Original Article

Tropical Pyomyositis

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Abstract

Background: Tropical pyomyositis is characterized by suppuration within skeletal muscles, manifesting as single or multiple abscesses. Though primarily a disease of tropics, it is increasingly being reported from temperate regions in immunosuppressed patients. However, India has only few sporadic case reports. **Aims:** The aim of this study is to evaluate the causative organisms, clinical presentations, diagnostic modalities, treatment protocols and outcome data in tropical pyomyositis patients. **Subjects and Methods:** The study was carried out in Nilratan Sircar Medical College and Hospital, Kolkata over 3 years (July 2010 to June 2013). A total of 12 patients were diagnosed with tropical pyomyositis (confirmed with aspiration and culture of pus from muscle). All the investigation and treatment data were recorded systematically. **Results:** The presenting feature was high fever and myalgia in all 12 patients. Quadriceps femoris was the most commonly involved muscle (50%); followed by iliopsoas (25%). Culture of the aspirate showed *Staphylococcus aureus* in nine patients (75%), *Klebsiella pneumonia* in one patient (8.33%) and no growth in two patients (16.67%) even after tubercular and fungal culture. **Conclusions:** Tropical pyomyositis can affect immune-competent individuals. *S. aureus* is the most commonly cultured organism. Immediate initiation of appropriate antibiotics and surgical debridement are required to avoid complications. The prognosis remains excellent if promptly treated.

Keywords: Fever, Muscle pain, *Staphylococcus aureus,* Tropical pyomyositis

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Introduction

Tropical pyomyositis is characterized by suppuration within skeletal muscles, which manifests as single or multiple abscesses. It occurs mostly in tropical regions of the world. The exact pathogenesis is unknown, but it is proposed that pyomyositis is often a result of bacteremic seeding. This disease entity is increasingly being reported from temperate regions of the world in patients receiving immunosuppressive therapy or with concomitant human immunodeficiency virus (HIV) infection.[1,2] The bacteria most commonly causing tropical pyomyositis include *Staphylococcus aureus* (90% in tropical areas, 75% in temperate zones) and Group A *streptococcus* (1-5%); less common bacterial causes are Group B, C and G *Streptococcus*, *pneumococcus*, Haemophilus spp., and Gram-negative bacilli.[2] Although it has been widely reported from Asia, Tropical Africa, Oceania and The Caribbean islands, from India there have only been sporadic case reports.[3,4] The increasing incidence of pyomyositis in temperate regions has been correlated with increasing incidence of community-associated methicillin-resistant *S. aureus* clones, which usually produce Panton-Valentine leukocidin, a pore-forming toxin encoded by two genes, *lukF-PV* and *lukS-PV*.[5,6] The term "tropical pyomyositis" should be restricted to primary muscle abscess arising within the skeletal muscle. It should not be used to describe: (a) Inter muscular abscesses, (b) abscesses extending into muscles from adjoining tissues such as bone or subcutaneous tissues and (c) those secondary to previous septicemia.

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Subjects and Methods

The study was carried out at Nilratan Sircar Medical College and Hospital, a tertiary care teaching hospital in Kolkata over a period of 3 years (July 2010 to June 2013). A total of 12 patients were diagnosed with tropical pyomyositis; all of them were confirmed with aspiration of pus from muscle; supplemented with muscle biopsy

in two cases. Informed consent was taken from all patients. Ultrasound examination was the primary imaging modality in all 12 cases due to logistic reasons. The findings were collaborated with magnetic resonance imaging (MRI) in four cases. The aspirated pus was sent for culture in all 12 cases. Intramuscular abscesses secondarily extending to the muscle from adjoining tissue and occurring in the background of septicemia were excluded from this study. All the investigation and treatment data were collected and recorded systematically [Figure 1].

Results

The mean age of the patients was 25 years (range 20-40 years). Among 12 patients, 10 patients were male and two patients were female (Male:Female = 5:1).

