

A Case of Lepromatous Leprosy with Type 2 Lepra Reaction and Multidrug-Resistant Tuberculosis: Diagnostic and Therapeutic Challenges

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ABSTRACT

Background: Leprosy, caused by *Mycobacterium leprae*, is a chronic infectious disease often complicated by immune-mediated reactions. Type 2 lepra reaction, or erythema nodosum leprosum (ENL), is characterized by systemic inflammatory symptoms requiring immunosuppressive therapy. Co-infection with multidrug-resistant tuberculosis (MDR-TB) further complicates management and prognosis.

Case Presentation: A 35-year-old male presented with abdominal pain, loose stools, vomiting, and dusky erythematous skin lesions. He was diagnosed with lepromatous leprosy and initiated on multidrug therapy. Subsequently, he developed ENL manifesting as flared-up lesions, facial puffiness, and small joint pain, necessitating corticosteroid treatment. Two months later, he was diagnosed with MDR-TB with right-sided pleural effusion and lung collapse, which was successfully managed with a Bedaquiline-based regimen.

Conclusion: This case highlights the diagnostic and therapeutic challenges posed by the coexistence of leprosy, ENL, and MDR-TB. Early recognition, multidisciplinary care, and integrated management strategies are essential for achieving favourable outcomes in such complex presentations.

KEYWORDS: Leprosy, Lepra Reaction, Erythema Nodosum Leprosum, Multidrug-Resistant Tuberculosis, Bedaquiline

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INTRODUCTION

Leprosy, a neglected tropical disease, continues to affect more than 120 countries worldwide. It is transmitted primarily through droplets from the nose and mouth and presents with a wide spectrum of clinical manifestations. A major cause of morbidity in leprosy is the development of immune-mediated complications known as lepra reactions, which require early recognition and appropriate management. Type 2 lepra reaction, or erythema nodosum leprosum (ENL), is an immune complex-mediated inflammatory response that often presents with systemic symptoms such as fever, joint pain, and tender skin nodules.

Coinfection with tuberculosis (TB) can further complicate the clinical course, particularly when it involves multidrug-resistant TB (MDR-TB), which is associated with limited therapeutic options and increased morbidity. This case highlights the diagnostic and therapeutic challenges at the intersection of leprosy, ENL, and MDR-TB, emphasizing the critical need for a multidisciplinary and integrated approach to management.

CASE PRESENTATION

A 35-year-old male, employed as an animal caretaker, without significant comorbidities, presented with a one-day history of abdominal pain, vomiting, fever, and loose stools. He reported two months of progressively spreading skin

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lesions originating from the right hand, involving the forehead, pinnae, arms, chest, back, and abdomen. Physical examination revealed multiple asymmetrical, dusky erythematous papulonodular lesions (figure 1a & 1b) forming

plaques predominantly on the forehead and pinnae, without associated pain, anesthesia, nerve thickening, madarosis, hair loss, or deformities.



Figure 1a: Facial papulonodular lesions.



Figure 1b: Dusky erythematous lesions over forearm

Investigations

Skin biopsy from forehead and abdomen demonstrated well-circumscribed perivascular and peri-adnexal histiocytic

infiltrates with abundant foamy cytoplasm, consistent with lepromatous leprosy. Incidentally, the patient was diagnosed with diabetes mellitus (HbA1c: 11.2%).

Microscopic Description
Both A and B show in the upper and mid dermis well circumscribed perivascular and periadnexal collections of histiocytes with abundant foamy cytoplasm. The overlying epidermis is flat and free of the dermal histiocytic infiltrate.

Final Pathologic Diagnosis
A-B) LL Hansens disease.

Multidrug therapy (MDT) comprising Dapsone, Rifampicin, and Clofazimine was initiated. Fifteen days later, the patient experienced exacerbation of lesions, joint pain, nerve tenderness, and peripheral edema consistent with ENL. Prednisolone (40 mg/day) was commenced and tapered, causing symptom recurrence and necessitating steroid dose adjustments.

Two months post-treatment, the patient presented with fever, chills, dry cough, and exertional dyspnea lasting four days. Examination revealed right-sided pleural effusion confirmed by chest X-ray (Figure 2a) and HRCT (Figure 2b) showing loculated effusion with underlying lung collapse. Pleural fluid analysis indicated lymphocytic exudate (ADA 69.2 U/L, negative malignancy, no bacterial growth).

Table 1 - Laboratory Investigations

Prameters	04/11/2024
Haemoglobin (g/dL)	9.7
White Blood Cell Count (/mm ³)	16860
Platelet Count (/mm ³)	439000
Total Bilirubin (mg/dL)	0.58
ALT/AST (U/L)	32/19.4
GGT/ALP (U/L)	120/141
Total Protein / Albumin (g/dL)	7.93, 3.59
Serum Creatinine (mg/dL)	1.34 (eGFR-60.35)
Serum Sodium (mEq/L)	133.9

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Serum Potassium (mEq/L)	5.04
C-Reactive Protein (CRP, mg/L)	30.7
Procalcitonin (PCT, ng/mL)	3.28



Figure 2a:
Chest X-ray showing right-sided pleural effusion.

