

Clinical Application of Bronchoscopy in Diagnosis of Tracheobronchial Tuberculosis

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Abstract: Objective To estimate the value of bronchoscopy in diagnosis of tracheobronchial tuberculosis. **Methods** 216 patients who had clinical presentations and examination of bronchoscopy findings diagnosed by using a standard or ultrathin bronchoscope were retrospectively investigated. **Results** Bronchoscopic findings: edematous-hyperemic type in 67 cases (31%); ulcerative type in 52 cases (24.1%); granular type in 78 (36.1%) and fibrostenotic type in 19 cases (8.8%). Localization of lesions: there were 242 lesions founded in 216 patients, trachea, 8 (3.3%); carina, 3 (1.2%); carina accompanied with left main bronchus, 4 (1.7%); left main bronchus, 65 (26.9%); left-upper lobar bronchus, 31 (12.8%); left lingual lobar bronchus, 18 (7.4%); left-lower lobar bronchus, 22 (9.1%); right main bronchus, 11 (4.5%); right-upper lobar bronchus, 28 (11.8%); right middle lobar bronchus, 36 (14.9%); right-lower lobar bronchus, 16 (6.6%). 21 patients (9.7%) contained two or more lesions simultaneously. **Conclusion** Tracheobronchial tuberculosis was lack of specific clinical features, and the bronchoscopic approach is necessary. Bronchial biopsy should be the most reliable and accurate step to get the definite diagnosis.

Key words: tracheobronchial tuberculosis; bronchoscopy; diagnosis

INTRODUCTION

In recent years, the incidence of pulmonary tuberculosis increasing in China^[1] which results from an increasing incidence of tracheobronchial tuberculosis. Tracheobronchial tuberculosis is a big health problem because of the followings: (1) Owing to its nonspecific of clinic feature and radiographic appearance, its diagnosis is frequently delayed even misdiagnosed; (2) Bronchostenosis may develop as a serious complication unless efficacious antituberculosis chemotherapy. Patients with active endobronchial tuberculosis (EBTB) discharge a high rate of tubercle bacilli, and hence early diagnosis is essential to prevent infection of TB and various complications accompanied by bronchial stenosis and/or complete obstruction. We studied the records of patients of tracheobronchial tuberculosis and estimate the value of bronchoscopy in the diagnosis of tracheobronchial tuberculosis.

Tracheobronchial tuberculosis is a kind of tuberculous inflammation that occurs at the trachea or bronchial mucosa. Pathologically, the initial lesion presents as simple erythema and edema of the mucosa. This lesion is followed by submucosal tubercle formation. When the inflammation erupts through mucosa, an ulcer is seen that may be covered by caseous material. Finally, the bronchial mucosal ulcer involves into hyperplastic inflammatory polyps, and the tracheobronchial tuberculous lesion heals by fibrostenosis^[2] which obstructs the bronchial lumen.

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This pathologic progression results in unfixated, nonspecific clinical and radiographic manifestations, so tracheobronchial tuberculosis can masquerade as many pulmonary illnesses.

SUBJECTS AND METHODS

During 5 years from 1999 to 2004, there were 216 cases including 95 males and 121 females, who had tuberculosis lesions in the trachea and bronchi as indicated by bronchoscopy. The age of these patients ranged from 15 to 81. 126 cases (58.3%) were ≤ 35 years old, 90 cases (41.7%) were ≥ 36 years old including 38 cases (17.6%) ≥ 60 years old. The time interval from onset of symptom to admission was from 15 days to 2.8 years including more than half a year in 51 cases (23.6%). Symptoms were as follows: irritating dry cough in 72.7%, sputum in 11.1%, intermittent hemoptysis in 34.7%, fever in 25%, chest distress in 13%, wheezing in 6.9%, debilitation, night-sweat and weight loss in 5.1%, no obvious symptoms in 7.4%. Main findings of chest roentgenogram on admission were as follows: infiltrations of various width in 67 cases (31%), atelectasis in 52 (24.1%), mass-like opacity in 9 (4.2%), obstructive pneumonia in 19 (8.8%), old tuberculosis in 21 (9.7%), pleural effusion in 12 (5.5%), hilar enlargement in 56 (25.9%), while 36 cases did not have any active lesions. Diagnosis at the admission were as follows: pulmonary tuberculosis or tuberculous pleuritis in 51 cases, lung cancer accompanied with obstructive pneumonia in 54 cases, pneumonia in 32 cases, bronchitis in 26 cases, bronchiectasis in 8 cases, asthma in 6 cases and bronchial foreign body accompanied with pneumonia in 4 cases. 130 out of the 216 cases were misdiagnosed, the misdiagnosis rate was 60.2% and 51 cases were diagnosed pulmonary tuberculosis or tuberculous pleuritis, 35 cases were diagnosed as tracheobronchial tuberculosis, diagnose accordance rate was 16.2%.

Flexible bronchoscopy was performed using a standard bronchoscope [Olympus BF-240 (2600276), BF-P40 (1132403), BF1-T40 (2600276) or ultrathin bronchoscope BF3-C40 (1310843), all bought from OLYMPUS MEDICAL SYSTEM CORP] according the standard procedure under local anesthesia to observe the trachea, carina and bronchus. For those who had pulmonary opacity, the ultrathin bronchoscope was used to observe the 6th-8th grade bronchus. During the procedure, diagnostic material was obtained by bronchial brushings, endobronchial biopsy for histological, cytological or bacteriological examinations.