The presenting feature was high grade fever (>102°F) and muscle pain in all 12 patients. Quadriceps femoris was the most commonly involved muscle (6 out of 12 patients, 50%); followed by iliopsoas (3 out of 12 patients, 25%). Gluteus maximus was involved in one patient (8.33%), pectoralis major and supraspinatus were involved in one patient (8.33%) and in one patient multiple muscle groups were involved (8.33%) [Table 1]. Three patients (25%) had a prior history of blunt trauma. No patient in this series had presented with toxic shock syndrome, spinal cord compression or acute abdomen.

Ultrasound examination was the first imaging modality used for screening in all 12 patients, which showed altered echogenicity and evidences of fluid collection. The wall of the hypoechoic intramuscular abscess was thick and no septa were found in the majority of cases. The findings were collaborated with MRI in four patients, which was superior to ultrasound in the soft-tissue delineation and exclusion of bony or joint space involvement.

The diagnosis was confirmed with aspiration of pus in all 12 patients. Culture of the aspirate showed growth of *S. aureus* in nine patients (75%), *Klebsiella pneumonia* in one patient (8.33%) and failed to show any growth in two patients (16.67%) even after tubercular and fungal culture [Table 2]. All the isolates of *S. aureus* in the present series were methicillin-resistant. The diagnosis of tropical pyomyositis was confirmed with muscle biopsy in those two patients who did not yield any growth in culture of the aspirated pus; it showed perimysial and endomysial inflammation along with myophagocytosis and muscle fiber necrosis. Blood culture showed no growth, trans-esophageal echocardiography was normal and HIV serology was negative in all the 12 patients. There was no history of diabetes mellitus or other chronic illness, organ transplantation, cancer and/or chemotherapy, immunosuppressive therapy in any of the 12 patients. None of our patients had hypogammaglobulinemia or decreased CD4 cell count. However, all patients had anemia (mean hemoglobin: 6.3 g/dl, range: 5.6-10.8 g/dl) and polymorphonuclear leukocytosis with shift to the left, along with raised erythrocyte sedimentation rate and C-reactive protein. Serum creatine phosphokinase (CPK) and lactate dehydrogenase (LDH) levels were not elevated in any of the 12 patients even with evidences of muscle destruction.

Majority of patients with staphylococcal pyomyositis were treated with intravenous (IV) injection vancomycin

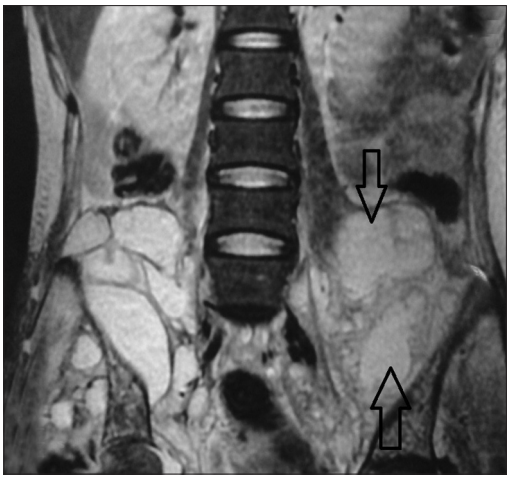

Figure 1: T1 weighted magnetic resonance imaging image showing hypointense lesions involving the left iliopsoas muscle (arrow)

Table 1: Distribution of the muscles involved in patients of tropical pyomyositis (*n*=12)

Muscles involved	No. of patients	Percentage
Quadriceps femoris	6	50
Iliopsoas	3	25
Gluteus maximus	1	8.33
Pectoralis major and supraspinatus	1	8.33
Multiple muscle groups involving biceps, gastrocnemius, anterior abdominal wall and paraspinal muscles	1	8.33

Table 2: Distribution of causative organisms from the culture of aspirated pus from the patients of tropical pyomyositis (*n*=12)

Causative organism isolated	No. of patients	Percentage
Staphylococcus aureus	9	75
Klebsiella pneumoniae	1	8.33
No growth (sterile pus)	2	16.67

in a dose of 15 mg/kg to a maximum of 1 g, given every 12 h along with surgical debridement and drainage of pus. For two patients with isolates of *S. aureus* highly sensitive to linezolid were treated with the drug as the sole antibiotic (injection linezolid 600 mg IV twice daily) along with surgical debridement and drainage of pus. Patient of pyomyositis caused by *Klebsiella pneumonia* was treated with a third generation cephalosporin along with an aminoglycoside (injection ceftriaxone 2 g IV once daily plus injection amikacin 500 mg twice daily with regular monitoring of renal function) along with surgical debridement and drainage of pus. Patients showing no growth in pus culture were treated with surgical drainage along with a combination of a broad spectrum third generation cephalosporin, linezolid and metronidazole. The antibiotics were continued for 10 days after patient became afebrile. All the patients were discharged in favorable condition with subsidence of fever and leukocytosis and improvement of hemoglobin profile.

