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Unilateral Massive Pleural Effusion Occupying the whole Hemithorax Due to Tuberculosis; a Rare form of Pleural Tuberculosis: a Case Report

Aklog Almaw Yigzaw¹, Binyam Melese Getahun², Mulugeta Wondmu Kedimu³, Metages Damtie Melaku⁴, Menelik Tarekegn Dagne⁵, Yoseph Gebremedhin Kassie⁶

¹Debre Tabor University, Assistant professor of Internal Medicine; Email: aklogalmaw@dtu.edu.et

²Debre Tabor Comprehensive Specialized Hospital, MD, Internist; Email: Biny2029@gmail.com

³Debre Tabor University, Assistant professor of General Surgery; Email: a.mulie469@gmail.com

⁴Debre Tabor University, Assistant professor of Internal Medicine; Email: metagesdamtie27@gmail.com

⁵Noble Clinic, MD; Email:mdmenelik1982@gmail.com

⁶Debre Tabor Comprehensive Specialized Hospital, MD, Internist; Email: yosephgkm@gmail.com

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ABSTRACT

Introduction: Tuberculous pleural effusions are usually unilateral, small to moderate in size, usually occupying less than two-thirds of the hemithorax. Massive pleural effusion as a result of tuberculosis is rare.

Case presentation: A 65-year-old male patient from Ethiopia came with a four-month history of productive cough and constitutional symptoms. Physical examination showed malnourished patient with evidence of massive left side pleural effusion; sputum Gene X-pert was positive for Mycobacterium tuberculosis, Chest X-ray demonstrated massive left side pleural effusion occupying the whole left hemithorax with trachea shifted to the right. Pleural fluid analysis was remarkable for lymphocytic effusion with a high protein and a negative cytology for malignant cells upon repeated testing.

Conclusion: Massive pleural effusion as a result of tuberculosis is a rare presenting way of pleural tuberculosis. Delay in diagnosis leads to catastrophic complications with significant morbidity and mortality.

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INTRODUCTION

Tuberculous pleural effusion is the second most common form of extrapulmonary tuberculosis (TB) and is the most common cause of pleural effusion in areas where TB is endemic [1-5]. It can occur in association with a reactivation or primary tuberculosis [4, 6-9]. In adults, most often they occur due to reactivation disease [7, 8]; in children, most often they occur in the setting of primary disease [9].

Tuberculous pleural effusions are usually unilateral, small to moderate in size, and self-limited [6]. It occupies less than two-thirds of the hemithorax in more than 85 percent of cases [10].

The initial evaluation of patients with suspected tuberculous pleural effusion should include diagnostic evaluation for pulmonary TB, beginning with sputum collection for smear/culture for acid-fast bacilli and for nucleic acid amplification (NAA) testing [11,12].

We are going to report a case of a 65-year-old farmer patient from

Ethiopia presented with a four-month history of productive cough and constitutional symptoms; the initial consideration was malignant pleural effusion (MPE) but later unexpected diagnosis was reached after thorough work up.

Case Presentation

A 65-year-old male who is a farmer from Ethiopia presented with four months history of cough productive of whitish sputum with estimated amount being 2 Arabic coffee cups daily, intermittent low-grade fever, drenching night sweating, loss of appetite and unquantified weight loss. He also had a two month history of easy fatigability, shortness of breath on mild exertion and left side pleuritic type of chest pain which got worsened upon coughing, sneezing, straining and deep inspiration. No previous history of chronic cough or dyspnea. He has no previous history of treatment for any form of tuberculosis. No contact history with a known pulmonary tuberculosis patient or chronic coughers. No history of palpitation, body swelling, orthopnea or paroxysmal nocturnal dyspnea. No underlying hypertension, diabetes mellitus, chronic lung process, cardiac, renal and liver disease. He didn't use alcohol or cigarette.

On physical examination; he appeared chronically sick looking with prominent zygomata and emaciated extremities. His body mass index was

* Corresponding author.

Yoseph Gebremedhin Kassie, Debre Tabor Comprehensive Specialized Hospital, MD, Internist; Email: yosephgkm@gmail.com

17.3 Kg/m² and vital signs were stable. Chest examination was remarkable for shifted trachea to the right, absent tactile fremitus, stony dullness upon percussion and absent air entry in the left whole lung field. There was no pertinent finding in the other systems.

