Tuberculous Pyomyositis of Forearm Muscles

Sagar Narang

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Abstract Tuberculous pyomyositis is a rare entity reported in literature. The presented case reports the occurrence of such a lesion in forearm muscles, without any bony involvement. The ambiguity in its diagnosis led to inadequate management by the primary care physician. Clinical suspicion, positive tuberculin test, culture of acid-fast bacilli, ‘effective drainage’, and timely anti-tubercular chemotherapy ultimately resulted in a good clinical recovery. This case has been presented to increase the awareness about the existence of such an entity in clinical practice, thereby influencing its workup and the possible modes of management.

Keywords Tuberculosis · Pyomyositis · Forearm muscles

Introduction

Tuberculous pyomyositis is an extremely rare manifestation of the involvement of the musculoskeletal system by the tuberculous process, described previously in the immunocompromised and immunocompetent individuals [2, 4, 5, 9–11, 14–16, 18, 20]. It is the least frequent location of extraspinal musculoskeletal tuberculosis (TB) reported in literature [23].

Materials and Methods

A 23-year-old man of Indian origin who was working as a businessman in a garment store presented with two gradually enlarging soft-tissue masses over the right forearm. The proximal one was located over the posterolateral aspect and the distal one over the anterior aspect of the forearm. These masses had been present for 3 months. The patient reported an increase in size of these swellings associated with pain and restriction of normal wrist movements in the 2-week period prior to presentation in our outpatient department. The patient had a negative drug and addiction history and an unremarkable past medical and surgical history. The recent onset of swellings was associated with loss of appetite and some degree of weight loss. There was no evening rise of body temperature. The findings on examination revealed the soft-tissue masses to be firm, non-mobile, and non-tender. Overlying skin appeared normal with no wound, scar, rash, or sinuses. Wrist dorsi-flexion was restricted to 60° with normal palmar-flexion. The brachial artery and the neurological examination of the upper limb appeared to be normal. At the time of presentation, the patient had been taking antibiotics (levofloxacin and cefpodoxime proxetil) and oral steroids for 2 weeks as advised by his primary care physician. He had not experienced any relief in symptoms following the drug therapy.

Plain radiographs showed the bones of forearm, elbow, and wrist joint to be intact (Fig. 1). Magnetic resonance imaging (MRI) was suggested but was not done by the patient. A radiograph of chest was reported to be normal. The erythrocyte sedimentation rate was 46 mm/h (normal rate 0–30 mm/h). The white blood cell count was $7.3 \times 10^4/l$ (normal count, $4.0\text{--}11.0 \times 10^4/l$), with 70% polymorphs, 19% lympho-

Investigations were performed at North Bengal Medical College and Hospital, Sushrutanagar, Darjeeling, India.

S. Narang (✉)
c/o Pratik Medico,
near Air view Hotel, Hill Cart Road,
Siliguri 734001, India
e-mail: sagar_narang2001@yahoo.com

Figure 1 Antero-posterior and lateral radiographs of the right forearm showing absence of any bone affection or joint involvement by the tuberculous process.

cytes, 6% monocytes, 5% eosinophils. The C-reactive protein was elevated to 9.2 mg/l (normal value up to 6 mg/l). The patient's HIV test was negative. A tuberculin test was done, which came out to be positive. The hypersensitivity reaction caused erythema, induration, and ulceration of the flexor soft-tissue mass (Fig. 2). Ziehl–Neelsen stain from the discharge showed presence of tuberculous bacilli.

Results

The patient was advised to have surgical drainage of the abscess, which he declined. Hence, no surgical drainage was carried out, and the ulcerated mass was treated conservatively with local wound care, repeated dressing change, and anti-tubercular chemotherapy. The patient was

Figure 2 Erythema, ulceration, and discharge from the volar soft tissue mass over right forearm following a positive tuberculin test (left forearm).

