Acute Decompensation in a Patient with Miliary Tuberculosis

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Introduction

Miliary tuberculosis is caused by hematogenous dissemination of Mycobacterium tuberculosis (TB). It can result from primary infection or reactivation of latent disease and may result in multiorgan failure, with CNS, liver, and adrenal gland involvement particularly common[1].

Case Presentation

HPI: 30-year-old female with history of HIV (CD4=87) presented with 2-month history of generalized, progressive body weakness and diffuse bilateral leg pain resulting in inability to ambulate.

ROS: She had headache, odynophagia, dry cough, nausea, weight loss, intermittent night sweats, and fatigue. No GI, pulmonary, or meningitic symptoms.

PMHx: HIV on Tenofovir, Lamivudine, and Dolutegravir (TLD). Discontinued HAART 11 months prior and restarted 4 months prior with intermittent adherence.

Exam:
Vitals: BP 102/67, HR 129, T 37.1, RR 17 , SpO2 99% on RA
GEN: Cachectic, dry mucus membranes
HEENT: PERRLA, no LAD, + oral thrush
CV: Sinus tachycardia
Pulm and Abdomen: Benign. No masses.
Neuro: A&Ox4, GCS 15, CN 1-12 intact, no meningeal signs, strength LE 0/5 and UE 3/5, patellar reflexes 0/2 bilaterally, flaccid tone in both LE, sensation intact.

Labs:
Serum Cryptococcal Ag: Neg
Serum RPR: Neg
TB testing: unable to obtain
CD4: **87**
AST: **97** ALT: **52**
Alk Phos: **488** Total Bili: **2.9**
Albumin: **1.7** INR: **2.05**

Lab	Admission	Day 4
WBC	11.2	14.5
Hb	8.1	6.3
Plt	91	32
Na	120	127
Cr	0.62	1.23

Hospital Course

Hospital day 4: Rapid decompensation
- CXR consistent with Miliary TB (Fig. 2), compared to CXR with clear lungs 4 months prior to admission (Fig. 1), initiated anti-TB treatment
- Early morning: Sudden onset AMS with agitation. AO x1.
- Mid morning: GCS 15→8. Pupils fixed and dilated. Developed tachycardia, tachypnea, hypoxia, and hypotension. CT brain and ICU transfer were attempted but declined.
- Early afternoon: Patient expired. When death was certified, scleral hemorrhages were noted. No autopsy was performed.

References:
1. Proudfoot, A T et al. "Miliary tuberculosis in adults." *British medical journal* vol. 2,5652 (1969): 273-6. doi:10.1136/bmj.2.5652.273
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3. Shah, Maunank et al. "Multicenter Study of the Accuracy of the BD MAX Tuberculosis Assay for Detection of Mycobacterium tuberculosis Complex and Mutations Associated With Resistance to Rifampin and Isoniazid." *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America* vol. 71,5 (2020): 1161-1167. doi:10.1093/cid/ciz9Multidrug-resistant32
4. Quinn, Carson M et al. "Tuberculosis IRIS: Pathogenesis, Presentation, and Management across the Spectrum of Disease." *Life (Basel, Switzerland)* vol. 10,11 262. 29 Oct. 2020, doi:10.3390/life10110262

Diagnostics

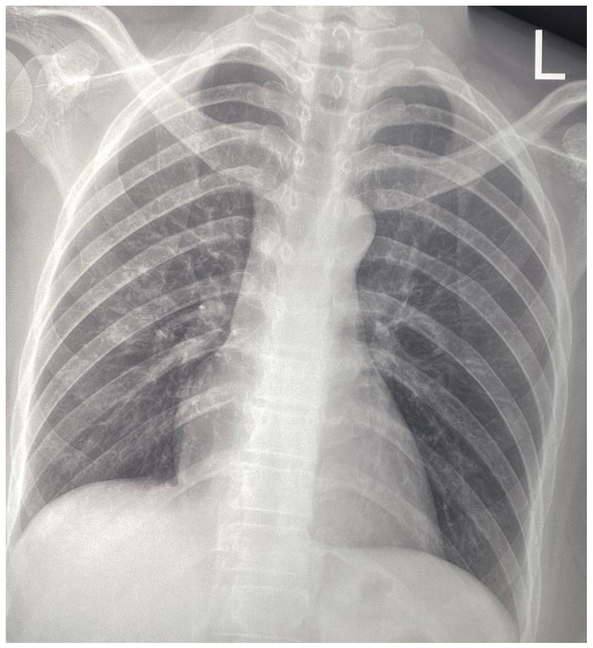

Figure 1. CXR: 4 months prior to admission
Read: Clear lungs.

