CASE REPORT - OPEN ACCESS

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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 Yigzaw[1], Binyam Melese Getahun[2], Mulugeta Wondmu Kedimu[3], Metages Damtie Melaku[4], Menelik Tarekegn Dagne[5], Yoseph Gebremedhin Kassie[6]

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

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

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

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

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

[6]*Debre 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.

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 through 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 zygomas and emaciated extremities. His body mass index was

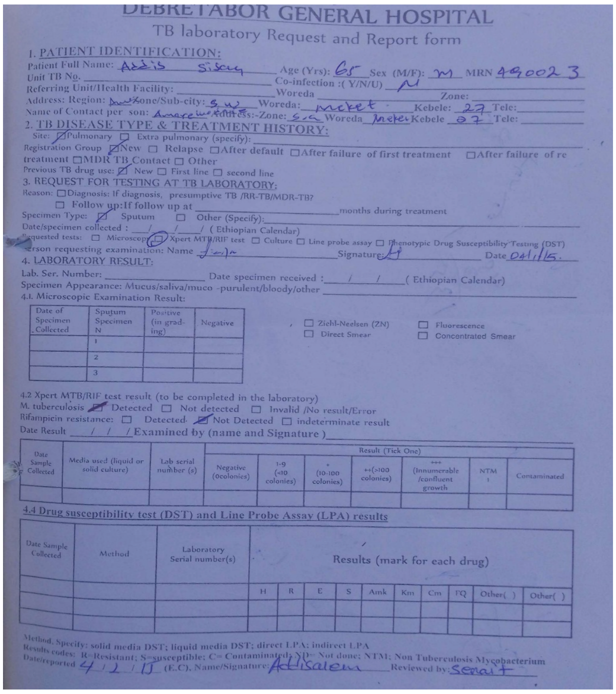
* Corresponding author.
Yoseph Gebremedhin Kassie, Debre Tabor Comprehensive Specialized Hospital, MD, Internist; Email: yosephgkm@gmail.com

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 (HRZE[2]/HR[4]) with pyridoxine initiated. Upon follow up the patient had significant improvement.



DEBRETABOR GENERAL HOSPITAL

TB laboratory Request and Report form

1. PATIENT IDENTIFICATION:
Patient Full Name: ______ Age (Yrs): 65 Sex (M/F): M MRN ______
Unit TB No. ______ Co-infection :(Y/N/U) ______
Referring Unit/Health Facility: ______ Woreda ______ Zone: ______
Address: Region: ______ Zone/Sub-city: ______ Woreda: ______ Kebele: ______ Tele: ______
Name of Contact person: ______ Address:-Zone: ______ Woreda ______ Kebele ______ Tele: ______

2. TB DISEASE TYPE & TREATMENT HISTORY:
Site: ☑ Pulmonary ☐ Extra pulmonary (specify): ______
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 diagnosis, 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: ☐ Microscopy ☐ Xpert MTB/RIF test ☐ Culture ☐ Line probe assay ☐ Phenotypic Drug Susceptibility Testing (DST)
Person requesting examination: Name ______ Signature: ______ Date ______

4. LABORATORY RESULT:
Lab. Ser. Number: ______ Date specimen received : ___/___/___ (Ethiopian Calendar)
Specimen Appearance: Mucus/saliva/muco -purulent/bloody/other ______
4.1. Microscopic Examination Result:

Date of Specimen Collected	Sputum Specimen N	Positive (in grading)	Negative
	1		
	2		
	3		

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

4.2 Xpert MTB/RIF test result (to be completed in the laboratory)
M. tuberculosis ☑ Detected ☐ Not detected ☐ Invalid /No result/Error
Rifampicin resistance: ☐ Detected ☑ Not Detected ☐ indeterminate result
Date Result ___/___/___/ Examined by (name and Signature) ______