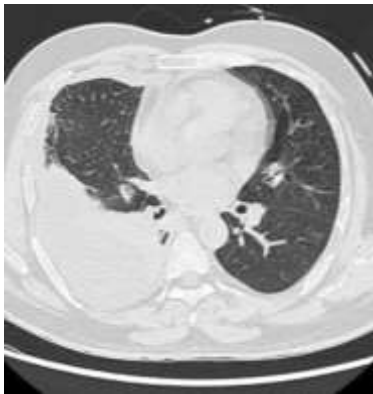


Figure 2b:
HRCT chest showing loculated right pleural effusion with lung collapse.



Figure 2c:
Chest X-ray showing pigtail catheter insertion for pleural drainage.

Table 2 - Pleural Fluid Analysis

Parameters	Report
Appearance	Hazy, clot present
WBC (cells/cubic mm)	910
Differential counts	Neutrophils 24%, Lymphocytes 74%, Monocytes 2%
RBC (cells/cubic mm)	1650
ADA (U/L)	69.2
Fluid glucose	78.5
Fluid LDH	1257
Fluid Protein	5.82
Cytology	Negative for malignant cells
Pyogenic culture	No growth

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Test Name	Result
 Gene Xpert MTB Rif	
Sample	Pleural fluid
Mycobacterium Tuberculosis Complex	Trace Detected
Rif Resistance	Indeterminate

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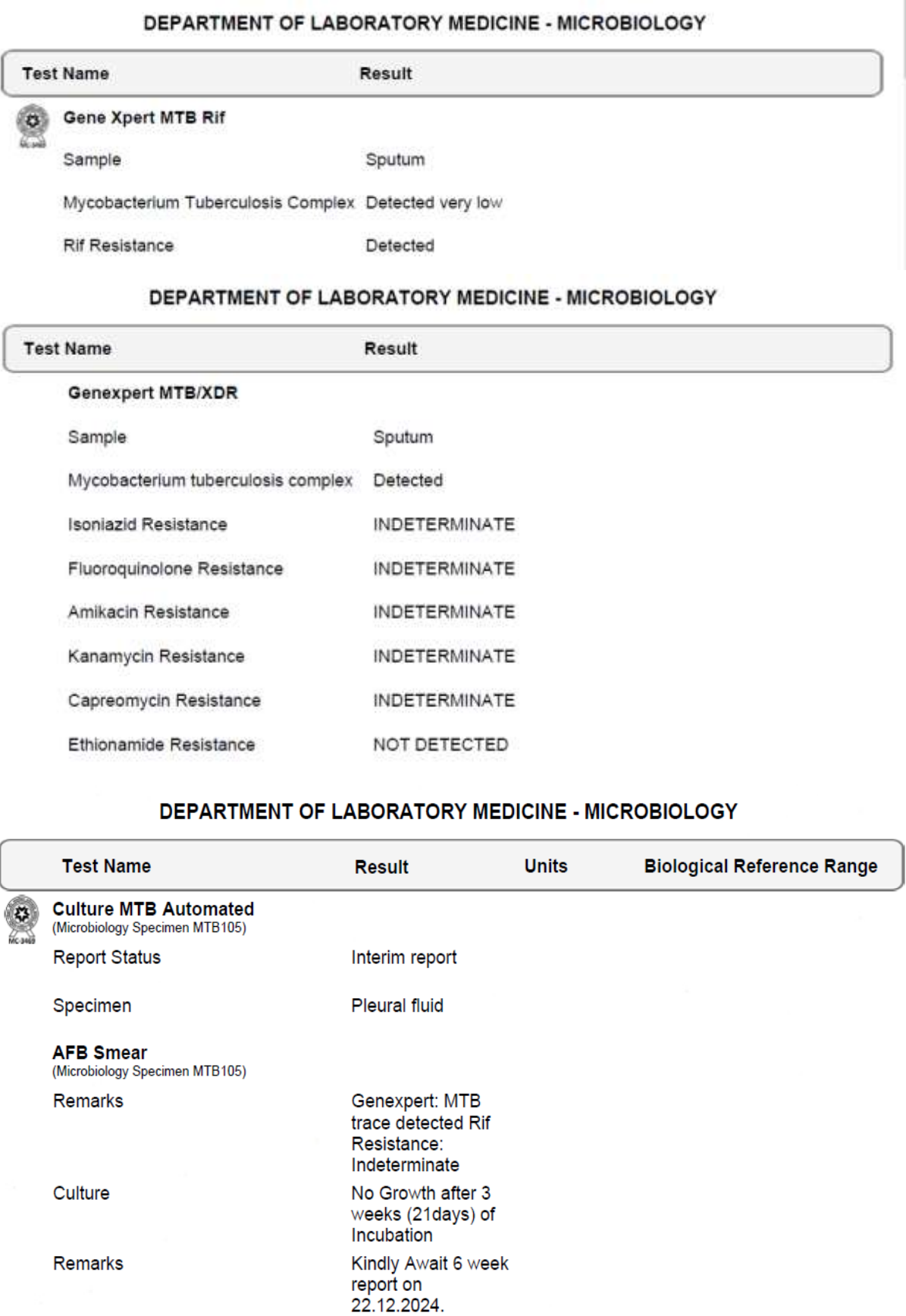