On investigations; Mycobacterium tuberculosis was detected on sputum Gene X-pert with no rifampin resistance (Figure 1), Erythrocyte sedimentation rate was 101mm/hr (Figure 2), pleural fluid analysis showed straw colored effusion, with high protein level of 5g/dl, pleural fluid white cell count of 293 cells with lymphocytes accounting for 95% giving a high pleural fluid lymphocyte to neutrophil ratio (Figure 3). Pleural fluid cytology was done three times and it showed lymphocytic effusion with very few mesothelial cells and no malignant cells seen (Figure 4). Chest X-ray showed; massive left side pleural effusion occupying the whole left hemithorax with tracheal and mediastinal shift to the right (Figure 5).

Complete blood count, Liver and renal chemistries, serum electrolytes, HIV antibody test, HBsAg and anti-HCVab were unremarkable. As well, abdominopelvic ultrasound, electrocardiography and echocardiography were non revealing.

A final diagnosis of Disseminated TB (lung, pleura) with massive pleural effusion as a result of TB was reached. The evidence from the history and physical examination as mentioned and investigations; an ESR value 101mm/hr, a positive sputum Gene X-pert, a high pleural fluid protein and lymphocyte to neutrophil ratio, and a negative pleural fluid cytology for malignant cells upon repeated testing. All of the above evidence confirmed the diagnosis of tuberculosis. Subsequently chest tube drainage was done and anti-tuberculosis therapy (HRZE²/HR⁴) with pyridoxine initiated. Upon follow up the patient had significant improvement.

DEBRE TABOR GENERAL HOSPITAL
TB Laboratory Request and Report form

1. PATIENT IDENTIFICATION:
 Patient Full Name: Addis Siban Age (Yrs): 68 Sex (M/F): M MRN 490023
 Referring Unit/Health Facility: _____ Woreda: _____ Zone: _____
 Address: Region: _____ Sub-city: suw Woreda: mekki Kebele: 27 Tele: _____
 Name of Contact per visit: _____ Address: _____ Zone: suw Woreda: mekki Kebele: 27 Tele: _____
 Site: Pulmonary Extra pulmonary (specify): _____

2. TB DISEASE TYPE & TREATMENT HISTORY:
 Registration Group: New Relapse After default After failure of first treatment After failure of re-treatment MDR TB Contact Other
 Previous TB drug use: New First line second line

3. REQUEST FOR TESTING AT TB LABORATORY:
 Reason: Diagnosis if diagnostic, presumptive TB /RR-TB/MDR-TB
 Follow up if follow up at _____ months during treatment
 Specimen type: Sputum Other (Specify): _____
 Date specimen collected: _____ / _____ / _____ (Ethiopian Calendar)
 Requested tests: Microscopic Xpert MTR/RIF test Culture Line probe assay Phenotypic Drug Susceptibility Testing (DST)
 Person requesting examination: Name: [Signature] Signature: [Signature] Date: 04/11/15

4. LABORATORY RESULTS:
 Lab. Ser. Number: _____ Date specimen received: _____ / _____ / _____ (Ethiopian Calendar)
 Specimen Appearance: Mucous/solid/mucous-purulent/bloody/other _____
 4.1. Microscopic Examination Result:

Date of Specimen Collected	Sputum Specimen	Positive (in grad- ing)	Negative
1			
2			
3			

 Ziehl-Neelsen (ZN) Fluorescence Concentrated Smear
 Direct Smear Fluorescence Concentrated Smear

4.2. Xpert MTR/RIF test result (to be completed in the laboratory)
 M. tuberculosis: Detected Not detected Invalid /No result/Error
 Rifampin resistance: Detected Not Detected Indeterminate result
 Data Result: _____ / _____ / _____ Examined by (name and Signature): _____

4.3. Drug susceptibility test (DST) and Line Probe Assay (LPA) results:

Date Sample Collected	Media used (liquid or solid culture)	Lab serial number (if)	Negative (no colonies)	TB (no. colonies)	Δ (no. colonies)	ΔΔ (no. colonies)	ΔΔΔ (no. colonies)	NTM (non-tuberculous mycobacteria) growth	NTM	Contaminated

Date Sample Collected	Method	Laboratory Serial number(s)	Results (mark for each drug)															
			H	R	E	S	Ank	Kn	Cm	Flu	Other 1	Other 2						

Method, Specimen: solid media DST; liquid media DST; direct LPA; indirect LPA
 Results only: R-Resistant; S-susceptible; C-Contaminated; TB-Not done; NTM-Non-Tuberculosis Mycobacterium
 Date reported: 4/12/15 (F-C) Name/Signature: [Signature] Reviewed by: [Signature]

Figure 1: Sputum GeneXpert.