Discussion

Traquair credited virchow for the earliest mention of tropical pyomyositis,[7] though Scriba and Beitrang zur described this entity for the first time in the year of 1885.[8] Levin *et al*. in 1971 reported the first case from a temperate region.[9] Since then many cases have been reported from various geographical regions of the world.[10,11] This increase in incidence is attributed to an increase in the number of immunocompromised patients and also partly to improvement in diagnostic techniques. Together it has led to heightened awareness of this disease entity.

As this entity is characteristically found in tropical areas, various terms such as tropical pyomyositis, myositis tropicans, tropical skeletal muscle abscess and tropical myositis are used. However, with increasing recognition from temperate regions, it is also referred to as non-tropical myositis, infectious myositis or spontaneous bacterial myositis. The classical presentation is with muscle abscess while the hallmark of the disease is the finding of myositis on a biopsy specimen of involved muscle. Therefore, some authors prefer the term myositis instead of pyomyositis.

The disease is seen in all age groups, although young males are the most susceptible group. The maximum incidence is seen at 10-40 years of age with a male to female ratio of 1.5:1.[2] Ashken and Cotton found that muscles, which are frequently involved in tropical pyomyositis include quadriceps, glutei, pectoralis major, serratus anterior, biceps, iliopsoas, gastrocnemius, abdominal and spinal muscles.[12] In our series, quadriceps femoris was the most common muscle to be involved (50%) followed by iliopsoas (25%).

S. aureus is the organism most commonly cultured from the abscess. Christin and Sarosi[11] mentioned that it is seen in up to 90% of cases in tropical areas and 75% of cases in temperate countries. *S. aureus* is the most common organism causing tropical pyomyositis in the present series, which has been isolated in 9 out of 12 patients (75%). They also mentioned that Group A *Streptococcus* accounts for another 1-5% of cases. However, we did not find Group A *Streptococcus* in any of our patients. Shepherd found that in tropical regions, pus cultures are sterile in 15-30% cases; 90-95% of patients also have sterile blood cultures as well.[13] In concordance with such finding, pus culture showed no growth in 2 out of the 12 patients (16.67%) of the present series while all the 12 patients had sterile blood cultures throughout the course of their illness. Blood cultures are positive in 20-30% of cases in temperate regions.[14] Better microbiological culture techniques in the temperate regions may account for these variations.

Gupta *et al*. mentioned that serum levels of muscle enzymes, which include aldolase, CPK, aminotransferase and LDH are normal or slightly raised despite evidence of muscle destruction.[15] In our series also no patient had any elevation of serum CPK and LDH. Raised CPK along with characteristic electromyography changes (short duration, low amplitude polyphasic potentials) usually favor the diagnosis of polymyositis.

The natural history is progressive suppuration with either spontaneous drainage and gradual resolution or eventual bacteremia and secondary infection leading to fatal outcome. Aggressive management combining appropriate antibiotics along with surgical debridement and drainage of pus is recommended. Notwithstanding the advances in diagnosis and treatment, mortality due to the disease varies from 0.5% to 2%.[16,17] However, no patient in the present series succumbed to the disease and all of them had excellent recovery.

Conclusion

In conclusion, it can be mentioned that the physicians must have a high index of suspicion for tropical pyomyositis particularly in patients presenting with fever and myalgia without significant elevation of muscle enzymes. *S. aureus* is the most commonly cultured organism while quite a few patients can show no growth in pus culture. Demonstration of pus on aspirate from the intramuscular abscess remains the gold standard for diagnosis. Immediate initiation of appropriate antibiotics and surgical debridement and drainage are required to avoid complications. The prognosis remains excellent if the disease is promptly identified and correctly treated.

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