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Pectoralis major muscle abscess in an immunocompromised adult: Case report and literature review

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ABSTRACT

INTRODUCTION: Primary chest wall abscess is considered a rare disease.

PRESENTATION OF CASE: A 60-year-old man presented with swelling of the pectoral muscle in the left side of his chest. Needle aspiration revealed pus. Computed tomography discovered fluid build-up anterior to the left pectoralis major muscle extending up to the left shoulder. There were multiple air pockets within the pectoralis major muscle and the surrounding fat stranding. Following antibiotic administration, we performed surgical debridement and irrigated the affected region. During surgery, the pectoralis major muscle was partially damaged; necrotic tissue was found only within the muscle. We diagnosed this condition as a pectoralis muscle abscess that most likely developed spontaneously from hematogenous spread. His postoperative course was uneventful, and there was no recurrence during a 3-month follow-up.

DISCUSSION: Pyomyositis is an acute infection of the skeletal muscle. Although it is more commonly found in tropical climates, it is also diagnosed in temperate climates in patients who are immunocompromised. Pyomyositis can be divided into three stages. Stage 1, which is considered the invasive stage, presents with low-grade fever, pain, local myalgia, and local edema but no pus collection. Stage 2, which is the purulent stage, presents with fever, severe muscle pain and tenderness, moderate edema, and abscesses. Stage 3 is diagnosed when sepsis develops secondary to *S. aureus* bacteremia.

CONCLUSION: In immunocompromised patients, the detection of pyomyositis at the early stage is challenging; however, most patients present at stage 2 or 3, which can increase the risk of complications.

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1. Introduction

Pyomyositis is considered a rare disease, especially when it occurs without predisposing factors. In 1885, the first case of pyomyositis was documented in Japan [1]. Although it is endemic in tropical countries, with a prevalence of 2.2–4% of all surgical cases [1], it is rare in temperate climates [2]. Pyomyositis commonly affects the muscles of the lower limbs, predominantly the quadriceps and iliopsoas, followed by the gluteal muscles [3]. Pyomyositis of the chest wall muscles, including pectoralis muscles, is extremely rare [4]. Primary pyomyositis usually manifests itself as a localized abscess, while secondary pyomyositis is the result of the direct extension of an infectious process in tissues adjacent to the muscles. The pathophysiology of pyomyositis is not clear, but is most likely due to hematogenous bacterial spread; however, trauma, immunodeficiency, chronic illness, malnutrition, viral and parasitic infections, bacteremia, and other factors have been reported as predisposing factors [5]. Clinically, patients can present with fever, pain, erythema, and induration of the affected part [6]. Most of the infections are secondary to *Staphylococcus aureus* [7]. Septic shock

can be present during a late stage of the disease [1]. The mortality rate secondary to pyomyositis varies from 1% to 20% [8]. Differential diagnosis and staging are established by ultrasound, computerized tomography (CT) scan, and magnetic resonance imaging (MRI). Treatment relies on antibiotic therapy and surgical drainage. Herein, we report a case of primary pectoralis muscle pyomyositis. This report is in line with the SCARE criteria [9].

2. Presentation of case

A 60-year-old Saudi male, with a history of diabetes mellitus and a 15-year course of oral hypoglycemic agents without other medications, presented to our emergency department complaining of severe chest pain over the left pectoralis muscle, which had started 6 days before presentation. The pain radiated to his right shoulder; was severe, constant, sharp, and pleuritic; and was accompanied by hotness, redness, and fever for 1 day. He denied any history of trauma, surgical interventions, prior episodes, intravenous drug use, contact with people who were sick, recent travel, shortness of breath, or weight loss. He had no family history of illness or genetic disorders and was neither a smoker nor consumes alcohol.

Upon initial presentation, he had a normal heart rate, normal blood pressure 135/80 mmHg, and a low-grade fever (38 °C).

