Clinical features of endobronchial tuberculosis

Kliničke karakteristike endobronhijalne tuberkuloze

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Abstract

Background/Aim. Endobronchial tuberculosis (EBTB) is a specific type of pulmonary tuberculosis which often affect the tracheobronchial tree, and can be microbiologically and/or pathohistologically confirmed. The aim of the study was to determine the clinical features and diagnostic aspects of EBTB. Methods. This retrospective study was conducted at the Clinic for Lung Diseases, Clinical Center of Serbia, Belgrade, from January 1997 to December 2007. All patients with EBTB confirmed by bronchoscopy with biopsy during a study period were analysed. Data included the patient’s medical history, a physical exam, chest X-ray, mycobacterial analysis of sputum samples, endoscopic types and patohistological confirmation. Results. In the study, 57.6% of the patients were males. The most frequent symptoms were cough (71.2%), malaise (54.2%), fever (49.2%), weight loss (40.7%), and hemoptysis (13.6%). Most of the patients were diagnosed within 30 days of symptoms onset. Sputum examination showed acid-fast bacilli in 31.4% of the patients, while sputum culture for tuberculosis bacilli were positive in 55.9% of the patients. The most common radiographic localization was in the upper lung lobes (63.5%). Cavities were present in 60.4% of the patients. The most common endoscopic subtype determined by bronchoscopy were nonspecific bronchitis (39.9%) and edematous-hyperemic subtype (36.4%). Conclusion. EBTB was more frequent among men, and among people in their fifties in our country. Detailed bronchoscopic examination, correlated with clinical and laboratory findings, will improve diagnostic rate and provide timely therapy.

Key words: tuberculosis, pulmonary; diagnosis; signs and symptoms; radiography; bronchoscopy; histological techniques.
Introduction

Endobronchial tuberculosis (EBTB) is a specific type of pulmonary tuberculosis (TB) which often injures the tracheobronchial tree, and can be microbiologically and/or pathohistologically confirmed. The diagnosis of EBTB is frequently delayed until the onset of serious bronchial stenosis with resultant atelectasis and bronchiecstasy. EBTB often presents a diagnostic challenge because the clinical presentation varies, and some patients can have normal chest radiography, even though the acid-fast bacilli (AFB) positive sputum sample is present. EBTB may have a prolonged and insidious course and mimic lung cancer, or an acute course, and imitate bronchial obstruction, aspiration of a foreign body or pneumonia, and sometimes the clinical course can be asymptomatic. Because of the complexity and different prognostic, an endoscopic EBTB classification was adopted based on morphological characteristics of the seven subtypes (actively caseating, edematous hyperemic, fibrostenotic, tumorous, granular, ulcerative, and nonspecific bronchitic) proposed by Chung and Lee. The course of EBTB differs according to the endoscopic type. Actively caseating, edematous hyperemic, and fibrostenotic subtypes most frequently lead to the formation of bronchostenosis that is the most serious complication of EBTB. All subtypes can be transformed one into another. The outcome of the treatment for all subtypes is predictable, except for the tumorous form. Fibrostenosis may develop later, after a nine-month doctrinaire treatment (a combination regimen composed of four kinds of anti-tuberculosis drugs – the commonly used drugs include isoniazid, rifampicin, pyrazinamide and ethambutol), which was observed in one third of cases. Endoscopic type can predict bacillar prominence and anticipate the extent and duration of the disease (the edematous hyperemic form, the granulous form, and non-specific bronchitis occur in the early stages, while other forms indicate a widespread disease). The proportion of EBTB in pulmonary TB is about 10–40%. Although the TB incidence has decreased during the last few decades in Serbia, this disease remains an important public health problem especially among patients older than 65 years. The incidence rates being for the last few decades 32–36 per 100,000 inhabitants, up to the last few years when they decreased to 24–26 per 100,000 inhabitants. However, there are a few data about EBTB in our country, and in the region of Balkan and Southern Europe as well, even in the countries with high TB prevalence.

The aim of this study was to determine common clinical features and diagnostic aspects of EBTB in our patients.

Methods

This retrospective study was conducted at the Clinic for Lung Diseases, Clinical Center of Serbia, Belgrade, from January 1997 to December 2007. A total of 118 consecutive patients with EBTB were hospitalized and treated in our hospital, during the study period. All the cases with EBTB confirmed by bronchoscopy with biopsy during study period were analysed. For each patient we had a questionnaire filled out. Data included the patient’s medical history, physical exam, chest X-ray, bronchial examination with bronchial biopsies and mycobacterial analysis of sputum samples. Statistical Package for Social Sciences (SPSS) program-version 15.0 was used for data entry and analysis. Statistical differences were evaluated using the chi-square test and t-test. The Institutional Ethics Committee approved the study.

