A Tracheobronchial Tuberculosis Patient With Diffuse Nodules in the Tracheobronchial Mucosa Observed by Bronchoscopy Misdiagnosed as Lung Infection

Yang Songa, b, Xiao-Fen Yan a

Abstract

Tracheobronchial tuberculosis (TBTB) is a special form of pulmonary tuberculosis (TB) whose major feature is the infection of the tracheobronchial tree by Mycobacterium tuberculosis. TBTB is diagnosed on histopathological examination of bronchoscopically obtained specimens showing granulomatous inflammation with caseation necrosis and/or positive acid-fast bacilli culture on the microbiological exam. Before bronchoscopy, TBTB is easily misdiagnosed as other lung diseases. This case presentation reports a patient with stable stage pulmonary tuberculosis (PTB) initially misdiagnosed as lung infection before bronchoscopy. Furthermore, sputum smears do not reveal acid-fast bacilli. After being bronchoscoped, the patient showed diffuse nodules in the tracheobronchial mucosa. Sputum culture by rapid liquid method shows positive Mycobacterium tuberculosis. This case can easily be missed diagnosis. It is necessary that bronchoscopy can be a routine means to screen TBTB among the patients with retreated PTB. One rare case was reported. Bronchoscopy showed the presence of diffuse miliary nodules in the mucosa of bilateral bronchi. Pathological examination revealed caseating necrotic granuloma. Mycobacterium tuberculosis was detected by rapid liquid culture. Our case was extremely difficult to diagnose the TBTB without abnormal chest X-ray or computed tomography manifestations. By regular anti-TB treatment with 9 months course, the patient was finally cured with negative Mycobacterium tuberculosis and almost normal tracheobronchial mucosa.

Keywords: Bronchoscopy; Chest CT; Retreated pulmonary tuberculosis; Tracheobronchial tuberculosis; Diffuse nodules

Case Report

A 43-year-old man was admitted to outpatient clinic with the complaints of intermittent cough and expectoration for 20 years. It was reported that the respiratory symptoms were intermittent at the beginning of the disease. The patient was diagnosed as PTB by a pulmonary physician at a county secondary hospital owing to repeated coughing and expectoration. His chest X-ray showed small slice infiltrating shadow on double upper lung field. The patient was initially treated by adopting the 2HRES/4HR program (H, isoniazid, 5 mg/kg; R, rifampicin, 10 mg/kg; E, ethambutol, 20 mg/kg; HRE: orally; S, streptomycin, 0.75 intramuscular injection, daily). All above-mentioned symptoms were improved considerably and drug withdrawal was accordingly received.

Four months ago, the patient again had moderately cough with purulent sputum and shortness of breath after activity. However, the frequency of the symptoms was increased and became persistent. Also she had a low-grade fever during the last 4 months without fatigue, weakness, hemoptysis, weight loss and night sweating. Just for this reason, he was for the first time admitted to our tertiary infectious disease hospitals for further examination on December 30, 2016. He had past medical history of a smoker (360 packs/year) and his medical history was unremarkable. Vital signs of the patient were normal. Physical examination revealed rough breathing sounds both in left and right upper lobe. No wheezing sound or coarse rales can be heard.

Computed tomography (CT) of thorax showed bronchiectasis with lung infection at right upper lung lobe. The radiological abnormality mainly presented fibrotic and proliferative foci. Obvious tracheal involvement was not observed. The microscopy of acid-fast bacilli (AFB) staining...
of the morning, night and instantaneous sputums was negative. Gram staining of the sputum was negative. The sputum culture showed the growth of Klebsiella pneumoniae bacteria. Almost antibiotics except for the ampicillin were susceptible to this bacterium by in vitro drug sensitivity test. Laboratory findings were as follows: erythrocyte sedimentation rate: 34 mm/h, WBC: 8,260/mm³, Hb: 13.8 g/dL, Hct: 38.4%, Plt: 281,300/mm³, procalcitonin: 0.4 µg/L and CRP: 0.42 mg/dL. The biochemical parameters were in normal limits. Pulmonary function test was also normal. The counts of serum CD4+ T cells were also normal by flow cytometry detection. Mycobacterium tuberculosis from the sputum specimen for gene Xpert MTB/RIF rapid analysis was negative. The Mycobacterium tuberculosis culture of sputum specimen was routinely carried out by using the BACTEC method.

The cough symptom had shown significant improvement by anti-infection treatment with piperacillin-tazobactam for 7 days. The patient was discharged from our hospital according to his requirement on January 29, 2017 before the laboratory result of Mycobacterium tuberculosis culture was reported. The diagnosis at discharge was followed as stable stage of PTB, bronchiectasis, and lung infection.

