Primary Pyomyositis Complicated by Bilateral Pyelonephritis in a Healthy Adolescent Boy

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Primary pyomyositis is a rare disease in healthy children and young adults. Early diagnosis is difficult because of its subtle and non-specific manifestations. The clinical course is usually benign and systemic dissemination is usually a manifestation in the late stage. We report a 13-year-old healthy boy who suffered from primary pyomyositis. Although the offending microbe was Oxacillin-sensitive Staphylococcus aureus, his response was unsatisfactory. Bilateral pyelonephritis was disclosed after CT scanning. He began to respond to additional Gentamicin treatment. He had an uneventful recovery thereafter and was discharged on the 8th admission day. Although systemic extension often occurs late in its course, we should consider early systemic dissemination is when treatments fail or virulent microbes are identified. Systemic re-evaluation and modification of treatment are necessary to reduce morbidity and mortality.

Key words: primary pyomyositis, pyelonephritis, adolescence

Introduction

Primary pyomyositis is a rare disease in healthy children and young adults. Early diagnosis is difficult because of its subtle and non-specific manifestations. The clinical course is usually benign and systemic dissemination is usually the manifestation in the late stage. Herein we report a 13-year-old healthy boy who suffered from primary pyomyositis.

Case Report

This 13-year-old boy fell and contused his buttock on a rock. No wound resulted and he did not visit a medical doctor. Three days later he developed fever and left buttock pain. Seven days after falling, he was brought to our emergency department because of persistent symptoms and a limp. On arrival, he was ill-looking and unable to stand without assistance. Vital signs were respirations 25 breaths/min, pulse 109 beats/min, blood pressure 120/75 mmHg and temperature 38.9°C. He had previously been active and healthy with no medical history of serious illness, risk factors for human immunodeficiency virus, recent injected drug use, or foreign travel. Physical examination revealed left hip pain on movement but no wound, overlying cellulites, or other abnormalities. Initial laboratory findings were WBC 17,180/mcL (bands 2%, segments 89%). Urinalysis, creatine kinase, and other blood tests, except for blood cultures, were within normal limits. A pelvic radiograph showed no abnormalities. He was admitted to the pediatric ward and given intravenous oxacillin 2 g every 4 hours. Magnetic...
resonance (MR) imaging the next day revealed inflammation in the left gluteus maximus, media and iliacus muscles with some fluid accumulation in the left sacroiliac joint (Fig. 1). No sign of endocarditis was found on echocardiography. Oxacillin-sensitive *Staphylococcus aureus* was cultured from his blood on the third hospital day. His fever persisted and a computed tomography (CT) scan on the fifth hospital day showed inflammation in the left gluteus muscles, small abscesses in the left pyriformis muscle, and multiple wedge-shape attenuations in both kidneys (Fig. 2). Early systemic spread resulting in acute pyelonephritis was diagnosed and intravenous Gentamicin, 240 mg daily was added to the antibiotic regimen. No microbe was cultured from urine obtained before administration of the aminoglycoside. His fever subsided on hospital day 8 and thereafter he recovered gradually and uneventfully. The antibiotics were switched to oral sulfamethoxazole-trimethoprim, 2 tablets (each tablet contains 400 mg of sulfamethoxazole and 80 mg of trimethoprim) twice a day. After ten days of oral antibiotics, he was discharged on the 19th hospital day without sequelae.

**Discussion**

By definition, primary pyomyositis is a bacterial infection of skeletal muscle not arising from contiguous infection in a host who is not immunocompromised and does not have another debilitating condition\(^1\)\(^4\). The pathophysiology remains undetermined although it is thought to arise from diminished local resistance in the setting of transient bacteremia. Antecedent blunt trauma, including strenuous exercise, has been reported and the formation of a small hematoma and surrounding damaged tissues from trauma are thought to provide a favorable location for bacteria to bind and proliferate\(^5\)\(^7\). *Staphylococcus aureus* remains the most common contributing pathogen, followed by *Streptococcus pyogenes*. Other microbes, such as *Salmonella, Bartonella*, gram-negative bacteria, and

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*Fig. 1 Magnetic resonance images of the pelvis of a 13-year-old boy eight days after falling. (A) The inflamed muscle is enhanced by gadolinium in an axial T1-weighted image obtained with fat saturation. (B) A conventional axial T2-weighted image with fat saturation demonstrates high signal intensities in the involved muscle and the left sacroiliac joint (arrow) consistent with a fluid collection and inflammation*
anaerobes, have also been reported\(^8,9\).

