

# Pleuroscopy for Tuberculosis Pleurisy Mimicking Heart Failure with Bilateral Pleural Effusion: A Case Report

Chung-Shu Lee<sup>1,2</sup>, Fu-Tsai Chung<sup>2</sup>, Shih-Hong Li<sup>2</sup>, Chih-Wei Wang<sup>3</sup>,  
and Chih-Hao Chang<sup>1,2</sup>

<sup>1</sup>*Division of Pulmonary and Critical Care, Department of Internal Medicine, Saint Paul's Hospital;*

<sup>2</sup>*Department of Thoracic Medicine, <sup>3</sup>Department of Pathology, Chang Gung Memorial Hospital, Lin-Kuo Branch, Chang Gung Medical Foundation*

## Abstract

We herein report the case of an 85-year-old woman with tuberculosis (TB) pleurisy presenting as heart failure and bilateral pleural effusions. The patient was admitted to our hospital because of shortness of breath and bilateral pleural effusions. She received diuretics treatment, but the pleural effusions did not resolve. Chest computed tomography revealed pleural effusion with lung atelectasis. Because no definite diagnosis was made after thoracentesis, the patient underwent pleuroscopy. A biopsy of the pleural nodules was done, and the specimen was diagnosed as granulomatous inflammation, suspected *Mycobacterium tuberculosis* infection. The patient's pleural effusion resolved after anti-tuberculosis treatment. (J Intern Med Taiwan 2017; 28: 366-371)

**Key Words: Medical thoracoscopy, Pleuroscopy**

## Introduction

Bilateral pleural effusions are usually caused by cardiac disease, kidney disease, liver disease, or miliary tuberculosis (TB)<sup>1</sup> However, exudates were also found in patients with pleural effusion through thoracentesis and pleural fluid analysis.<sup>2</sup> To give adequate therapy, identifying the etiology of the pleural effusions is crucial. In patients with undiagnosed exudative pleural effusions, a pleuroscopy is a safe and feasible procedure to obtain a diagnosis.<sup>3,4</sup> We report a case of TB pleurisy mimicking heart

failure with bilateral pleural effusion diagnosed by pleuroscopy.

## Case Report

An 85-year-old woman came to the emergency department of our hospital due to a shortness of breath for two weeks. She was in good health until one month earlier, when she had dry cough. Two weeks before admission, she had dyspnea and bilateral lower legs edema. Her past history and family history were unremarkable. Her heart rate was 62 beats per minute, systolic and diastolic blood pres-

sure were 101/56 mmHg, respectively. The physical examination revealed bilateral basal crackles. The chest radiograph showed blunting of the bilateral costophrenic angles, with suspected bilateral pleural effusion (Fig. 1). The patient's resting electrocardiogram (EKG) was atrial fibrillation. The cardiac echo showed preserved left ventricular systolic function with a 52% ejection fraction by M-mode. And her BNP level was up to 307.6 pg/mL.

The patient's symptoms improved after diuretics treatment, however, the bilateral pleural effusions did not resolve. Ultrasound-guided thoracentesis was performed. The pleural effusion had a protein level of 3.9 g/dL, a lactate dehydrogenase (LDH) level of 180 U/L, and a glucose level of 137mg/dL. These and other pleural effusion analysis results are shown in Table 1. In the patient's blood tests, the total protein level was 6.3 g/dL, and the LDH level was 212 U/L. Exudative pleural effusion was confirmed on the basis of Light's criteria. We had done culture of pleural effusion three times and TB-PCR twice. However, the pleural effusion studies including cytology and microbiology all had negative results.



Figure 1. Chest radiograph at the time of emergency department admission showed bilateral pleural effusion.

The chest computed tomography scan showed bilateral pleural effusion with lung atelectasis changes (Fig. 2). The patient's respiratory symptoms were transiently alleviated by thoracentesis, but the bilateral pleural effusion recurred. Because of the recurrent pleural effusion with an unknown etiology, the patient received a pleuroscopic examination, and multiple nodular lesions were noted on the left parietal pleura (Fig. 3). Pleural biopsies were done by forceps during the pleuroscopy, and the pathology revealed granulomatous inflammation (Fig. 4), with a suspected *Mycobacterium tuberculosis* infection. The biopsy specimen was sent for acid-fast bacilli (AFB) special stains, but the result was negative. Tissue culture was not performed at that time. Anti-tuberculosis therapy was started. After a 6-month course of anti-tuberculosis treatment (isoniazid, rifampicin, pyrazinamide, and ethambutol for 2 months followed by isoniazid, rifampicin, and pyrazinamide for 4 months), her symptoms and pleural effusions improved partially (Fig. 5).

