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Case Presentation

Tropical Pyomyositis Diagnosis by a Modern Medical Imaging - A Case Report and Review Of Literature

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Abstract

Background

Tropical pyomyositis, defined as a single or multiple abscesses within the large skeletal muscle groups of the body, is a great masquerader due to the non-specific symptoms and signs at the time of presentation, so the diagnosis is often delayed.

Case Presentation

We present a case of a South Asian diabetic male, who presented with pyomyositis of the left thigh adductors, to a general surgical unit, and subsequently developed severe systemic sepsis. MRI imaging aided the diagnosis of tropical pyomyositis with the patient's condition steadily improving institution of antibiotics, followed by surgical drainage.

Conclusion

Despite advances in treatment and diagnosis, mortality of tropical pyomyositis remains substantial. We believe that increased awareness with early recognition with the help of appropriate imaging and prompt treatment are the cornerstones for reducing the mortality from this rare disease.

Keywords: Medical Imaging; Pyomyositis; Skeletal Muscle; Abscesses; *Staphylococcus*

Abbreviations

MRI: Magnetic Resonance Imaging;

AST: Aspartate Transaminase;

MRSA: Methicillin Resistant *Staphylococcus aureus*;

VISA: Vancomycin Intermediate *Staphylococcus aureus*

Introduction

Tropical pyomyositis is characterized by single or multiple abscesses within the large skeletal muscle groups of the body. Although initially described in the tropics [1], an increasing number of cases have been reported from the temperate climates [2-6]. Although fever and myalgia is a common presenting feature [4], Tropical pyomyositis can be a great masquerader, mimicking a wide variety of commoner diseases, making it a diagnostic challenge to the less experienced or the unsuspecting clinician. Although it is commonly associated with some form of immune deficiency, extensive bilateral pyomyositis has been reported even in immunocompetent individuals [6, 7]. Although large skeletal muscle groups like quadriceps, iliopsoas [4] and glutei [6] are commonly affected this is by no means a generalization. Pyomyositis has been reported from hip abductors [8] and isolated obturator externus muscles [9] as well as intercostal muscles and paraspinal group of muscles [10]. The condition is commonly diagnosed late, increasing the morbidity and mortality. Prompt diagnosis with the aid of medical imaging [11, 12], incision and drainage with institution of appropriate antibiotic therapy avoids undue morbidity.

Case Presentation

A 53 year old diabetic man presented to the general surgical unit with intermittent fever and left lower limb pain of two weeks duration. Pain was of non mechanical type and there was no history of preceding trauma. On examination he was febrile and a swelling was noted in the medial and posterior aspect of the left thigh affecting the adductor muscle group, with overlying skin induration. Regional lymph nodes were not enlarged. His initial blood counts were within normal limits but the ESR and CRP were high. Liver function tests were within the normal range except for a marginally elevated Aspartate Transaminase (AST) level. An initial diagnosis of thrombophlebitis was made and the patient was treated with non steroidal anti inflammatory drugs. However the patient continued to be symptomatic, with increasing swelling of the thigh. A duplex scan of the thigh was performed which excluded deep vein thrombosis. Ultra sound scan of the abdomen was performed to exclude a psoas deep seated abscess. The patient continued to deteriorate despite antibiotic treatment. He rapidly progressed to a state of severe sepsis with oliguric renal failure requiring haemodialysis. An MRI scan of the left thigh was then performed which showed a multiloculated area of low signal intensity on T1 weighted images and uniform high signal density on T2 weighted images, with Gadolinium enhancement in the periphery, affecting the Left adductor group of muscles including adductor magnus and extending into hamstrings. Underlying bone was normal (Figure 1 and 2). A provisional diagnosis of tropical pyomyositis with systemic sepsis was

made. Treatment with intra venous cloxacillin was started after obtaining blood cultures. Incision and drainage of the abscess was performed under general anesthesia, and pus as well as tissue biopsies were sent for culture.



Patient's condition improved steadily following drainage and institution of antibiotics. Pus and blood cultures failed to grow any organism, although tissue biopsy culture became positive for *Staphylococcus*.