Lab. Ser. No. _____ Receipt No. _____ Price 2000 Birr

Name: Addis Siban Age: 68 Sex: M MRN: 490023
 Address: Woreda: _____ Kebele: _____ OPD #: 3A
 Ward & Bed #: _____ source of Specimen _____
 Clinical Dx: TB
 Requested by: [Signature] (Dr./HO, Nurse) sign. [Signature] Date of request: 4/11/15
 Date of Specimen Collection: 4/11/15 Time Collected: 5:15 Collected by: Sign. [Signature]

Test	Result	Ref. No.	Test	Result	Ref. No.
<input type="checkbox"/> Total WBC	K cells/ul	4.5-11x10 ⁹ ul(M)	<input type="checkbox"/> Differential		
<input type="checkbox"/> RBC Count	M cells/ul	4.5-5.9x10 ¹² ul(M) 4.5-2x10 ¹² ul(F) 3.8-5x10 ¹² ul(child)	<input type="checkbox"/> Neutrophil	%	36-80%
<input type="checkbox"/> Hemoglobin	g/dl	13.5-17.5g/dl(M) 12.0-16g/dl(F)	<input type="checkbox"/> Lymphocyte	%	20-50%
<input type="checkbox"/> Hematocrit	%	41-53% (M) 36-48% (F) 31-41% (child)	<input type="checkbox"/> Eosinophil	%	0-7%
<input type="checkbox"/> MCV	fL	80-100fL	<input type="checkbox"/> Basophil	%	0-2%
<input type="checkbox"/> MCH	pg	26-34pg/cell	<input type="checkbox"/> Monocyte	%	2-12%
<input type="checkbox"/> MCHC	g/dl	31-37g/dl	<input type="checkbox"/> Immature	%	—%
<input type="checkbox"/> RDW		Cv=11.5-14.5% SD=35-47 fL	<input type="checkbox"/> PBC morphology		12-14 Seconds
<input type="checkbox"/> Platelets Count	K cells/ul	150-350x10 ⁹ child/ad			18-28 Seconds
<input type="checkbox"/> PDW					170-420ng/dl
<input type="checkbox"/> MPV	fL	0.5-2.5% Red cells	<input type="checkbox"/> PT	Sec	0-15mm/hr(F) 0-20mm/hr(M)
<input checked="" type="checkbox"/> ESR Mm/hr	<u>101</u>		<input type="checkbox"/> aPTT	Sec	
<input type="checkbox"/> Reticulocyte Count %			<input type="checkbox"/> INR		
			<input type="checkbox"/> Fibrinogen	Mg/dl	

Lab. Comments: _____

Test done by / Code: Yesork Date of Completion: 04/11/15 Time of Completion: 5:09
 Reviewed / Approved by (Code): [Signature] Date: 04/11/15 Time: 5:09 Sign. _____

Figure 2: Sputum GeneXpert.

Aklag Almaw Yizaw, Binyam Melese Getahun, Mulugeta Wondmu Kedimu, Metages Damtie Melaku, Menelik Tarekgn Dagne, Yoseph Gebremedhin Kassie (2024). Unilateral Massive Pleural Effusion Occupying the whole Hemithorax Due to Tuberculosis: a Rare form of Pleural Tuberculosis: a Case Report. American J Case Rep Clin Imag; 1(1):1-3

Body fluid Analysis And Test Results

Name Of patients Adiss Sisay Age 65sex m_ card no 490023

Type of specimen PLEURAL fluid site of specimen _____ date of collection _____ Requested By _____ Date _____

No	Name of Test	Result	Normal Range /Reference/
1	Apperance/Color	YELLOW	clear
2	PH	--	
3	Glucose	120mg/dl	40-70 mg/dl
4	Total Protein	5.0	<3 BV mg/dl
5	RBCs	---	
6	WBCs count	293cell/mm ³	< 1000 cells/ μ l
7	LDH	420	110-210U/L or less than 50% of plasma value
8	DLC	Neutrophil= 5% Lymphocyte =95%	N=20-40 L=40-60 M=0-4
9	Indian Ink	---	NO fungal elment seen
10	AFB	No Afb seen	No
11	Gram stain	No gram RXN bacteria	No
12	Amylase	----	138-404units/l
13	VDRL	NEGATIVE	Negative

Lab comments:
Test done by: WUBETU Date 05/01/15 sign. [Signature]

Figure 3: Pleural Fluid Analysis.