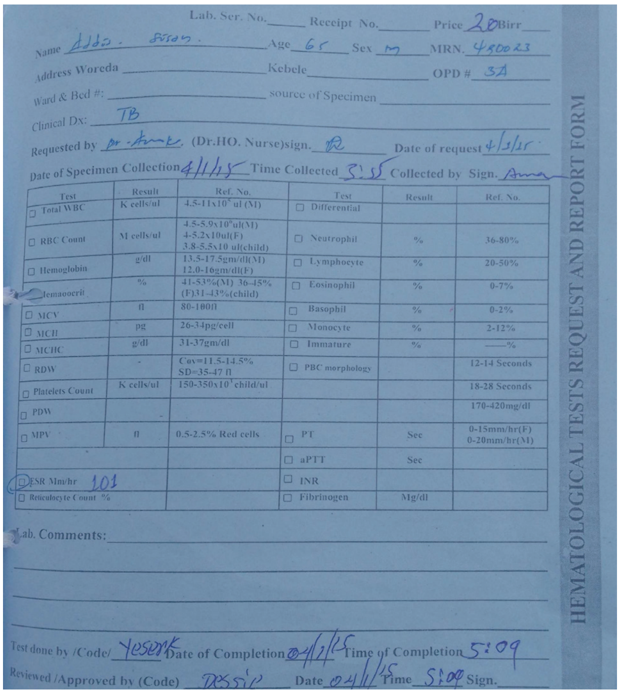
Date Sample Collected	Media used (liquid or solid culture)	Lab serial number (s)	Result (Tick One)						
			Negative (0colonies)	1-9 (<10 colonies)	+ (10-100 colonies)	++(>100 colonies)	+++ (Innumerable /confluent growth	NTM	Contaminated

4.4 Drug susceptibility test (DST) and Line Probe Assay (LPA) results

Date Sample Collected	Method	Laboratory Serial number(s)	Results (mark for each drug)									
			H	R	E	S	Amk	Km	Cm	FQ	Other( )	Other( )

Method. Specify: solid media DST; liquid media DST; direct LPA; indirect LPA
Results codes: R=Resistant; S=susceptible; C= Contaminated; ND= Not done; NTM: Non Tuberculosis Mycobacterium
Date/reported ___/___/___ (E.C), Name/Signature: ______ Reviewed by: ______

Figure 1: Sputum GeneXpert.



Lab. Ser. No.______ Receipt No.______ Price 20 Birr______
Name ______ Age 65 Sex M MRN. ______
Address Woreda ______ Kebele ______ OPD # ______
Ward & Bed #: ______ source of Specimen ______
Clinical Dx: TB
Requested by ______ (Dr.HO. Nurse)sign. ______ Date of request ______
Date of Specimen Collection ______ Time Collected ______ Collected by Sign. ______

Test	Result	Ref. No.	Test	Result	Ref. No.
☐ Total WBC	K cells/ul	4.5-11x10³ ul (M)	☐ Differential		
☐ RBC Count	M cells/ul	4.5-5.9x10⁶ul(M) 4-5.2x10ul(F) 3.8-5.5x10 ul(child)	☐ Neutrophil	%	36-80%
☐ Hemoglobin	g/dl	13.5-17.5gm/dl(M) 12.0-16gm/dl(F)	☐ Lymphocyte	%	20-50%
☐ Hemaoocrit	%	41-53%(M) 36-45% (F)31-43%(child)	☐ Eosinophil	%	0-7%
☐ MCV	fl	80-100fl	☐ Basophil	%	0-2%
☐ MCH	pg	26-34pg/cell	☐ Monocyte	%	2-12%
☐ MCHC	g/dl	31-37gm/dl	☐ Immature	%	——%
☐ RDW	-	Cov=11.5-14.5% SD=35-47 fl	☐ PBC morphology		12-14 Seconds
☐ Platelets Count	K cells/ul	150-350x10³ child/ul			18-28 Seconds
☐ PDW					170-420mg/dl
☐ MPV	fl	0.5-2.5% Red cells	☐ PT	Sec	0-15mm/hr(F) 0-20mm/hr(M)
			☐ aPTT	Sec	
☐ ESR Mm/hr 101			☐ INR		
☐ Reticulocyte Count %			☐ Fibrinogen	Mg/dl	

