culture of the purulent material and antibiotic sensitivities will aid in the selection of appropriate antibiotic therapy. The duration of antibiotic therapy can range from a few days to a more prolonged course, as occurred in this case.

The diagnosis of pyomyositis requires

a high index of suspicion and should be considered in all patients with fever and muscle pain. This is particularly important in patients with diabetes. MRI is the diagnostic imaging modality of choice. Successful treatment requires early recognition, appropriate use of antibiotic therapy, and debridement and drainage of the affected tissues.

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