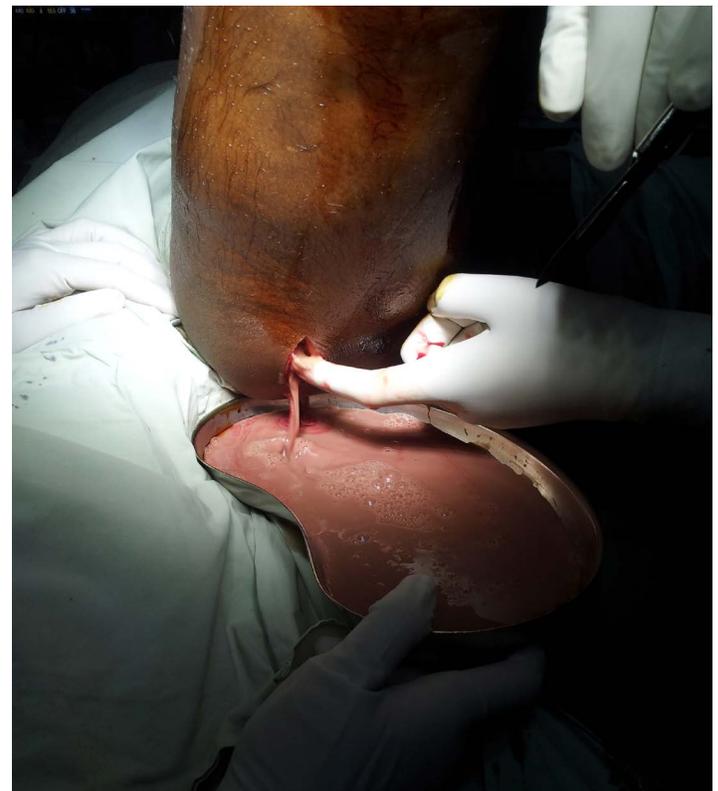


Figure 1 and 2 Magnetic Resonance (MR) images of the left thigh showing the extent of the multiloculated area suggestive of pyomyositis.

Discussion

Tropical pyomyositis is characterized by single or multiple micro abscesses within a large skeletal muscle group of the body. Although initially described in the tropics[1], increasing number of cases have been reported from the temperate climates as well [2, 3]. Due to its prevalence in the tropics [13,14], it is also known as *Myositis tropicans*, tropical skeletal muscle abscess, or tropical myositis. This is illustrated by the fact that, in certain tropical countries, pyomyositis accounts for nearly four percent of hospital admissions [15, 16]. Recent data suggests that up to 75% of tropical pyomyositis patients have some form of underlying immunosuppression such as diabetes, leukemia or asplenia [17]. Vigorous exercise or trauma has also been implicated as a predisposing factor for tropical pyomyositis [18,19].

Clinically pyomyositis commonly presents as a swelling in large skeletal muscle groups such as quadriceps, glutei, pectoralis major, serratus anterior, biceps, iliopsoas, gastrocnemius, abdominal and spinal muscles [20], as was the case with our patient. Unusual locations such as hip abductors[8] and obturator externus muscle [9] has also been reported. It is more common among males. Usually a single muscle group is involved but on occasion multiple muscle groups are affected simultaneously or contiguously [14, 16]. Clinical picture is characterized by three stages- invasive, suppurative and late stage.

The Invasive stage is characterized by variable fever, painful and firm swelling of a muscle group with or without erythema, and minimal systemic symptoms. As the inflammatory process is diffuse, aspiration at this stage does not reveal any pus. High spiking fever with systemic signs herald the onset of the suppurative stage. Even though pus may be aspirated at this stage, classical signs of an abscess may be absent due to the overlying tense muscle. As the disease progresses, the late stage is characterized by systemic sepsis with acute renal failure and sometimes complicated by metastatic abscess formation. Deviating from the classical presentation pyomyositis has also been noted to present with acute spinal cord compression [21], or even cervicobrachial neuralgia [22].

Mainstay of the diagnosis is high degree of clinical suspicion supported by positive blood culture, and later confirmed with a pus culture, as well as tissue biopsy for culture and sensitivity testing. Blood cultures may be positive in 5%–10% of the cases in the tropics to 20%–30% in temperate regions [23, 24]. The muscle enzymes Creatine phospho Kinase, Aldolase, and Aminotransferase may be normal or only slightly elevated, despite extensive muscle involvement [25,26].