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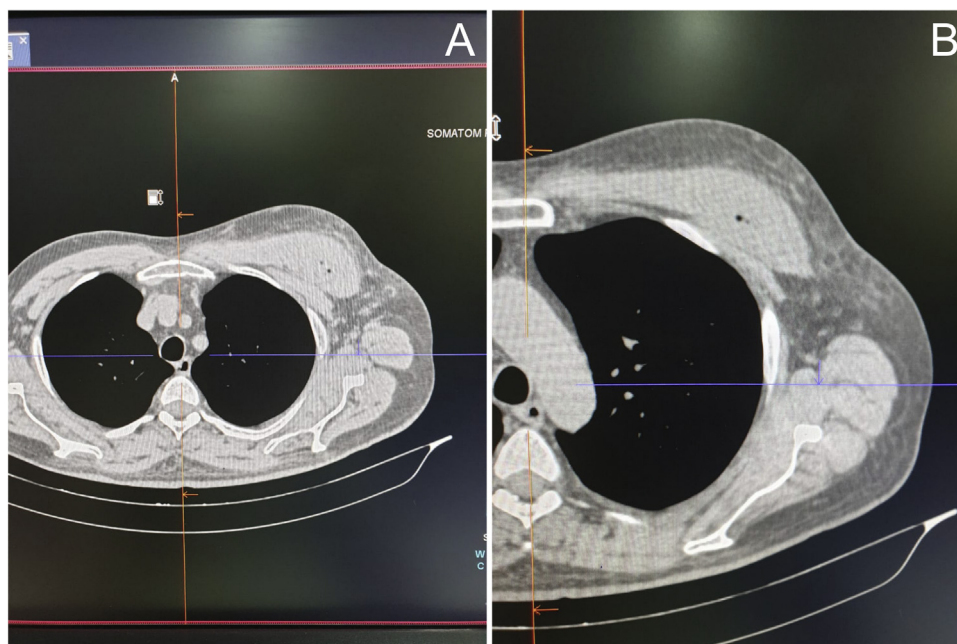


Fig. 1. CT scan of the chest showing pectoralis major enlargement, with high-density fluid collection anterior to the left pectoralis major muscle (A). This is associated with multiple air pockets within the muscle as well as in the surrounding fat stranding, indicating infection and/or inflammation (B).

Compared to his right chest, his left chest was swollen, hot, erythematous, and tender to palpation from the nipple to the left shoulder, and it had 4/5 the strength of the right shoulder. There was no palpable lymph node on his left axilla or neck. Lab results showed an elevated white blood cell count (13,500 leukocytes/mm³ with 80% neutrophils) and C-reactive protein (7 mg/dl). The chest radiography result was normal. Ultrasound of his left chest showed an area of skin induration with tiny anechoic areas within the pectoralis muscle, indicating cellulitis and possible abscess collection. CT chest scan revealed a high-density fluid collection anterior to the left pectoralis major muscle that measured approximately 6 × 2 cm and extended up to the left shoulder. This was associated with multiple air pockets within the pectoralis major muscle, as well as the surrounding fat stranding, both of which indicated infection, possibly an anerobic infection (Fig. 1).

On admission, the patient was started on intravenous antibiotics, including piperacillin, tazobactam, and vancomycin. Surgery was discussed with the patient, after which the informed consent was signed. The surgery was performed by an experienced consultant surgeon. A moderate amount of purulent fluid was found between the pectoralis minor and major muscles, which was drained, and we confirmed the diagnosis as pyomyositis. Wound cultures revealed methicillin-resistant *S. aureus*. The patient improved with serial drainages. He was discharged in stable condition with instructions on daily dressing for his wound. His postoperative course was uneventful, with no abscess recurrence at the 3-month follow-up.

3. Discussion

Pyomyositis is an acute infection of the skeletal muscle. Although commonly found in tropical climates, it is also diagnosed in temperate climates in patients who are immunocompromised [5]. Our patient was immunocompromised secondary to chronic diabetes mellitus; thus, this made him more prone to pyomyositis than healthy individuals. Diabetes mellitus may lead to the damage of skeletal muscle, which can eventually increase the risk of infarction, myositis, and pyomyositis [10,11]. Additionally, patients with diabetes are more susceptible to micro-angiopathy, which can

lead to vascular insufficiency, muscle infarction, and altered migration of neutrophils to the muscle [10]. Furthermore, patients with diabetes have an increased risk of skin colonization by *S. aureus* [12]. In temperate regions, patients with pyomyositis are usually those with impaired immune systems, including malignancy, human immunodeficiency virus (HIV) infection, chronic liver disease, renal insufficiency, diabetes mellitus, acquired immunodeficiency syndrome, hematological disorders (leukemia, lymphoma, or neutropenia), intravenous drug abuse, and concurrent infections [10].