Figure 3 Healing of the lesion on right forearm after 4 months of anti-tubercular drug therapy.

started on anti-tubercular chemotherapy with four-drug combination of rifampicin (450 mg), isoniazid (300 mg), ethambutol (800 mg), and pyrazinamide (1,500 mg) given for the initial 2 months. This was followed by a two-drug regimen of rifampicin (450 mg) and isoniazid (300 mg) for another 7 months. High-dose pyridoxine (40 mg per day) was prescribed to prevent the isonicotinyl hydrazine-related neuropathy during the course of anti-tubercular chemotherapy. The patient tolerated the therapy well without any complications. Gradually, over a period of 4 months, the proximal mass reduced in size, and the discharge from the ulcerated mass reduced and ceased (Fig. 3). The erythema and induration lessened, and the wrist dorsi-flexion was regained. At 1-year follow-up, the patient was in good health, symptom-free, and had regained normal movements of his right wrist.

Discussion

Tuberculosis remains one of the deadliest diseases in the world. The World Health Organization estimates that, each year, more than 8 million new cases of tuberculosis occur, and approximately 3 million people die from the disease [26]. Tuberculosis presenting as a soft-tissue mass is rare. Isolated cases have been reported in the abdominal wall, psoas muscle, pancreas, and mediastinum of AIDS patients [19]. More commonly, tuberculous abscesses involve the paravertebral soft tissues in cases of tuberculous spondylitis.

Pyomyositis is a term used to describe a bacterial infection and the formation of an abscess in the skeletal muscle. The etiology of pyomyositis has not yet been well-defined. *Mycobacterium tuberculosis* is an extremely rare organism responsible for pyomyositis in an immunocompetent patient, though in this case, concomitant use of oral

steroids might have resulted in the worsening of the condition. Tuberculous pyomyositis is typically caused by invasion from adjacent structures rather than by primary infection, lymphatic spread, or hematogenous seeding [2]. The diagnosis of tuberculous pyomyositis is more common in immunodeficient patients and associated with the use of corticosteroids, the presence of HIV infection, the administration of cancer chemotherapy, and renal failure [2, 6, 10, 14, 16, 20, 24]. Tuberculous pyomyositis can develop in immunocompetent persons, with the common symptoms of evening rise of temperature, night sweats, malaise, loss of appetite, and weight loss [18]. The focus of infection is not usually clear, and only presumptions about a traumatic inoculation of the skeletal muscles can be made. The diagnosis of tuberculous pyomyositis is still largely based on clinical suspicion based on its insidious onset, slow progression, non-responsiveness to various antibiotics, and by success of anti-tubercular chemotherapy retrospectively [5]. The differential diagnoses would include bacterial, tuberculous, or fungal abscesses and hematoma and neoplasm [4, 17]. A positive tuberculin test helps as a guide to the suspicion of tuberculous involvement of skeletal muscles in these cases but may not be positive always. Demonstration of acid-fast bacilli (AFB) on Ziehl–Neelsen stain from the discharge or aspirate from abscesses may further confirm the etiology of these cases. However, this may not always be the case if the bacterial load in the abscess is small. In such cases, the aspirate may be negative for AFB despite the abscess being of tubercular origin. A pathological report of granulomatous inflammation is beneficial in the early diagnosis of tuberculous pyomyositis, even if the AFB stain is negative [2]. The laboratory abnormalities in patients with TB may include an elevated erythrocyte sedimentation rate, significant anemia, leukocytosis, and elevated creatine phosphokinase levels, though none of these is specific to this particular diagnosis and none are seen in each case [2, 7]. Imaging modalities such as ultrasonography, computed tomography scan, and MRI are important in diagnosing pyomyositis [8, 9]. The location, extent, and consistency of a mass can be determined by these imaging studies, which aid the process of establishing a differential diagnosis of tuberculous pyomyositis [2, 13]. MRI is the best modality for evaluating soft-tissue masses, including inflammatory infectious processes. Still, when T1- and T2-weighted images are used, it is sometimes difficult or even impossible to differentiate neoplasm (benign or malignant) from non-neoplastic diseases, including inflammatory processes. The small areas of relatively low signal intensity within the abscess on the T2-weighted images generally represent debris and proteinaceous material [1, 21, 23].