Commonest cause of the abscesses in pyomyositis is staphy-

lococcus- 90% in tropics and 75% in temperate climates [3]. However *Pneumococcus*, *Neisseria*, *Haemophilus*, *Aeromonas*, *Serratia*, *Yersinia*, *Pseudomonas*, *Klebsiella*, and *Escherichia* have all been uncommonly implicated [3,27]. Rarely, *Salmonella*, *Citrobacter*, *Fusobacterium*, *Anaerobes*, and *Mycobacterium* have been implicated [28-31].

Pus cultures are negative in around 30% of cases in the tropics[32] and similarly, 90-95% patients have sterile blood cultures[23, 27]. In temperate countries up to 30% of blood cultures may become positive [24].

Interestingly, skeletal muscle is intrinsically resistant to microbial proliferation under normal circumstances, as evidenced by the very low incidence of abscess in muscles in autopsy proven cases of *Staphylococcal septicaemia* [33]. Skeletal muscle becomes especially vulnerable, when it is traumatized or following vigorous exercise, and this is evidenced by the fact that 20 to 50% of pyomyositis cases have a preceding history of blunt trauma or vigorous exercise[34]. Some studies have revealed that in susceptible individuals, neutrophils are not adequately primed against staphylococcal during the course of infection[35]. Intravenous drug abuse is also a common risk factor for developing pyomyositis [36,37]. It is increasingly being reported among patients with HIV [37,38].

Due to its nonspecific presenting features, the differential diagnosis for pyomyositis is wide, and includes muscle contusion, osteomyelitis septic arthritis, cellulitis, muscle haematoma, deep vein thrombosis, muscle rupture, leptospirosis and polymyositis. Despite advances in treatment and diagnosis, mortality of pyomyositis remains around 0.5% to 2% [33]. Early and appropriate use of medical imaging aid differentiating among the extremely broad differential diagnosis for this uncommon albeit lethal condition, reducing morbidity and mortality.

Although MRI is considered the gold standard of diagnosing pyomyositis [39], dynamic compression ultrasound used at the bedside or emergency department might demonstrate loculated collection of pus, facilitating early diagnosis and institution of prompt treatment [12]. It is suggested that ultrasound is best utilized during the purulent stage of pyomyositis, where it may demonstrate diffuse muscle hyperechogenicity and diffuse hyperemia [40,41]. However the reader must be cautioned that despite the presence of fluid, intramuscular abscess may not exhibit the more typical ultrasound features seen in superficial collections, necessitating dynamic compression ultrasound for accurate diagnosis [12].

Hyper intense signal in the muscles of concern on T2-weighted images is thought to correlate with a MRI diagnosis of pyomyositis [42-44].

Once the diagnosis is established, prompt surgical debridement as well as aggressive antimicrobial therapy is essential, eg; *Cloxacillin*. For Methicillin Resistant *Staphylococcus aureus*

(MRSA) organisms, vancomycin or teicoplanin are suitable alternatives. For Vancomycin Intermediate *Staphylococcus aureus* (VISA), Linezolid is a suitable alternative. Treatment should continue until the wound is clean, the leukocyte count becomes normal, or the patient is afebrile for 7–10 days. If the patient is a nasal carrier of staphylococci, eradication with topical Mupirocin or oral Rifampicin is recommended [45].

Conclusion

We believe that increased awareness with early appropriate medical imaging led prompt diagnosis and treatment are the cornerstones for reducing the mortality from this rare albeit lethal infection.

Consent

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

Competing Interests

The authors declare that they have no competing interests.

