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Multidrug-Resistant tuberculosis of the shoulder joint: A case series and treatment response to modified all-oral longer regimen

Dr. Rajendra Tatu Nanavare[1*], Dr. Rajendran R[2], Dr. Dipak Vinayak Chaudhari[2]
[1] Department of Medical, Group of TB Hospital, Tropical Medicine in College of Physician and Surgeon CPS Mumbai, Maharashtra, India
[2] Department of Medical, Group of TB Hospital, Mumbai, Maharashtra, India

Abstract
Tuberculosis (TB) of the shoulder joint is a rare extrapulmonary manifestation of skeletal TB. Multidrug-resistant TB (MDR-TB) involving the shoulder joint poses diagnostic and therapeutic challenges. We report a case series of three patients with shoulder joint TB, focusing on one case of rifampicin- and fluoroquinolone-resistant TB successfully managed under the National Tuberculosis Elimination Program (NTEP) with a modified all-oral longer regimen including delamanid (DLM). The report highlights the importance of early molecular diagnostics and individualized treatment regimens in extrapulmonary MDR-TB.

Keywords: Extrapulmonary tuberculosis, shoulder joint TB, MDR-TB, fluoroquinolone resistance, delamanid, NTEP, line probe assay, genxpert

Introduction

Mycobacterium tuberculosis, the causative organism of tuberculosis, has plagued human beings since ancient times—dating back to prehistoric eras. While pulmonary tuberculosis remains the most prevalent form, extra-pulmonary tuberculosis (EPTB) still accounts for a significant proportion, comprising approximately 15–18% of newly diagnosed TB cases. Among the various manifestations of musculoskeletal TB, the vertebral column—particularly the thoracic and lumbar spine—is the most frequently affected site, involved in more than half of the skeletal TB cases. In contrast, tubercular involvement of the shoulder joint is exceedingly rare. Its occurrence is estimated to be between 1–2% of all musculoskeletal TB cases, making it an unusual and often overlooked location for this chronic infectious disease [1].

Tuberculous bacilli have been infecting the humans since the days beyond recall. Extra-pulmonary tuberculosis (TB) accounts for about 15–18% of newly detected TB cases, spine being the most common site for musculoskeletal TB which is involved in more than half of the cases involving musculoskeletal system. Shoulder involvement is very uncommon, and its incidence is estimated to be about 1–2% [1]. Shoulder TB is hardly considered as a differential diagnosis as the clinical presentation is indolent and non-specific. Even the radiographic features are not remarkable; hence, the diagnosis is often delayed. Early diagnosis and initiation of the treatment are pivotal in prevention of severe joint damage [2].

Tuberculosis of the musculoskeletal system accounts for approximately 1–2% of all TB cases, with the shoulder joint being an uncommon site. Diagnosis is often delayed due to nonspecific symptoms and limited clinical suspicion. The emergence of multidrug-resistant TB (MDR-TB) adds complexity to management, especially in extrapulmonary forms where drug penetration and monitoring of response are more difficult.

Case series presentation

Case 1

A 50-year-old female presented with a one-month history of swelling over the right shoulder joint. MRI revealed a lesion suggestive of tuberculosis of the shoulder joint. Anti-tubercular therapy (ATT) was initiated as per standard first-line regimen. Initial improvement was noted. However, after one month, she developed worsening pain and restricted shoulder movement.

Aspirated fluid from the joint swelling was sent for molecular testing:

GenXpert MTB/RIF: MTB detected; rifampicin resistance detected

Line probe assay (LPA): Resistance to rifampicin, isoniazid, and fluoroquinolones

AFB culture: Awaited at the time of decision-making

The patient was diagnosed with MDR-TB with additional resistance to fluoroquinolones. As per NTEP guidelines, she was initiated on an all-oral longer regimen, excluding fluoroquinolones, with delamanid (DLM) incorporated as a substitute. S he tolerated the treatment well and showed clinical and radiological improvement over the subsequent months.

Outcome: Patient responded well to the modified regimen with gradual improvement in joint mobility and reduction of swelling.

Case 2: Pediatric TB Shoulder Post Trauma in an 11-Year-Old Male

An 11-year-old male with a history of minor trauma to the right shoulder developed progressive swelling and restriction of movement after two months. MRI of the shoulder revealed features suggestive of TB.

Biopsy: ssInadequate specimen for GeneXpert

Diagnosis: Based on clinical, radiological, and supportive evidence

Treatment: Started on first-line ATT under NTEP

Outcome: Patient showed good clinical response with resolution of swelling and improved joint movement over time.

Case 3: HIV-Positive Patient with Pulmonary TB and Shoulder Involvement
A 39-year-old HIV-positive male on antiretroviral therapy (ART) presented with restricted right shoulder movement and swelling. Chest X-ray showed bilateral extensive pulmonary TB.
Pus Aspiration: GeneXpert: MTB detected, no rifampicin resistance

Management: Treated as drug-sensitive TB with continuation of first-line ATT and ART

Outcome: Clinical improvement noted in both pulmonary and joint symptoms.

Discussion
Tuberculosis of the shoulder is a diagnostic dilemma due to its rarity and mimicry of other inflammatory or degenerative joint disorders. The index case underlines the necessity of performing early moleculasr diagnostics (GenXpert, LPA) even in extrapulmonary TB to identify drug-resistant strains. Fluoroquinolone resistance is particularly concerning due to its impact on backbone treatment efficacy.
In this case, replacement of fluoroquinolones with delamanid (DLM) allowed continuation of an effective all-oral regimen. Delamanid has shown promise in MDR-TB management due to its favorable safety profile and oral administration.
The use of a personalized regimen under NTEP highlights the flexibility and adaptability of national protocols in tackling resistant TB.

Conclusion
Extrapulmonary MDR-TB, particularly of the shoulder joint, requires high clinical suspicion and timely use of molecular tools. Delamanid-based regimens can be effective in cases with fluoroquinolone resistance. Clinicians must remain vigilant for treatment failure in extrapulmonary TB and pursue genotypic resistance testing to guide therapy.

Message
1. Message for the Community
Tuberculosis can affect any part of the body, not just the lungs. Pain, swelling, or restricted movement in a joint that doesn't improve should not be ignored. Early diagnosis and proper treatment can lead to full recovery, even in drug-resistant TB. Community awareness and timely medical consultation are key to overcoming this disease. Don't delay—TB is curable, but early action is essential.

2. Message for Healthcare Workers
Maintain a high index of suspicion for TB in atypical musculoskeletal presentations, especially in endemic areas. Always consider molecular diagnostic tests (GenXpert, LPA) in cases showing poor response to first-line therapy. Early detection of drug resistance allows for timely initiation of appropriate treatment, improving outcomes and preventing disability in extrapulmonary TB cases.

3. Future Perspectives
The future of managing extrapulmonary and drug-resistant TB lies in:
Strengthening molecular diagnostics at peripheral levels
Increasing access to newer oral drugs like bedaquiline and delamanid
Expanding multidisciplinary collaboration (orthopedics, radiology, pulmonology)
Long-term follow-up studies to better understand treatment outcomes in skeletal MDR-TB
Public health strategies to improve awareness of extrapulmonary TB manifestations.

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