NAME Adiss Sisay sex m Age 65 Card No 490023 Date 06/11/15
 WARD M.W BED NUMBER #41
 REQUESTING PROFESSIONAL NAME Betelalew (M.D) SIGNATURE [Signature]

HISTORY AND P/E FINDINGS: 65 year old male complains of dry cough which later became productive of whitish sputum, associated w/ TB symptoms sfx.
He absent cavity on the whole left side of chest
chest x-pert undetected

DIAGNOSIS: disseminated TB to lung & pleura + R/O lung ca

STUDY REQUESTED: pleural fluid cytology

RADIOLOGIST'S REPORT:
MFC - Smears show mainly small mature lymphocytes admixed with very few mesothelial cells.
No malignant cells seen.

Index - pleural fluid - lymphocytic effusion.

NAME Dr. Tadela B SIGNATURE [Signature] DATE 06/10/15

Figure 4: Pleural Fluid Cytology.

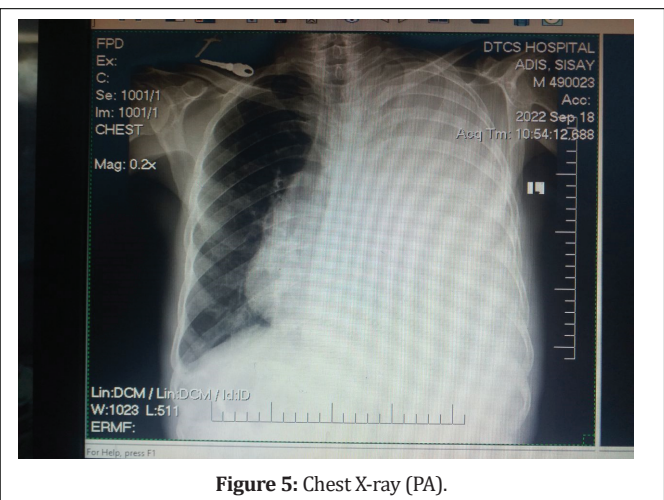


Figure 5: Chest X-ray (PA).

Discussion

Tuberculous pleural effusions are usually small to moderate in size occupying less than two-thirds of the hemithorax; massive pleural effusion as a result of tuberculosis is an uncommon finding [10]. The diagnosis of tuberculous pleural effusion may be definitively established via demonstration of Mycobacterium tuberculosis in pleural fluid or a pleural biopsy specimen [1, 6]. However, it is reasonable to make a presumptive diagnosis of TB without pathologic confirmation in the following scenarios:

-In a patient with an established diagnosis of pulmonary TB without signs/symptoms that raise suspicion for an alternative cause for pleural effusion

-In the setting of high clinical suspicion for TB, pleural fluid analysis with lymphocytic-to-neutrophil ratio >0.75 and adenosine deaminase (ADA) >40 units/L, or by demonstration of one or more caseating granulomas on pleural biopsy [1, 2, 11,12].

So, this case has almost the whole left hemithorax affected by tuberculous pleural effusion as part of disseminated tuberculosis (Figure 1 & 5).

Diagnosing pleural TB in the absence of concomitant pulmonary involvement is challenging in resource limited settings like ours because of very low yield of pleural fluid AFB and Gene X-pert, and lack of facilities to do pleural biopsy, ADA and IGRA. Fortunately, our patient has concomitant pulmonary involvement diagnosed by sputum Gene X-pert with pleural fluid analysis supportive of tuberculous effusion plus alternative diagnoses being very less likely.

Conclusion

Massive pleural effusion as a result of tuberculosis is a rare presenting way of pleural tuberculosis. Delay in diagnosis leads to catastrophic complications with significant morbidity and mortality.

Abbreviations

- ADA-Adenosine deaminase
- AFB-Acid Fast Bacilli
- IGRA-Interferon gamma release assay
- MPT-Malignant pleural effusion
- MTB-Mycobacterium tuberculosis
- PA-posterior-anterior
- TB-Tuberculosis
- HRZE- Isoniazide, Rifampicine,Pyrazinamide,Ethambutol
- HR-Isoniazide, Rifampicine

Ethical Approval

Institutional approval is not required to publish the case details.

Consent

Written informed consent was obtained from the patient for the publication of this case report and accompanying image.

Acknowledgments

We thank the patient and his family for their approval to publish the case.

Author Contributions

All authors made equal contribution in the acquisition of data, analysis and interpretation; took part in drafting and writing of manuscript, revising and reviewing the article, gave final approval of the version to be published, have agreed to which journal the article has been submitted, and agree to be held accountable for all aspects of the work.

Data Availability Statement

The data that support the findings of this case report are available from the corresponding author upon reasonable request.

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Disclosure

The authors declare no conflicts of interest in relation to this case report

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