References

1. Traquair RN. Pyomyositis. The Journal of tropical medicine and hygiene. 1947, 50(5): 81-89.
2. Gibson RK, Rosenthal SJ, Lukert BP. Pyomyositis. Increasing recognition in temperate climates. The American journal of medicine. 1984, 77(4): 768-772.
3. Christin L, Sarosi GA. Pyomyositis in North America: case reports and review. Clinical infectious diseases : an official publication of the Infectious Diseases Society of America . 1992, 15(4): 668-677.
4. Chattopadhyay B, Mukhopadhyay M, Chatterjee A, Biswas PK, Chatterjee N et al. Tropical pyomyositis. North American journal of medical sciences. 2013, 5(10): 600-603.
5. Ravindran V, Duke O. Non-tropical pyomyositis in a patient with systemic lupus erythematosus. Lupus . 2009, 18(4): 379-380.
6. Kamal T, Hall M, Moharam A, Sharr M, Walczak J. Gluteal pyomyositis in a non-tropical region as a rare cause of sciatic nerve compression: a case report. Journal of medical case reports. 2008, 2: 204.
7. Al-Najar M, Obeidat F, Ajlouni J, Mithqal A, Hadidy A. Primary extensive pyomyositis in an immunocompetent patient: case report and literature review. Clinical rheumatology. 2010, 29(12): 1469-1472.
8. Hashemi SA, Vosoughi AR, Pourmokhtari M. Hip abductors pyomyositis: a case report and review of the literature. Journal of infection in developing countries. 2012, 6(2): 184-187.
9. Fowler T, Strote J. Isolated obturator externus muscle abscess presenting as hip pain. The Journal of emergency medicine. 2006, 30(2): 137-139.
10. Prasad R, Verma N, Mishra OP. Pyomositis: a report of three cases. Annals of tropical paediatrics. 2009, 29(4): 313-316.
11. Drosos G. Pyomyositis. A literature review. Acta orthopaedica Belgica. 2005, 71(1): 9-16.
12. Tichter A, Riley DC. Emergency department diagnosis of a quadriceps intramuscular loculated abscess/pyomyositis using dynamic compression bedside ultrasonography. Critical ultrasound journal. 2013, 5(1): 3.
13. Ladipo GO, Fakunle YF. Tropical pyomyositis in the Nigerian Savanna. Tropical and geographical medicine. 1977, 29(3): 223-228.
14. Chacha PB. Muscle abscesses in children. Clinical orthopaedics and related research. 1970, 70: 174-180.
15. Levin MJ, Gardner P, Waldvogel FA. An unusual infection due to *Staphylococcus aureus*. The New England journal of medicine. 1971, 284(4): 196-198.
16. Horn CV, Master S. Pyomyositis tropicans in Uganda. East African medical journal. 1968, 45(7): 463-471.
17. Hossain A, Reis ED, Soundararajan K, Kerstein MD, Hollister LH. Nontropical pyomyositis: analysis of eight patients in an urban center. The American surgeon. 2000, 66(11): 1064-1066.
18. Jayoussi R, Bialik V, Eyal A, Shehadeh N, Etzioni A. Pyomyositis caused by vigorous exercise in a boy. Acta Paediatr. 1995, 84(2): 226-227.
19. Diamandakis V, Grose C. Bad consequences of bicycle accidents. Pyomyositis. The Pediatric infectious disease journal. 1994, 13(5): 422-425.
20. Ashken MH, Cotton RE. Tropical Skeletal Muscle Abscesses (Pyomyositis Tropicans). The British journal of surgery. 1963, 50: 846-852.
21. Brik R, Braun J, Bialik V, Zuckerman N, Berant M. Non-tropical pyomyositis in children--with report of severe neurological complications. Acta paediatrica Scandinavica. 1989, 78(2): 331-334.