Figure 3: Microbiological investigations showing MTB detection in pleural fluid and sputum with Rifampicin resistance detected on sputum GeneXpert. Pleural fluid culture showed no growth after 21 days.

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Pleural Fluid culture was suggestive of no growth after 6 weeks of incubation.

Management

The patient was diagnosed with MDR-TB and initiated on a regimen comprising Bedaquiline, Linezolid, Levofloxacin, Cycloserine, and Clofazimine. Serial ECG monitoring ensured safe management of QT interval prolongation risks.

Follow-up

On follow-up, there was significant regression of facial papulonodular lesions, with residual pigmentation and

flattening of skin lesions on the forehead (Figure 4a). Similarly, forearm lesions showed near-complete resolution with only residual post-inflammatory hyperpigmentation (Figure 4b).

The patient remained clinically stable with no recurrence of lepra reaction or tuberculosis symptoms and was continuing treatment under close multidisciplinary follow-up.



Figure 4a: Facial lesions showing significant regression after treatment.



Figure 4b: Forearm lesions showing resolution with residual pigmentation post-treatment.

DISCUSSION

Leprosy, caused by *Mycobacterium leprae*, is a chronic infectious disease that often presents with various dermatological and neurological symptoms. Its management is challenging due to its diverse clinical manifestations and potential complications. One of the most severe complications is the occurrence of lepra reactions, specifically Type 2 lepra reaction or erythema nodosum leprosum (ENL). ENL is an immune complex-mediated inflammatory reaction that can present with systemic symptoms, including fever, joint pain, and erythematous nodules, necessitating prompt recognition and corticosteroid treatment for effective management (1, 2).

The case presented illustrates the complexity of managing leprosy when associated with other comorbidities. The patient developed ENL shortly after initiating multidrug therapy (MDT) for lepromatous leprosy, requiring the introduction of corticosteroids. While corticosteroids are beneficial in controlling lepra reactions, they carry the risk of steroid-induced complications such as immune suppression and fractures. In this case, the patient had reactivation of latent tuberculosis which was multi-drug resistant. MDR-TB presents a unique challenge, as it is resistant to first-line anti-tuberculosis drugs, including rifampicin and isoniazid. The management of MDR-TB requires the use of second-line

drugs, and in this case, a Bedaquiline-based regimen was initiated. Bedaquiline, Linezolid, Levofloxacin, Cycloserine, and Clofazimine are part of the second-line treatment for MDR-TB and must be administered under careful medical supervision (5, 6). Screening for latent TB is essential to prevent reactivation and active TB. Bedaquiline, used in treatment of MDR-TB is shown to be effective as a monotherapy for leprosy (11), however judicious use of the drug is mandatory.

The patient's concurrent leprosy and MDR-TB required a multidisciplinary approach, involving dermatology, infectious disease specialists, and pulmonologists. Effective management of these overlapping conditions requires early diagnosis, ongoing monitoring, and adjustment of therapeutic regimens based on the patient's response. The case emphasizes the need for integrated care and close follow-up in patients with multiple coexisting infectious diseases to ensure favourable outcomes (7, 8).

CONCLUSION

This case highlights the diagnostic and therapeutic challenges faced in the management of a patient with lepromatous leprosy, Type 2 lepra reaction (ENL), and MDR-TB. Timely and aggressive treatment of leprosy with multidrug therapy (MDT) can help reduce bacterial load and decrease the risk

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of lepra reactions. Lepra reactions should be kept in mind while treating leprosy and should be treated promptly when such reactions occur. Prompt initiation of multi-drug therapy, combined with adjunctive therapies like anti-inflammatory agents for lepra reactions, can improve outcomes. Screening for latent TB is important to prevent flare up to active disease. The overlapping conditions necessitated careful differential diagnosis, prompt initiation of appropriate therapies, and ongoing management to prevent complications. The use of steroids to manage ENL, along with the careful management of MDR-TB with a Bedaquiline-based regimen, underscores the complexity of treating such multifaceted cases. Early diagnosis, integrated care, and multidisciplinary approaches are essential for improving outcomes in patients with leprosy and coexisting conditions like MDR-TB (9, 10).

DECLARATIONS

Conflict of Interest: None.

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Patient Consent: Obtained.

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