On February 6, 2017, the sputum Mycobacterium tuberculosis culture of this patient displayed positive result. For this reason, he was subsequently informed by telephone hospitalized on February 7. Fortunately, he followed the doctor’s advice and underwent flexible bronchoscopy trans-nasally under local anesthesia with 2% lidocaine on February 8, 2017. The bronchoscopy revealed necrotic endobronchial lesion, diffuse nodules in the trachea and bilateral main bronchi. A large number of purulent sputum attached to the wall of the trachea. The mucosa of trachea was characterized by severe congestion and edema (Fig. 2). Bronchial biopsy and bronchial lavage were performed. AFB staining of the bronchial lavage fluid was positive. The histopathological evaluation of the biopsy specimens revealed granulomatous inflammation. The in vitro drug sensitivity test of Mycobacterium tuberculosis showed multidrug resistant to isoniazid, streptomycin, para-aminosalicylic acid, amikacin and capreomycin. Ultimately, the patient was confirmed the diagnosis of TBTB.

**Discussion**

TB accounts for millions of active disease cases and deaths in both developed and developing countries. Pulmonary infection with Mycobacterium tuberculosis is the most common form of TB [6]. Therefore, TB continues to be one of the most common causes of mortality and morbidity due to infectious cause in China [7]. TBTB is a special form of PTB, which was formerly called as endobronchial tuberculosis (EBTB) [8]. Being shown firstly in 1698 by Richard Morton in an autopsy case died due to TB, TBTB was defined as a tuberculous infection of the tracheobronchial tree with microbial and histopathological evidence, with or without parenchymal involvement [9].

The pathogenesis of EBTB remains poorly understood due to the heterogeneity in the clinical presentation, duration of symptoms and variability of clinical features [10]. Systemic symptoms like anorexia, weight loss, and night sweats might not be prominent in TBTB [11]. TBTB can cause various radiological and bronchoscopical findings [8]. The normal diagnosis way from patients with active TB usually does not require a bronchoscopy as routine procedure. However, Jung and his colleagues recently described that TBTB is present in 50% of patients with active pulmonary TB [12]. Furthermore, TBTB is classified into seven subtypes by bronchoscopy findings: actively caseating, edemartous-hyperemic, fibrostenotic, tumorous, granular, ulcerative, and non-specific bronchitic [13]. The clinical presentation shows non-specific respiratory symptoms or radiologic images. Moreover, 10-20% of cases present with normal chest radiographs [14]. Campos et al [15]
reported a patient with a normal chest X-ray whose bronchoscopy showed granular TBTB. The diagnosis of TBTB remains a challenge for clinicians since initially it shows non-specific signs and symptoms.

In our case, TBTB was misdiagnosed as lung infection. We thought there were three reasons that cause the misdiagnosis. 1) The imaging features of pulmonary parenchyma were very similar to stable TB for lack of typical clinical presentations. 2) Klebsiella pneumoniae bacteria in sputum had been cultured, which was suspected highly for the community-acquired pneumonia. 3) Particularly we took it for granted that lung infection was a definite diagnosis since the symptoms were improved with antibiotic therapy. 4) The bronchoscopic diversity of TBTB was neglected.

Classical symptoms of EBTB are cough, difficulty expectorated high viscose sputum, wheezing, fever, chest pain and hemoptyisis. These symptoms may be seen in other respiratory diseases, so they do not help for the early diagnosis of TBTB. The most common symptom is persistent cough, which is thought to be related to the endobronchial inflammation. Radiological findings of TBTB cases listed according to their frequency were consolidations/infiltrations, nodular lesions, cavitary lesions and uni- or bilateral hilar widening [3]. TBTB was more common in patients with advanced cavitary TB. Generally, bronchoscopy is selectively performed when TBTB is suspected in patients with severe cough, hemoptyisis, wheezing or a positive AFB smear with normal chest X-ray. Because TBTB is highly infectious, bronchoscopy may be beneficial, as it allows early detection of TBTB in all patients with active PTB. There are no exact guidelines or indications to conduct bronchoscopy for detecting TBTB in patients with PTB. Clinicians need to know the exact incidence of TBTB and patient selection criteria for bronchoscopy among patients with PTB.

TBTB is easily misdiagnosed as multiple pulmonary diseases on account of atypical clinical manifestations and various imaging features. Bronchoscopy contributes to the evaluation and diagnosis of TBTB and the taking of the samples (biopsy or BAL) to the pathologic and bacteriological analyses. A closer attention needs to be devoted to identify the bronchoscopic types in TB endemic regions.

Author Contributions

Conception and design: Xiao-Feng Yan. Drafting of the article: Song Yang. Critical revision of the article for important intellectual content: Xiao-Feng Yan. Final approval of the article: Xiao-Feng Yan.

Disclosures

None.

Prior Presentation

It was presented as an academic report on the second annual meeting on TB quality control, at Chongqing city, China, on November 16, 2017.

Consent

Informed consent for participation was obtained from this patient.

Conflict of Interest

None of the authors have any financial conflict of interest.

References

Yang