Pyomyositis, which is due to pyogenic organisms, has three clinical stages, first stage or invasive stage, in which

the clinical symptoms are mild with pain, fever, and anorexia, the disease being in a subacute form. Second stage or suppurative stage presents with high fever, chills, myalgia, septic syndrome, and fluctuation in the muscle due to the presence of pus. Third stage has pronounced systemic manifestations, sepsis, and fever with possibility of complications like metastatic abscesses, arthritis, septic shock, and renal failure. Treatment of pyomyositis is surgical or radio-guided drainage of the abscesses with administration of appropriate intravenous antibiotics. Pyomyositis of tubercular origin is comparatively rare and does not follow the classical three stages of pyogenic pyomyositis. The literature has sporadic reports of tuberculous pyomyositis treated with surgical debridement, with recurrence requiring further surgeries [5, 15, 22, 25]. No specific guidelines exist for the management of tuberculous pyomyositis [15], though the cornerstone happens to be early diagnosis and anti-tubercular chemotherapy. “Effective drainage” of the abscess must be ensured. This may be done by aspiration [4] or by surgical exploration. In the reported case, spontaneous ulceration of the mass following tuberculin test occurred, the patient refused surgery, and the lesion healed in 4 months on anti-tubercular chemotherapy. A suggestion toward adoption of a less radical approach while dealing with tuberculous pyomyositis can be made. These lesions may first be aspirated and cultured and treated with anti-tubercular drugs. The surgical option may be reserved for the following scenarios: (a) painful masses, rapidly enlarging, acting like space-occupying lesions and causing jeopardization of other functional structures in the vicinity (compartment-syndrome like situation) [11]; (b) recurrence after aspiration or debridement [5]; (c) immunocompromised state, where the bacterial load is high; (d) associated with bony destruction or sequestrum formation [12]; (e) doubtful diagnosis [3]; (f) non-responsiveness to anti-tubercular drugs despite culture being positive for *M. tuberculosis*; and (g) failed aspiration of the abscess and thereby lack of “effective” drainage.

A high level of clinical suspicion, supplemented with mycobacteriological testing and relevant imaging studies, is necessary to make an early diagnosis of tuberculous pyomyositis. In most cases, receiving timely diagnosis, effective drainage, and appropriate anti-tubercular chemotherapy, the prognosis for functional recovery is good.

References

1. Abdelwahab IF, Bianchi S, Martinoli C, et al. Atypical extraspinal musculoskeletal tuberculosis in immunocompetent patients: part II, tuberculous myositis, tuberculous bursitis, and tuberculous tenosynovites. *Can Assoc Radiol J.* 2006;57 5:278–86.