## Discussion

Although bilateral pleural effusions are

Table 1. Pleural effusion analysis

Specimen	Pleural effusion
Appearance	Turbid
Color	Yellow
SP.Gravity	1.030
Protein	Positive*
Leukocyte count	725 /uL
RBC	3200/uL
Neutrophil	57%
Lymphocyte	43%
Glucose(PL)	137 mg/dL
T-Protein (PL)	3.9 g/dL
LDH (PL)	181.0 U/L
Total Protein (B)	6.3 g/dL
LDH (B)	212.0 U/L

\* Criteria of positive pleural protein:

The pleural protein was analyzed by Rivalta test. The test would be classified as positive result when the cloud-particle drop was suspended under 100ml-level in a 200ml tube.

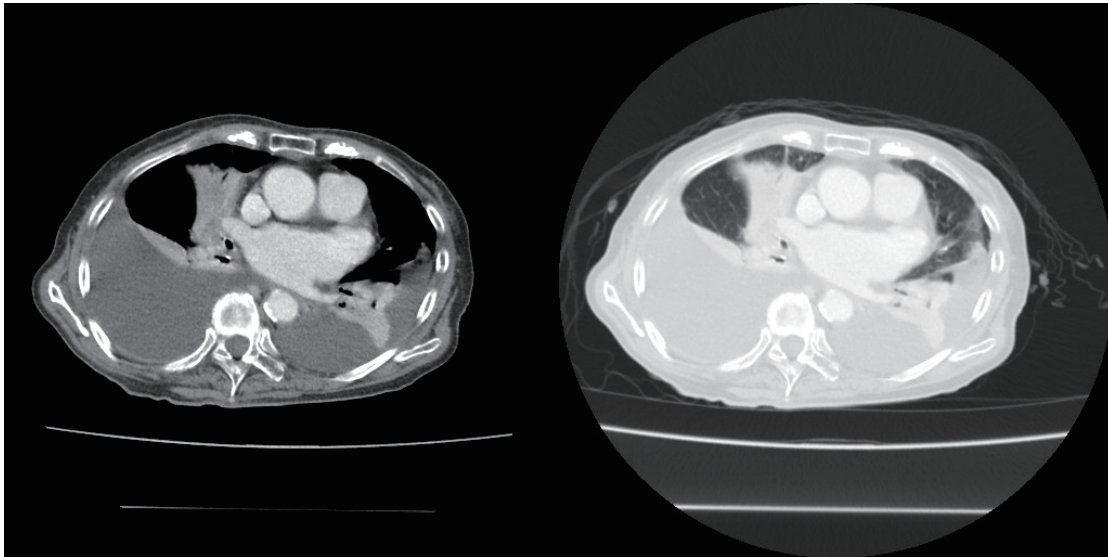


Figure 2. Computed tomography of the chest of an 85-year-old woman showed bilateral pleural effusions.