22. Flory P, Brocq O, Euller-Ziegler L, Ziegler G. Pyomyositis: cervical localization. *The Journal of rheumatology*. 1993, 20(8): 1411-1413.
23. Gambhir IS, Singh DS, Gupta SS, Gupta PR, Kumar M. Tropical pyomyositis in India: a clinico-histopathological study. *The Journal of tropical medicine and hygiene*. 1992, 95(1): 42-46.
24. Brown JD, Wheeler B. Pyomyositis. Report of 18 cases in Hawaii. *Archives of internal medicine*. 1984, 144(9): 1749-1751.
25. Gupta B, Khanna SK, Sharma BK. Pyomyositis. *The Journal of the Association of Physicians of India*. 1980, 28(3-4): 91-94.
26. Meena AK, Rajashekar S, Reddy JJ, Kaul S, Murthy JM. Pyomyositis - clinical and MRI characteristics report of three cases. *Neurology India*. 1999, 47(4): 324-326.
27. Sarubbi FA, Gafford GD, Bishop DR. Gram-negative bacterial pyomyositis: unique case and review. *Reviews of infectious diseases*. 1989, 11(5): 789-792.
28. Mootsikapun P, Mahakkanukrauh A, Suwannaroj S, Nanagara R. Tuberculous pyomyositis. *Journal of the Medical Association of Thailand = Chotmaihet thangphaet*. 2003, 86(5): 477-481.
29. Minami K, Sakiyama M, Suzuki H, Yoshikawa N. Pyomyositis of the vastus medialis muscle associated with Salmonella enteritidis in a child. *Pediatric radiology*. 2003, 33(7): 492-494.
30. Fincher RM, Jackson MW, Fischer AQ. *Citrobacter freundii*: a newly reported cause of pyomyositis. *The American journal of the medical sciences*. 1990, 299(5): 331-333.
31. Wolf RF, Konings JG, Prins TR, Weits J. *Fusobacterium pyomyositis* of the shoulder after tonsillitis. Report of a case of Lemierre's syndrome. *Acta orthopaedica Scandinavica*. 1991, 62(6): 595-596.
32. Shepherd JJ. Tropical myositis: is it an entity and what is its cause? *Lancet*. 1983, 2(8361): 1240-1242.
33. Smith PG, Pike MC, Taylor E, Taylor JF. The epidemiology of tropical myositis in the Mengo Districts of Uganda. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 1978, 72(1): 46-53.
34. Hall RL, Callaghan JJ, Moloney E, Martinez S, Harrelson JM. Pyomyositis in a temperate climate. Presentation, diagnosis, and treatment. *The Journal of bone and joint surgery American volume*. 1990, 72(8): 1240-1244.
35. Idoko JA, Oyeyinka GO, Giassudin AS, Naida A. Neutrophil cell function and migration inhibition studies in Nigerian patients with tropical pyomyositis. *The Journal of infection*. 1987, 15(1): 33-37.
36. Ebright JR, Pieper B. Skin and soft tissue infections in injection drug users. *Infectious disease clinics of North America*. 2002, 16(3): 697-712.
37. Crossley M. Temperate pyomyositis in an injecting drug misuser. A difficult diagnosis in a difficult patient. *Emergency medicine journal : EMJ*. 2003, 20(3): 299-300.
38. Biviji AA, Paiement GD, Steinbach LS. Musculoskeletal manifestations of human immunodeficiency virus infection. *The Journal of the American Academy of Orthopaedic Surgeons*. 2002, 10(5): 312-320.
39. Theodorou SJ, Theodorou DJ, Resnick D. MR imaging findings of pyogenic bacterial myositis (pyomyositis) in patients with local muscle trauma: illustrative cases. *Emergency radiology*. 2007, 14(2): 89-96.
40. Chau CL, Griffith JF. Musculoskeletal infections: ultrasound appearances. *Clinical radiology*. 2005, 60(2): 149-159.
41. Bureau NJ, Ali SS, Chhem RK, Cardinal E. Ultrasound of Musculoskeletal Infections. *Seminars in musculoskeletal radiology*. 1998, 2(3): 299-306.
42. Gordon BA, Martinez S, Collins AJ. Pyomyositis: characteristics at CT and MR imaging. *Radiology*. 1995, 197(1): 279-286.
43. Soler R, Rodriguez E, Aguilera C, Fernandez R. Magnetic resonance imaging of pyomyositis in 43 cases. *European journal of radiology*. 2000, 35(1): 59-64.
44. Falasca GF, Reginato AJ. The spectrum of myositis and rhabdomyolysis associated with bacterial infection. *The Journal of rheumatology*. 1994, 21(10): 1932-1937.
45. Hudson IR. The efficacy of intranasal mupirocin in the prevention of staphylococcal infections: a review of recent experience. *The Journal of hospital infection*. 1994, 27(2): 81-98.