Results

There were 68 (57.6%) men and 50 (42.4%) women, the ratio being 1.4 : 1. The mean age was 44.3 ± 4.32 years (ranged from 16 to 73 years). Twenty four (20.3%) of the patients were older than 60 years. At the time of diagnosis, there was a significant tendency for the women that had EBTB to be younger than 40 years, compared to the men (p = 0.05) (Figure 1).

Nearly half (47.8%) of the patients were diagnosed within 30 days of symptom onset. The clinical presentation of EBTB varied. Five (4.2%) patients were asymptomatic, all the other patients have at least one symptom of TB. Symptoms and their duration before diagnosis are presented in Table 1, the dominant being cough and general weakness. The incidence rates being for the last few decades 32–36 per 100,000 inhabitants, up to the last few years when they decreased to 24–26 per 100,000 inhabitants. However, there are a few data about EBTB in our country, and in the region of Balkan and Southern Europe as well, even in the countries with high TB prevalence.

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Patients

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Duration of symptoms (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% ± SD</td>
</tr>
<tr>
<td>Cough</td>
<td>84 (71.2)</td>
</tr>
<tr>
<td>Hemoptysis</td>
<td>16 (13.6)</td>
</tr>
<tr>
<td>Fever</td>
<td>58 (49.2)</td>
</tr>
<tr>
<td>General weakness</td>
<td>64 (54.2)</td>
</tr>
<tr>
<td>History of weight loss</td>
<td>48 (40.7)</td>
</tr>
</tbody>
</table>

*The total number of patients is higher than 118 because some of the patients had more than one symptom.*

Table 2

Roentgenographic site in 118 patients with endobronchial tuberculosis

<table>
<thead>
<tr>
<th>Localisation</th>
<th>Patients, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right upper lobe</td>
<td>27 (22.9)</td>
</tr>
<tr>
<td>Left upper lobe</td>
<td>22 (18.6)</td>
</tr>
<tr>
<td>Both side – upper lobes</td>
<td>26 (22.0)</td>
</tr>
<tr>
<td>Middle lobe</td>
<td>6 (5.1)</td>
</tr>
<tr>
<td>Right lower lobe</td>
<td>8 (6.8)</td>
</tr>
<tr>
<td>Left lower lobe</td>
<td>6 (5.1)</td>
</tr>
<tr>
<td>Both side – diffusely</td>
<td>23 (19.5)</td>
</tr>
<tr>
<td>Total</td>
<td>118 (100.0)</td>
</tr>
</tbody>
</table>

Table 3

The bronchoscopic findings in 118 patients with endobronchial tuberculosis

<table>
<thead>
<tr>
<th>Bronchoscopic findings</th>
<th>Patients, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actively caseating</td>
<td>10 (8.5)</td>
</tr>
<tr>
<td>Edematous-hyperemic</td>
<td>43 (36.4)</td>
</tr>
<tr>
<td>Fibrostenotic</td>
<td>10 (8.5)</td>
</tr>
<tr>
<td>Tumorous</td>
<td>5 (4.2)</td>
</tr>
<tr>
<td>Granular</td>
<td>3 (2.5)</td>
</tr>
<tr>
<td>Nonspecific bronchitis</td>
<td>47 (39.9)</td>
</tr>
<tr>
<td>Total</td>
<td>118 (100.0)</td>
</tr>
</tbody>
</table>

Of the 118 patients, 111 (94.0%) cases presented with chronic tuberculous bronchitis on the pathological findings of biopsy obtained by bronchoscopic procedures while only 6% cases presented tuberculous granuloma.

Discussion

This research encompassed one of the largest numbers of a series of EBTB cases in the region of Balkan. We found that there were more male than female ETBT patients in the fifth decade of life (sex ratio 1.4 : 1), which is confirmed by papers from different regions (Hong Kong, Korea, China, Japan, Brazil) 1–13. In contrast, the preponderance of females among patients with EBTB is stated in the works of other authors 14.

Respiratory symptoms in EBTB, according to our results, were nonspecific. Cough and fatigue dominate, followed by fever, weight loss and hemoptysis. Cough was the most common symptom according to the results of other studies 1,15. Thoracic pain was present in almost a third of our patients (31.4%), whereas this symptom was less frequently observed (15%) by other authors 3,9. In our study group, 13.6% of the patients had hemoptysis, while according to other papers, 25% to 40.2% of the patients had hemoptysis 9. General symptoms, such as weakness, fever, and weight loss, were present in a significant number of patients, according to the results of this study and other studies, as well 3,9. As for the duration of symptoms prior to diagnosis of TB, according to our results, the interval varies from 1 week to 1 year, but the severity of symptoms (most commonly cough and fatigue) most likely contributed to the fact that almost half of patients came for a checkup during the first 30 days of the onset of symptoms. Short average period from disease onset to diagnosis of EBTB, when compared to overall pulmonary TB in the same settings, could be explained by clear clinical symptoms that lead to suspicion to EBTB and faster implementation of diagnostic procedure.