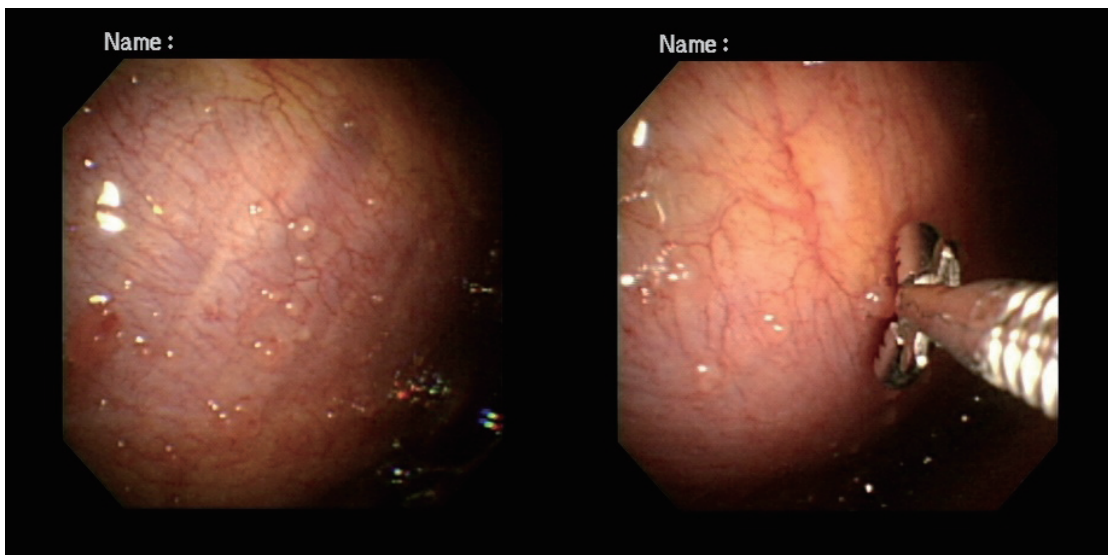


Figure 3. Pleuroscopic examination revealed several nodules at the parietal pleura and forceps biopsy was done.

common in patients with congestive heart failure presenting with transudate, exudates were also found in bilateral pleural effusion.<sup>2</sup> A previous study reported that the total protein, glucose, and LDH levels were similar in both sides of patients with bilateral pleural effusion and diagnostic thoracentesis performed on one side was suggested.<sup>5</sup> In tuberculosis endemic countries, tuberculosis induced pleural effusion remains difficult to diagnose. Some risk factors can lead to the development of active tuberculosis, such as human immunodeficiency virus (HIV),<sup>6</sup> dia-

betes mellitus,<sup>7</sup> post-gastrectomy<sup>8,9</sup> and the use of disease-modifying antirheumatic drugs.<sup>10</sup> Health care workers also have a higher risk of becoming infected with tuberculosis, with a prevalence of approximately 33%–79% for latent TB infection.<sup>11</sup> However, the patient in this case study had no HIV, diabetes mellitus, alcoholism, cigarette smoking, or use of immunosuppressive agents. Studies have reported an association between aging and tuberculosis and revealed that elder patients have an atypical presentation rather than typical sputum smear

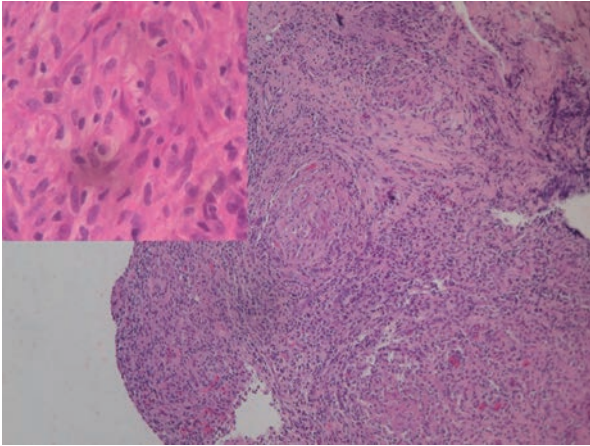


Figure 4. The pleural biopsy showed granulomatous inflammation with aggregates of epithelioid histiocytes (hematoxylin and eosin stain, 100X). The picture in the upper left corner was magnified 400X.

for positive pulmonary tuberculosis.<sup>12,13</sup> Another study showed extrapulmonary tuberculosis could present in 50% of the older adult patients.<sup>14</sup>

Lymphocytosis in pleural effusion is traditionally known as a presentation of TB pleural effusion. But Ruan and his colleague reported lymphocytosis in pleural fluid is not associated with a positive culture of tuberculosis in pleural effusion.<sup>15</sup> Previous studies have demonstrated that 9.5%–11% of patients with TB pleurisy had neutrophil-predominant pleural fluid.<sup>16–18</sup> Although the patient in this case study had a neutrophil percentage of 57%, we could not rule out TB pleurisy. The diagnosis of TB pleural effusion relies on mycobacterial stains, sputum and pleural effusion culture, pleural biopsy, or the elevation of adenosinedeaminase (ADA) in the pleural fluid.<sup>19,20</sup> However, the diagnostic yields of mycobacterial culture were 62%, 12%, and 52% in the pleural tissue, pleural effusion, and sputum, respectively.<sup>21</sup> A previous study showed that 38% of patients with granuloma in pleural biopsy specimen had a positive AFB stain.<sup>22</sup> A study in United State enrolled 7549 pleural TB patients, and 15.8% had a positive of AFB.<sup>23</sup> To diagnose TB using through traditional methods such as AFB and pleural effu-