The clinical course of pyomyositis can be divided into three stages [13]. Stage 1, the invasive stage, presents with low-grade fever, pain, local myalgia, and local edema but no pus collection. Patients in Stage 1 usually respond to intravenous antibiotics. Stage 2, which is the purulent stage, presents with fever, severe muscle pain and tenderness, moderate edema, and abscesses. This stage develops 10–21 days from the onset of the symptoms. Patients are usually diagnosed at this stage. Stage 3 is diagnosed when sepsis develops secondary to *S. aureus* bacteremia. Staging is important to assess the severity of pyomyositis and to initiate the appropriate treatment. Pyomyositis clinical presentations can mimic necrotizing fasciitis that involves superficial and deep fascia infection with a rapid progression that often occurs suddenly with a mortality rate of 25%–75% [13]. Pyomyositis and necrotizing fasciitis can even coexist in immunocompromised patients. Blisters, bullae, and skin crepitus are diagnostic features of necrotizing fasciitis [14].

Ultrasound and CT scans are the initial radiographic techniques used to evaluate pyomyositis and determine its stage since plain radiographs usually reveal normal results in these patients [13]. We can visualize the muscle enlargement and heterogeneous attenuation due to fluid collections by CT scans [15]. Ultrasound is useful during the suppurative phase when an abscess has already formed and for image-guided abscess aspiration [13]. Magnetic resonance imaging (MRI) is considered to be the gold standard modality used to assess pyomyositis, even in the early stages [16]. T2-weighted MRI shows muscle enlargement and intramuscular abscesses when present [5], can distinguish between pyomyositis and necrotizing fasciitis [5], and can determine the spread of the infection between the muscle compartments and surrounding soft tissues [13].

The treatment of pyomyositis depends on its stage. For stage 1, the appropriate treatment is antibiotics that treat the causative organism, as *Staphylococcus aureus* accounts for 70–95% of the cases, mostly penicillin resistant [7,17,18]. Other rare causative organisms include group A beta-hemolytic streptococci, alpha-hemolytic and non-hemolytic streptococci, *Staphylococcus epidermidis*, *Staphylococcus pyogenes*, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Haemophilus influenzae*, *Escherichia coli*, *Neisseria gonorrhoea*, *Klebsiella*, *Yersinia enterocolitica*, *Pseudomonas* species, *Pasteurella* species, *Salmonella typhi*, and tubercle bacilli [17–19]. For stages 2 and 3, treatment requires the percutaneous drainage or surgical drainage of the abscesses and antibiotics according to the culture of the purulent material, specifically those covering gram-positive and gram-negative bacteria [20]. In immunocompromised patients, anaerobic coverage should also be used; repeated drainage and wound irrigation are commonly required. Antibiotic use continues until clinical and radiological tests show complete improvement [20]; patients are usually treated with antibiotic regimens for 3–4 weeks after undergoing abscess drainage [5].

4. Conclusion

Our patient was clinically presented with stage 2 pyomyositis. In immunocompromised patients, the detection of pyomyositis at the early stage is challenging; however, most patients present at stage 2 or 3, which can increase the risk of complications. CT scan is considered an acceptable radiological modality to detect the presence of pyomyositis, particularly in stage 2, as found in this case. Surgical intervention with broad-spectrum antibiotics is the recommended treatment for this stage of pyomyositis.

Declaration of Competing Interest

No conflicts of interest.

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Ethical approval

The patient was consented to publish his case as a case report, and ethical approval not needed in a case report in our institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

All the study done by single author.

Registration of research studies

NA.

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Data availability statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Provenance and peer review

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