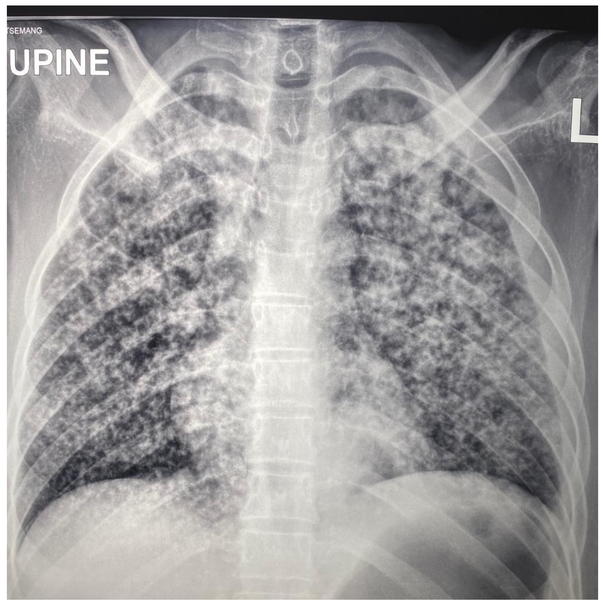

Figure 2. CXR: Hospital day 4
Read: Diffuse, innumerable miliary nodules. Most consistent with miliary TB. Less likely PJP given lack of ground glass.

Discussion

Testing for M. Tuberculosis

Acid Fast Smear and Culture	• In military TB, sensitivity of sputum smear is ~33% and culture is ~62% [2]. • Limited by long processing time for culture.
Histopathology	• Caseating granulomas on a tissue section strongly supports TB.
Molecular Tests	• Gene Xpert MTB/RIF assay is a NAAT done on sputum that can identify M. tuberculosis and rifampin resistance. • Sensitivity 93% in suspected TB cases without HIV/AIDS[3].
Urine Antigen Test	• Detects the cell wall of mycobacterium. • Most sensitive test in patients with HIV and CD4 counts <100. • Poor sensitivity in patients without HIV.

Diagnosis:
The most likely diagnosis is disseminated TB, with suspected involvement in the following organs:
- Liver: LFT abnormalities
- Bone marrow/Spleen: anemia and thrombocytopenia
- CNS/Spinal Cord: Lower extremity paralysis
- Lungs: X-ray findings of military TB

While cultures or sputum results were not available due to lab resources, the clinical picture is consistent with disseminated TB. A urine antigen (ULAM) is the most sensitive test to confirm the diagnosis since the CD4<100.

Cause of Death:
The patient developed signs of increased intracranial pressure (ICP) and shock. She died within hours of this finding. Differential includes:
- Spontaneous cerebral hemorrhage
  - In setting of coagulopathy (INR 2.0 and platelets 32)
  - May present with rapid decompensation
- Tuberculoma
  - Mass occupying lesion which can raise ICP
  - Typically associated with slower onset of symptoms
- IRIS in setting of possible CNS TB
  - Patients with HIV/AIDS + opportunistic infection are at risk for immune reconstitution inflammatory syndrome (IRIS)
  - Patient was restarted on ART without a TB test

Teaching Points

- TB remains one of the world's **most deadly infectious diseases**, second only to COVID-19, with 10 million cases and 1.3 million deaths in 2020 alone[4]. TB burden is highest in places like Botswana that have a high HIV prevalence.
- **The co-infection of HIV and TB is associated with worse patient outcomes.** These patients are at risk for rapid dissemination, as exemplified by this case.
- Rapid neurological decompensation in patients with TB can be related to increased ICP in the setting of a tuberculoma or IRIS.
- IRIS typically presents within 4-8 weeks of ART change or initiation, but it can present months (and even years) after[4].