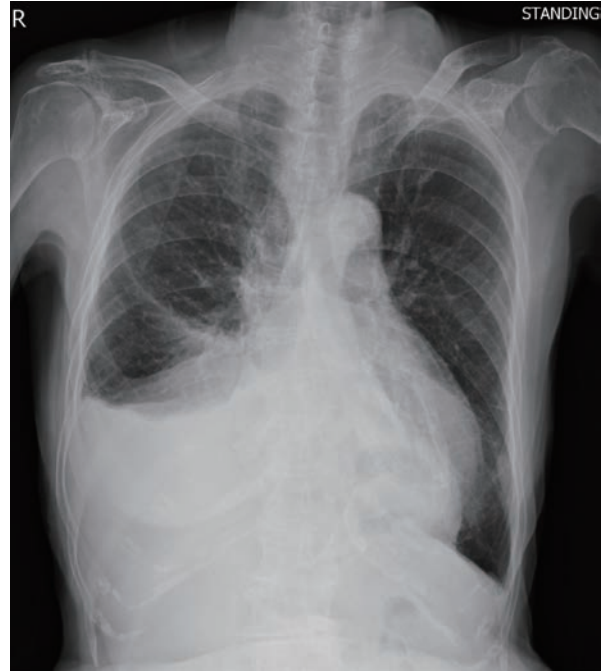


Figure 5. Chest X-ray showed the resolved bilateral pleural effusion after anti-tuberculosis treatment. Retro-cardiac area density was compatible with hiatal hernia by computed tomography image.

sion culture remains challenging.<sup>24</sup> ADA, an enzyme that catalyzes the deamination of adenosine to inosine, is a biomarker used for TB diagnosis. A previous study showed that ADA is a sensitive and specific test for tuberculosis pleurisy diagnosis (sensitivity: 0.92; specificity: 0.9).<sup>25</sup> Moreover, pleural ADA is useful in areas with a low prevalence of TB.<sup>26</sup> Liu et al reported that ADA and interferon gamma in pleural effusion were both useful to differentiate TB pleural effusion from malignant pleurisy.<sup>27</sup> ADA has a low cost compared with interferon gamma, and it should be employed if the test is available. Because no ADA tests were available in our facility, we did not compare the ADA test with the pleural biopsy result for TB pleural effusions.

For exudative pleural effusion without an established etiology after evaluation, pleural biopsy is recommended. Pleuroscopy is a safe and highly sensitive procedure used to diagnose tuberculosis and malignant pleural effusions.<sup>28,29</sup> Closed pleural

biopsy has a lower diagnostic yield for tuberculosis and pleural malignancy than does thoracoscopy.<sup>30,31</sup> The sensitivity of histology and mycobacterial culture by closed needle biopsy was 66% and 48%, respectively.<sup>32</sup> In conclusion, TB pleurisy may present as heart failure with bilateral pleural effusions. Pleuroscopy is a safe and well tolerated procedure for elderly patients with pleural effusions of unknown etiology.

## Ethics Approval

This study was approved by Institutional Review Board (IRB No.: 201700475B0) of Chang Gung Medical Foundation.

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## 肋膜腔鏡用於結核性肋膜炎模仿心臟衰竭合併 雙側肋膜積水：病例報告

李忠恕<sup>1,2</sup> 鍾福財<sup>2</sup> 李適鴻<sup>2</sup> 王志偉<sup>3</sup> 張志豪<sup>1,2</sup>

<sup>1</sup>天主教聖保祿修女會醫院 內科部胸腔內科  
林口長庚醫院 <sup>2</sup>胸腔科內科 <sup>3</sup>病理科

### 摘 要

我們在這裡報告一名85歲的結核性肋膜炎女性表現為心臟衰竭合併雙側肋膜積水的病例。病人由於喘以及雙側肋膜積水而入院。她先接受利尿劑治療，但肋膜積水無法消除。胸部電腦斷層掃描顯示肋膜積水與肺擴張不全的變化。由於胸腔穿刺檢查後無明確診斷，病患接受肋膜腔鏡檢查。肋膜切片結果診斷為肉芽腫性炎症，疑似結核感染。在接受抗結核藥物治療後，她的肋膜積水就改善了。