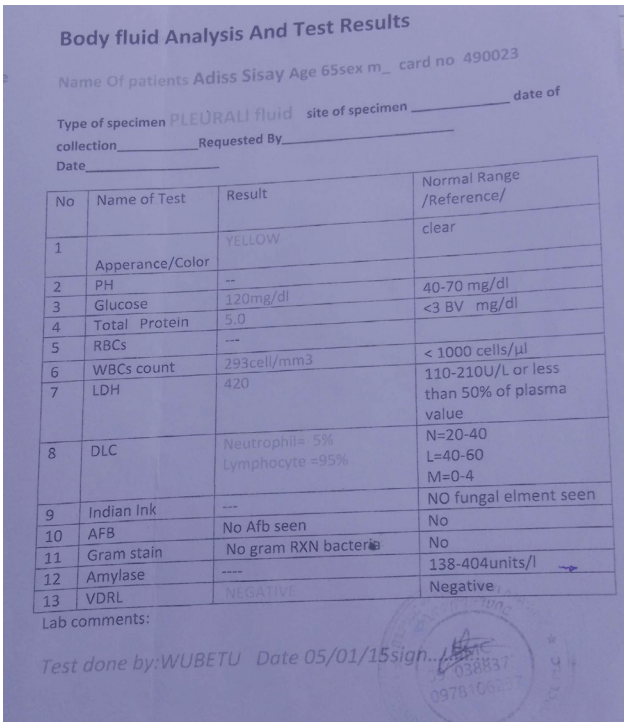
Lab. Comments: ______

Test done by /Code/ ______ Date of Completion ______ Time of Completion 5:09
Reviewed /Approved by (Code) ______ Date ______ Time ______ Sign. ______

HEMATOLOGICAL TESTS REQUEST AND REPORT FORM

Figure 2: Sputum GeneXpert.

Aklog Almaw Yigzaw, Binyam Melese Getahun, Mulugeta Wondmu Kedimu, Metages Damtie Melaku, Menelik Tarekegn 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_____

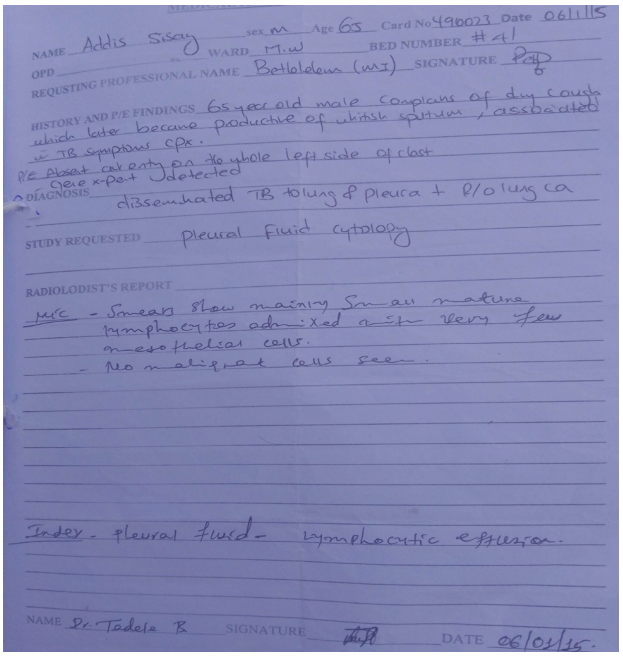
Date_____

No	Name of Test	Result	Normal Range /Reference/
1	Apperance/Color	YELLOW	clear
2	PH	--	40-70 mg/dl
3	Glucose	120mg/dl	<3 BV mg/dl
4	Total Protein	5.0	
5	RBCs	---	< 1000 cells/µl
6	WBCs count	293cell/mm3	110-210U/L or less than 50% of plasma value
7	LDH	420	N=20-40 L=40-60 M=0-4
8	DLC	Neutrophil= 5% Lymphocyte =95%	NO fungal elment seen
9	Indian Ink	---	No
10	AFB	No Afb seen	No
11	Gram stain	No gram RXN bacteria	138-404units/l
12	Amylase	----	Negative
13	VDRL	NEGATIVE	

Lab comments:

Test done by:WUBETU Date 05/01/15sign...