Three clinical stages have been described and represent a continuity of disease from diffuse inflammation of the affected muscle to focal abscess formation, and finally to a disseminated bacterial infection with septicemia and multiorgan dysfunction\(^10\). In the very beginning, patients feel local muscle pain which is indistinguishable from muscle aches from other causes. Within a few days, affected muscles become edematous. A low-grade fever and mild leukocytosis may be present in this invasive stage. Around 1 to 3 weeks after development of muscle infection, fever, leukocytosis and constitutional symptoms may become significant. Pus can be aspirated from the affected muscle but there is still no fluctuation. This is the suppurative stage and most patients are diagnosed at this stage. If the patient remains untreated, a late stage may occur with much pus in the affected muscle weeks after onset. Fluctuation will predominate and patients may become toxic with sepsis\(^11\). Mortality, though very rare, has been reported in this stage\(^11-12\). The clinical course of primary pyomyositis is usually milder than that of necrotizing fasciitis or myositis. Amputation or systemic expansion of infection is rarely reported unless there is inadequate treatment or no treatment for several weeks. The rapid clinical course with early systemic spread in our healthy patient is atypical. Clinicians should be alert to this rare situation if there is suspected treatment failure.

It is difficult to diagnose primary pyomyositis in the early stages. Laboratory results are usually subtle and non-specific. Creatinine kinase levels are often within normal limits, not only in this stage but frequently throughout the whole clinical course\(^2\). MR imaging is the most useful tool for diagnosis because it can disclose diffuse muscle inflammation and subsequent abscess formation\(^13\). CT scanning can clearly demonstrate swelling of the involved muscle and the abscess; however, it may fail to show diffuse inflammatory changes in the early stage of infection\(^14\). Plain radiography is typically non-diagnostic. It may be useful to exclude bony lesions such as osteomyelitis or tumors that may

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Fig. 2 Computed tomographic scan of the pelvis and abdomen in a 13-year-old boy 11 days after falling. (A) Besides the swelling in the left gluteus muscle, there is a focal low-density lesion (arrow) in the left pyriformis muscle consistent with abscess formation. (B) Multiple foci of wedge-shaped, low densities are demonstrated in the bilateral kidney parenchyma, consistent with acute pyelonephritis.
mimic the clinical manifestations of pyomyositis. Ultrasound may be useful for abscess detection and enabling guided needle aspiration, but the technique is operator-dependent.

Early diagnosis and prompt treatment remain the keys to successful treatment. Parenteral administration of a single antibiotic directed against staphylococci and streptococci is often effective in primary, uncomplicated cases. Oxacillin or cloxacillin is a common, suitable choice, with a first-generation cephalosporin as an alternative. Combination antibiotic treatment should be considered if the patient is seriously ill, has risks from other co-morbidities, or is in an area with a high prevalence of methicillin resistance\(^{15}\). Intravenous antimicrobial therapy is generally given for at least 7-10 days, followed by a variable period of oral antibiotic therapy for a total duration of 4 to 6 weeks, depending on the severity and presence of any complications\(^{14,16}\). Drainage may be necessary for an abscess. Percutaneous drainage can be undertaken under ultrasonographic or CT guidance. Surgical operative drainage is reserved for cases where adequate drainage cannot be achieved by percutaneous methods. More aggressive treatment, including extensive debridement, may be necessary for patients with Streptococcal pyomyositis because it has been reported to have an extensive and aggressive course\(^{17,18}\).

Primary pyomyositis is rare and patients usually present with non-specific symptoms in the early stages. Although most cases have a favorable outcome, morbidity and even mortality may be encountered. Pyomyositis should be suspected in patients with acute onset of severe, localized muscle pain and fever. Systemic expansion, which usually occurs in the late stage, should be suspected in any stage of the illness if the response to treatment is not satisfactory or a virulent microbe has been isolated.

References


一位青少年發生的原發化膿性肌炎併雙側腎盂腎炎

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原發化膿性肌炎是種會發生在健康兒童及青年，但卻十分罕見的疾病。此病早期表現常不明顯，且無特異性，這使得早期診斷相當困難。此病病程溫和，全身性擴散，通常在疾病的晚期才會發生。我們報導了一位健康，但卻感染了原發化膿性肌炎的13歲男孩。雖然致病菌為怕Oxacillin的金黃色葡萄球菌，他對治療的反應卻不理想。經過進一步電腦斷層攝影檢查，發現已併發雙側腎盂腎炎，經加上Gentamicin治療後病情才開始好轉，並於住院八天後出院。雖然此病通常要到晚期才會擴散，但如果治療的反應不理想，或是鑑定出的菌種較為猛烈，我們必須警覺疾病是否已有早期擴散。盡快再次全身評估及調整治療，是減少併發症與死亡的不二法門。

關鍵詞：原發化膿性肌炎，腎盂腎炎，青少年