In terms of the bacilarity of sputum in EBTB, several different results have been published. Thus, some studies 1,4,13 confirm the assumption of high infectivity of patients with EBTB by the presence of simple sputum positive for AFB in 51.8–91% patients. On the other hand, some studies 9,13 report on a significantly lower (9.1–17%) positive sputum for AFB. The results of the present study confirm AFB in one third of the patients, while the Löwenstein-Jensen culture of sputum samples were positive in over half the cases, which is consistent with the results reported by other authors 9. Certainly, different histological types EBTB correspond to these contradictory findings. It was noted that the endoscopic ulcerative form and actively caseating type of EBTB have higher sputum positivity, which is not the case with edematous-hyperemic and fibrostenotic type 5, so that in these cases the histological confirmation of disease fibrobronchoscopy is required, while negative sputum for AFB does not exclude the diagnosis of EBTB.

Radiographic analysis of the lungs of the patients in our study showed that cavernous changes in the lungs were present in about two-thirds of the patients with EBTB and this finding did not differ significantly from the results in the literature 13. None of the patients had chest radiography without pathologic changes, in our study. In contrast to our work, many studies have ascertained the presence of normal chest radiographs in 10–20% of cases 9,10,14,15. Normal chest radiography is a diagnostic trap for EBTB that is why the diagnosis of the disease is often delayed 20. The authors agree

that the most common radiographic localization of pulmonary TB is in the upper lobes which was confirmed by our results, as well (63.5%). The middle and lower lobes, as atypical radiographic presentations, in our work were affected in 17% of the patients, while the same results, were found in up to 42–90% of patients, according to the literature. The most common endoscopic forms of EBTB determined by bronchoscopy in our study were nonspecific bronchitis in 39.8% of the patients, followed by the edematous hyperemic form in 36.4%, while the granular form was recorded in only 2.5% of the cases, and no patient had ulcerative EBTB form. These results differ from those in the study by authors who made a proposal of classification, Chung and Lee 23 and Lee et al. 24, which showed the most frequent occurrence to be the actively caseating form (43%), while nonspecific bronchitis (7.9%) and ulcerative type (2.7%) were the rarest represented. The differences could most likely be explained by the duration of the disease until bronchoscopy, that is, endoscopic exploration. In our study, in approximately half of the patients the disease was diagnosed by bronchoscopy during the first month, which resulted in the highest frequency of nonspecific bronchitis and edematous-hyperemic type, which confirmed the observation that these forms occur in the early stages of EBTB. Bronchoscopy was performed in order to obtain good aspirate sample for bacteriologic analysis, and later to use the same sample to test the susceptibility to antituberculosis (AT) drugs. Concerning difficulties of Mycobacterium tuberculosis isolation, it was the case in the past from time to time up to 3–4 years ago, due to the periods when sputum induction could not be performed at all because of a lack of essential equipment (the nineties of 20th century and first few years of new millennium). This diagnostic procedure was conducted in the patients with radiological findings which were not enough persuasive of TB process, and in a certain proportion in the patients with radiological findings which were not enough persuasive of TB process, and in a certain proportion in the patients with radiological findings which were not enough persuasive of TB process, and in a certain proportion in the patients with radiological findings which were not enough persuasive of TB process. Due to a serious problem of increasing incidence of lung cancer in our country, in the last decade more than 27% 25, it is very important to use bronchoscopy as diagnostic tool.

A histologic confirmation of EBTB is of great importance in the prevention of further spread of TB and to eliminate the suspicion of malignancy. It is also useful in differentiation from the other granulomatosis, mostly sarcoidosis. We found TB granuloma in 6% of the patients. When EBTB cannot be diagnosed by histologic confirmation findings after repetitious examinations, diagnosis should be established by a combination of clinical, bacteriological and bronchoscopic findings and aggressive treatments must be performed to eradicate Mycobacterium tuberculosis to avoid tracheobronchial stenosis.

Conclusion

In our patients, EBTB was more frequent among men, and among people in their fifties. Detailed bronchoscopic examination is unavoidable as being a simple and reliable diagnostic procedure, correlated with clinical and laboratory findings. This procedure alone will improve diagnosis accuracy rate and provide timely therapy.

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References


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