



Pelvic Primary Pyomyositis Complicated by Septic Pulmonary Embolism and Shock in a Young Adult

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Pyomyositis is an acute infection of skeletal muscles. It can be life-threatening if diagnosis and treatment are delayed. We present a case of a 23-year-old male delayed diagnosis of pyomyositis of the iliacus muscle and gluteal minimus muscle complicated with pulmonary septic embolism and septic shock who was treated with early goal directed cardiovascular resuscitation and surgical exploration combined with parenteral antibiotics. Computed tomography is useful in making the diagnosis. Early diagnosis and treatment may avoid surgery and reduce mortality.

Key words: Pyomyositis, septic pulmonary embolism, hip pain

INTRODUCTION

Pyomyositis is an acute bacterial infection occurring in skeletal muscle with no obvious local or adjacent source of infection. Initial symptoms include localized muscle pain, swelling, and tenderness. The diagnosis of pyomyositis is often delayed because other primary diagnoses are first considered. Septic pulmonary embolism was defined as the presence of lung abscess, multiple round or wedge-shaped densities located in the lung periphery with or without the presence of feeding vessels, in addition to the isolation of bacteria in the blood or sited of infection. We presented a case with staphylococcal pyomyositis of the iliacus muscle and gluteal minimus muscle in a 23-year-old male complicated with septic pulmonary embolism and septic shock. Pelvic pyomyositis must be considered in the differential diagnosis of acute pain in the hip region.

CASE REPORT

A 23-year-old soldier was transferred to our institution for intensive care unit management after initially presenting to another hospital with right hip pain after a vigorous military

training about 2 weeks ago. He was initially diagnosed with myofascial pain because the plain radiography of right hip revealed no bone or joint abnormality in the outpatient department of the transferring hospital. Two weeks later, the patient returned to the emergency department of the transferring hospital with symptoms of fever, shortness of breath, drowsy, severe right hip pain, and limp. He subsequently developed septic shock and respiratory failure. The patient received fluid resuscitation and emergency endotracheal tube intubation in the emergency department of the transferring hospital and was transferred to our institution. Vital signs on admission included a temperature of 39°C, a pulse rate of 142 beats/min, and blood pressure of 95/60 mmHg. The chest auscultation showed crackles without wheezing. Examination of the patient's skin reveals no evidence of abrasions, pustules and open wound. Laboratory data on admission revealed the leukocyte count was 1130/mm³ (79% neutrophils and 18% lymphocytes). The platelet was 24,000/mm³. The C-reactive protein was 20.18 mg/dL. Renal function impairment was noted (blood urea nitrogen: 38, creatinine: 1.8 mg/dL). Arterial blood gas showed metabolic acidosis (pH: 7.31, HCO₃⁻: 15, PaCO₂: 32). The blood lactate was 5 mmol/L. Results of urine analysis were negative. The human immunodeficiency virus (HIV) test was negative. The imaging studies were obtained prior to transfer, which included chest X-ray, computed tomography (CT) scan of his chest, abdomen and pelvis. The chest CT showed multiple irregular peripheral nodular lesions, peripheral wedge-shape infiltration and cavity lesion [Figure 1]. The pelvis CT scan revealed marked enlargement and low attenuation in the right iliacus muscle and gluteal minimus muscle that indicates pyomyositis [Figure 2]. Ultrasound-guided drainage evacuated <5 ml of seropurulent material from right gluteal

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minimus muscle. The patient was admitted to intensive care unit for management of septic shock and multiple organ failure. Following admission, he was treated with intravenous antibiotic therapy (imipenem 500 mg every 6 h, teicoplanin 400 mg every 12 h, and vancomycin 1000 mg every 12 h), fluid resuscitation with crystalloids and inotropic agent. Two days after the initiation of antibiotic therapy and platelet transfusion, surgery was scheduled because of the patient's lack of clinical improvement and the persistence of low-grade fever and general signs of inflammation on laboratory studies. One surgical incision was made with right ilioinguinal approach and another incision was made by lateral approach of thigh. Purulent fluid extending from the ilioc muscle and gluteal minimus muscle was noted during operation and the necrotic muscle was removed [Figure 3a and b]. The purulent fluid obtained was processed for bacterial culture. Methicillin-sensitive *Staphylococcus aureus* was yielded in the blood culture 8 days after admission. The same bacteria were isolated from the fluid taken during the operation. The patient subsequently proceeded four additional irrigation and debridement surgery and the dead space in the right ilioc muscle was covered by rectus femoris muscle flap [Figure 3c]. Six weeks after the initiation of antibiotic therapy, the patient was started on oral cephalexin (500 mg/6 h for 2 weeks). The total duration of antibiotic treatment was 8 weeks. The hospital course was complicated by tension pneumothorax with subcutaneous emphysema and the patient was treated with chest tube intubation. Ten weeks following, the patient was discharged and reported no right hip pain. He was able to ambulate with crutch.