2. Ahmed J, Homans J. Tuberculosis pyomyositis of the soleus muscle in a fifteen-year-old boy. *Pediatr Infect Dis J*. 2002;21 12:1169–71. doi:[10.1097/00006454-200212000-00019](https://doi.org/10.1097/00006454-200212000-00019).
3. Ashworth MJ, Meadows TH. Isolated tuberculosis of a skeletal muscle. *J Hand Surg [Br]*. 1992;17 2:235. doi:[10.1016/0266-7681\(92\)90099-N](https://doi.org/10.1016/0266-7681(92)90099-N).
4. Batra S, Ab Naell M, Barwick C, et al. Tuberculous pyomyositis of the thigh masquerading as malignancy with concomitant tuberculous flexor tenosynovitis and dactylitis of the hand. *Singapore Med J*. 2007;48 11:1042–6.
5. Baylan O, Demiralp B, Cicek EI, et al. A case of tuberculous pyomyositis that caused a recurrent soft tissue lesion localized at the forearm. *Jpn J Infect Dis*. 2005;58 6:376–9.
6. Biviji AA, Paiement GD, Steinbach LS. Musculoskeletal manifestations of human immunodeficiency virus infection. *J Am Acad Orthop Surg*. 2002;10 5:312–20.
7. Bobrowitz ID. Active tuberculosis undiagnosed until autopsy. *Am J Med*. 1982;72:650–8. doi:[10.1016/0002-9343\(82\)90476-4](https://doi.org/10.1016/0002-9343(82)90476-4).
8. Chau CL, Griffith JF. Musculoskeletal infections: ultrasound appearances. *Clin Radiol*. 2005;60 2:149–59. doi:[10.1016/j.crad.2004.02.005](https://doi.org/10.1016/j.crad.2004.02.005).
9. Chu CK, Yang TL, Tan CT. Tuberculous pyomyositis of the temporal muscle in a nonimmunocompromised woman: diagnosis by sonography. *J Laryngol Otol*. 2004;118 1:59–61. doi:[10.1258/002221504322731673](https://doi.org/10.1258/002221504322731673).
10. Ergin F, Arslan H, Bilezikçi B, et al. Primary tuberculosis in the gluteal muscle of a patient with chronic renal failure. A rare presentation. *Nephron*. 2001;89 4:463–6. doi:[10.1159/000046122](https://doi.org/10.1159/000046122).
11. Farnell RD, Davies N, Unwin AJ. Tuberculous compartment syndrome of the forearm. *Orthopedics*. 2001;24 4:393–4.
12. George JC, Buckwalter KA, Braunstein EM. Tuberculosis presenting as a soft tissue forearm mass in a patient with a negative tuberculin skin test. Case report 824. *Skeletal Radiol*. 1994;23:79–81. doi:[10.1007/BF00203710](https://doi.org/10.1007/BF00203710).
13. Gubbay AJ, Isaacs D. Pyomyositis in children. *Pediatr Infect Dis J*. 2000;19:1009–12. doi:[10.1097/00006454-200010000-00015](https://doi.org/10.1097/00006454-200010000-00015).
14. Indudhara R, Singh SK, Minz M, et al. Tuberculous pyomyositis in a renal transplant recipient. *Tuber Lung Dis*. 1992;73 4:239–41. doi:[10.1016/0962-8479\(92\)90093-Y](https://doi.org/10.1016/0962-8479(92)90093-Y).
15. Jang EY, Lee SO, Choi SH, et al. Case of pyomyositis due to *Mycobacterium haemophilum* in a renal transplant recipient. *J Clin Microbiol*. 2007;45 11:3847–9. doi:[10.1128/JCM.01067-07](https://doi.org/10.1128/JCM.01067-07).
16. Johnson DW, Herzig KA. Isolated tuberculous pyomyositis in a renal transplant patient. *Nephrol Dial Transplant*. 2000;15 5:743. doi:[10.1093/ndt/15.5.743](https://doi.org/10.1093/ndt/15.5.743).
17. Kadambari D, Jagdish S. Primary pyogenic psoas abscess in children. *Pediatr Surg Int*. 2000;16 5–6:408–10. doi:[10.1007/s003839900329](https://doi.org/10.1007/s003839900329).
18. Kim JH, Wallerstein S, Thoe M, et al. Myopathy in tuberculosis: two presumptive cases and a review of the literature. *Mil Med*. 1997;162:221–4.
19. Lupatkin H, Brau N, Flomenberg P, et al. Tuberculous abscesses in patients with AIDS. *Clin Infect Dis*. 1992;14:1040.
20. Mootsikapun P, Mahakkanukrauh A, Suwannaroj S, et al. Tuberculous pyomyositis. *J Med Assoc Thai*. 2003;86 5:477–81.
21. Paajanen H, Grodd W, Revel D, et al. Gadolinium-DTPA enhanced MR imaging of intramuscular abscesses. *Magn Reson Imaging*. 1987;5:109–15. doi:[10.1016/0730-725X\(87\)90040-3](https://doi.org/10.1016/0730-725X(87)90040-3).
22. Pretorius ES, Hruban RH, Fishman EK. Tropical pyomyositis: imaging findings and a review of literature. *Skeletal Radiol*. 1996;25:576–9. doi:[10.1007/s002560050139](https://doi.org/10.1007/s002560050139).
23. Soler R, Rodríguez E, Remuñán C, et al. MRI of musculoskeletal extraspinal tuberculosis. *J Comput Assist Tomogr*. 2001;25 2:177–83. doi:[10.1097/00004728-200103000-00004](https://doi.org/10.1097/00004728-200103000-00004).
24. Tehranzadeh J, Ter-Oganesyan RR, Steinbach LS. Musculoskeletal disorders associated with HIV infection and AIDS. Part I: infectious musculoskeletal conditions. *Skeletal Radiol*. 2004;33 5:249–59. doi:[10.1007/s00256-004-0764-z](https://doi.org/10.1007/s00256-004-0764-z).
25. Wang JY, Lee LN, Hsueh PR, et al. Tuberculous myositis: a rare but existing clinical entity. *Rheumatology*. 2003;42:836–40.
26. World Health Organization Group at risk: WHO report on the tuberculosis epidemic. Geneva: World Health Organization; 1996.