Figure 3: Pleural Fluid Analysis.



NAME Addis Sisay sex M Age 65 Card No 490023 Date 06/1/15

OPD WARD M.W BED NUMBER #41

REQUSTING PROFESSIONAL NAME Bethelehem (MD) 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 cpx.

P/E Asset cachexia pn to whole left side of chest

Gene x-pert detected

DIAGNOSIS disseminated TB tolung & pleura + R/O lung ca

STUDY REQUESTED Pleural Fluid cytology

RADIOLODIST'S REPORT

M/C - Smears show mainly small mature lymphocytes admixed with very few mesothelial cells.

- No malignat cells seen.

Indey - pleural fluid - lymphocytic effusion.

NAME Dr Tadele B SIGNATURE DATE 06/01/15.

Figure 4: Pleural Fluid Cytology.

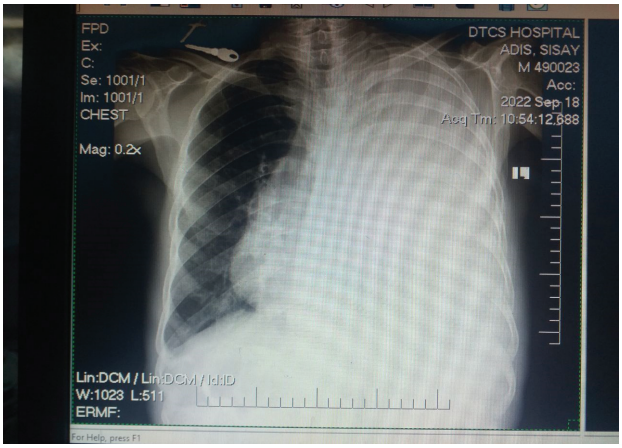


Figure 5: Chest X-ray (PA).

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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There is no funding to report this case.

Disclosure

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

REFERENCES

1. Zhai K, Lu Y, Shi HZ. Tuberculous pleural effusion. J Thorac Dis 2016; 8:E486.
2. Light RW. Update on tuberculous pleural effusion. Respirology 2010; 15:451.
3. Baumann MH, Nolan R, Petrini M, et al. Pleural tuberculosis in the United States: incidence and drug resistance. Chest 2007; 131:1125.
4. Seibert AF, Haynes J Jr, Middleton R, Bass JB Jr. Tuberculous pleural effusion. Twenty-year experience. Chest 1991; 99:883.
5. Lewinsohn DM, Leonard MK, LoBue PA, et al. Official American Thoracic Society/Infectious Diseases Society of America/Centers for Disease Control and Prevention Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clin Infect Dis 2017; 64:e1.
6. Gopi A, Madhavan SM, Sharma SK, Sahn SA. Diagnosis and treatment of tuberculous pleural effusion in 2006. Chest 2007; 131:880.
7. Torgersen J, Dorman SE, Baruch N, et al. Molecular epidemiology of pleural and other extrapulmonary tuberculosis: a Maryland state review. Clin Infect Dis 2006; 42:1375.
8. Kim HJ, Lee HJ, Kwon SY, et al. The prevalence of pulmonary parenchymal tuberculosis in patients with tuberculous pleuritis. Chest 2006; 129:1253.
9. Merino JM, Carpintero I, Alvarez T, et al. Tuberculous pleural effusion in children. Chest 1999; 115:26.
10. Valdés L, Alvarez D, San José E, et al. Tuberculous pleurisy: a study of 254 patients. Arch Intern Med 1998; 158:2017.
11. Sahn SA, Huggins JT, San José ME, et al. Can tuberculous pleural effusions be diagnosed by pleural fluid analysis alone? Int J Tuberc Lung Dis 2013; 17:787.
12. Jiménez Castro D, Díaz Nuevo G, Pérez-Rodríguez E, Light RW. Diagnostic value of adenosine deaminase in nontuberculous lymphocytic pleural effusions. Eur Respir J 2003; 21:220.