RESULTS

1. Bronchoscopic Findings

According to the classification of the forms of tracheobronchial tuberculosis^[3], the bronchoscopic findings were as follows: edematous-hyperemic type in 67 cases (31%) featuring as mucosal swelling with surrounding hyperemia; ulcerative type in 52 (24.1%) featuring as mucosal ulceration covered with white or yellow pseudomembrane; granular type in 78 (36.1%) featuring like scattered cauliflower, polypus or boiled rice covered with caseating tissues, causing the bronchial lumen partly or completely obstructed; fibrostenotic type in 19 cases (8.8%) featuring as marked narrowing of the bronchial lumen with fibrosis.

2. Localization of Lesions

There were 242 lesions founded in these 216 patients. The localization and number of lesions were as follows: trachea, 8 (3.3%); carina, 3 (1.2%); carina accompanied with left main bronchus, 4 (1.7%); left main bronchus, 65 (26.9%); left-upper lobar bronchus, 31 (12.8%); left lingual lobar bronchus, 18 (7.4%); left-lower lobar bronchus, 22 (9.1%); right main bronchus, 11 (4.5%); right-upper lobar bronchus, 28 (11.8%); right middle lobar bronchus,

36 (14.9%); right-lower lobar bronchus, 16 (6.6%). 21 patients (9.7%) contained two or more lesions simultaneously. 17 patients' lesion were found at the 4th-6th grade bronchus using the Olympus BF 3C40 type ultrathin bronchoscope.

All the patients were final diagnosed by endobronchial biopsy and/or bronchial brushings positive for acid-fast bacilli. Among these tests, 176 cases were diagnosed by histopathology, and its detectable rate was 96.6% (170 cases). The 68 cases were diagnosed by bronchial brushings, and its detectable rate was 89.4% (61 cases). And the total detectable rate was 95.5%. All the cytological results were negative.

DISCUSSION

Of the 216 patients, only 35 cases were diagnosed as tracheobronchial tuberculosis before the bronchoscopy, rate of misdiagnosis and missed diagnosis was 83.8%. Among these patients, tracheobronchial tuberculosis showed preponderant in female patients, consistent with other reports^[4-5]. The difference may be possibly due to the thinner caliber of female bronchi or tendency of retention of the secretion in the airway of females. Among the main symptoms, dry cough accounted for 72.7%, intermittent hemoptysis for 34.7%, and about 7.4% cases had no obvious clinical symptoms. Most of patients had no specific tuberculous symptoms, at the early stage, when the bronchial lumen was not narrowed, small lobar infiltrates may be the only radiographic manifestation, or the chest radiograph may be entirely normal, tracheobronchial tuberculosis may be masquerade as trachitis, bronchitis, or other infectious diseases. When the bronchial lumen was narrowed, the patients often presented dyspnea, wheezing, which was easy to be diagnosed as asthma.

Among these 216 cases, the lesions occurred mainly in the left bronchus. This maybe attributable to the anatomic characteristic of left bronchus. They are slender and horizontal, susceptible for secretion and bacteria to be detained here. Other predilection sites were as follows: right middle lobar bronchus, left upper lobar bronchus, right upper lobar bronchus, left lower lobar bronchus, left lingual lobar bronchus, right lower lobar bronchus, trachea, carina. This distribution pattern of lesions showed that tracheobronchial tuberculosis was dispersal and scattered. Among those types classified on the basis of findings under bronchoscopy, in our study, granular type accounted for the biggest portion, and then edematous-hyperemic type, ulcerative type, fiberostenotic type. The bronchoscopic findings were nonspecific and many were similar to that of lung cancer. On intensive inspection, some differences still could be observed, as follows: as to edematous-hyperemic type, the inflammation is predominant, widespread with a mount of white spumescient secretion while lesion of infiltrating type of cancer was often localized, presented minor inflammation, less secretion and manifested as bronchial lumen stenosis with granulonoduli protruding the coarse mucosa; ulcerative type tracheobronchial tuberculosis covered with white or yellow or both thick gelatinous pseudomembrane, the mucosa surrounded presented a inflammatory changes, when erasing the pseudomembrane, the underling granulation tissue would appear which was not easy to bleed, while lung cancer tissue was covered with thin necrotic tissue and pseudomembrane, when erasing the pseudomembrane, the underling cauliflower-like tissue would appear which was easy to bleed; granular type manifested as polypoid or cauliflower-like granuloma causing the obstruction or stenosis of the bronchial lumen and was difficult to distinguish from lung cancer expect that the tuberculous tissue was comparatively tenacious, difficult for grasping and unsusceptible to bleeding while tumorous tissue was loose, fragile and susceptible to bleeding; fiberostenotic type manifested that the mucosa whitened and bronchial lumen became a crushed waterdrop shape and was not easy to obtain biopsy specimens because of the dense fibrosis.

During recent years, several experts reported the usage of bronchoscopy yield of tracheobronchial tuberculosis^[6-8], the diagnosis rate could be up to 90%. All of our 216 cases got the definite diagnosis of tracheal or bronchial tuberculosis by bronchoscopic biopsy or brushing demonstrating that bronchoscopy was a reliable and acute method for diagnosing tracheobronchial tuberculosis.

CONCLUSION

Tracheobronchial tuberculosis was lack of specific clinical features. For those who have chronic cough, hemoptysis, fever, chest pain or wheezing, tracheobronchial tuberculosis is a provisional diagnosis. The bronchoscopic approach is mandatory, not only for the prompt diagnosis of tracheobronchial tuberculosis, but also for the prevention of further bronchostenosis.

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