DISCUSSION

Staphylococcus aureus pyomyositis occurs most commonly in tropical areas. In more temperate regions, pyomyositis historically is found in healthy young males who develop pain and swelling of muscles after activity. Tenderness and induration soon follow.^{1,2} Most frequent anatomic locations include proximal lower extremity, shoulder, calf, paravertebral, psoas, and periscapular muscle groups.^{3,4} Two distinct events are thought to occur in the genesis of pyomyositis. The first is an initial muscle injury (acute or overuse) with a second, concurrent bacteremia within a few days of the muscle trauma. Skin lesions, such as abrasions, pustules, and open/penetrating wounds, have been postulated as a potential portal of entry for *S. aureus*, leading to the bacteremia.³ Other predisposing factors include vitamin C deficiency, beriberi, and parasite, virus, or spirochete infection. HIV myositis and the mitochondrial toxicity of antiretroviral medications also increase the risk of infection.^{5,6}



Figure 1. Chest computed tomography shows multiple irregular peripheral nodular lesions, peripheral wedge-shape infiltration and cavity lesion multiple nodular opacities. A diagnosis of septic pulmonary embolism was made

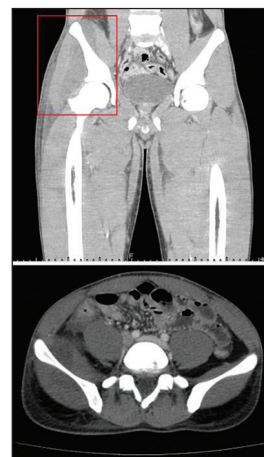


Figure 2. Coronal and axial view computed tomography scan shows marked enlargement and low attenuation in the right ilioc muscle and gluteal minimus muscle that indicates pyomyositis

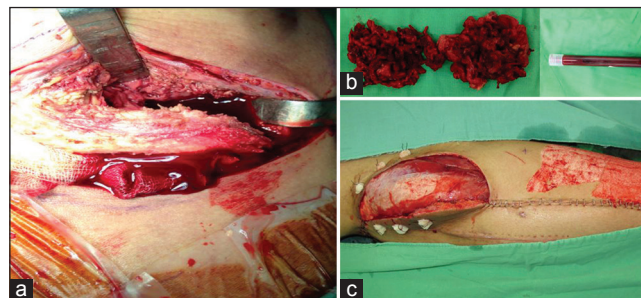


Figure 3. (a) Open surgical drainage of ilioc muscle, (b) necrotic muscle tissue and collection of fluid, (c) rectus femoris muscle flap coverage

Subsequent bacterial seeding of the muscle tissue results in the focal pyomyositis. Congestion and blood stasis in the involved muscles during and following exercise may act as

further precipitating factors. Review of the United States-based literature revealed cases of bacterial pyomyositis in children and young adults after arm wrestling, volleyball, and swimming.⁷

Since the initial presentation often includes nonspecific signs of fever, anorexia, lethargy, and generalized pain, the definitive diagnosis is often delayed by several weeks. Routine laboratory studies are rarely helpful in establishing the diagnosis. On an average, 60-70% of patients have leukocytosis, often with a left shift. Erythrocyte sedimentation rates are commonly elevated, whereas muscle enzymes are usually in the normal range.^{1,3,4}

Plain radiographs are often unremarkable. Ultrasonography of the involved region may reveal swelling and findings consistent with an abscess.⁸ Gallium bone scan may be useful early in the disease course.¹ CT scan with contrast or gadolinium-enhanced magnetic resonance imaging studies are the investigations of choice in making a more definitive diagnosis.⁹

Definitive diagnosis is made by Gram stain, aerobic and anaerobic culture of purulent material. *S. aureus* was the most common infecting organism and responsible for pyomyositis in approximately 90% of cases.¹⁰ Appropriate antibiotic therapy should include anti staphylococcal coverage. Of note, 20% of North American patients may harbor organisms that are methicillin resistant.⁴ Results of Gram stain and culture can be used to refine antibiotic management. The average duration of treatment in North America was 22 days in one large retrospective review of 100 patients, and a treatment course of 2-3 weeks was recommended as reasonable.⁴

Early and aggressive surgical exploration combined with parenteral antibiotics have been the standard treatment in the literature.^{1,11} Goals of surgical treatment include visualization of any deep foci, removal of necrotic tissue, reduction of compartment pressures, and collection of material suitable for Gram stain and culture. Modalities used include open surgical drainage or CT-guided needle drainage.¹

The progress of infection and presentation can be divided into three stages. Stage 1 is the invasive stage, with minimal inflammation, and no pus collection. The muscle is wooden or "hard-rubber" stiff on palpation. Stage 2 is the suppurative stage, occurring 10-21 days after symptom onset, with most patients presenting at this stage. In Stage 3, patients present with systemic upset, with high fever, and septicaemia.¹²

It is not clear why there was no progression to the formation of an abscess since the condition had been developing over 2 weeks. This is comparable to the range of 3 days to 3 weeks, which has been described elsewhere and in which the primary presentation was usually with an abscess.¹⁰

The history of previous physical exercise may or may not be relevant. It is possible that a "minor" strain of the iliacus in some way made the muscle more susceptible to transient

bacteremia. This association has been recognized previously.¹¹

Pyomyositis of pelvis should be considered in the differential diagnosis of any people with pyrexia complaining of the hip joint pain or muscle aches, particularly as differential diagnosis in septic arthritis of the hip. Orthopedic surgeons should be aware of this condition.

CONCLUSION

Thigh pain is common in the athletic population and, while musculoskeletal issues are by far the most frequent cause, rare infections can lead to prolonged disability and systemic illness. The case illustrates the point that one must keep pyomyositis in the differential diagnosis in musculoskeletal pain-especially when the response to initial treatment is slow or inadequate.

DISCLOSURE

All authors declare no competing financial interests.

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