

A Study of 73 Cases of Bronchial Tuberculosis

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We reviewed 73 cases of bronchial tuberculosis (59 adults and 14 children) diagnosed between 1973 and 2000 using histologic and bacteriologic criteria. The most frequent symptom was cough. Radiographic studies showed an alveolar pattern in 35 cases and obstructive pneumonitis or atelectasis in 28 cases. Endoscopy results showed that granuloma was more common in children under 16 years of age (64%) than in adults (22%). Granulomatous or ulcerative bronchitis was significantly more frequent in adults (66%; $P < .005$).

Bronchial tuberculosis is not an exceptional occurrence. Clinical and radiographic signs are nonspecific. Endoscopy images of granuloma and granulomatous or ulcerative bronchitis may be similar to those of bronchial neoplasia. Diagnosis therefore requires fiberoptic bronchoscopy combined with histology and microbiology studies.

Key words: *Bronchial tuberculosis. Bronchoscopy. Radiography.*

Tuberculosis bronquial. Estudio de 73 casos

Hemos revisado 73 casos de tuberculosis bronquial (59 adultos y 14 niños) diagnosticados entre 1973 y 2000 según criterios histológicos y bacteriológicos. El síntoma más frecuente fue la tos. Desde el punto de vista radiológico, se observó patrón alveolar en 35 casos y neumonitis obstructiva o atelectasia en 28. En la endoscopia, el granuloma fue más frecuente en los menores de 16 años (64%) que en los adultos (22%). El conjunto de bronquitis granulosa y ulcerada predominó de forma significativa ($p < 0,005$) en los adultos (66%).

La tuberculosis bronquial no es un hecho excepcional. La clínica y la radiografía son inespecíficas. Las imágenes endoscópicas de granuloma y de bronquitis granulosa o ulcerada pueden ser similares a las de una neoplasia bronquial, por lo que para su diagnóstico es imprescindible la práctica de una fibrobroncoscopia con estudio histológico y microbiológico.

Palabras clave: *Tuberculosis bronquial. Broncoscopia. Radiografía.*

Introduction

Bronchial tuberculosis is the tuberculous infection of the large bronchi that can be seen using a standard fiberoptic bronchoscope; it is currently rarely diagnosed.¹ The pathogenic mechanisms described for bronchial tuberculosis include progression of nodal disease to the bronchial wall, endoluminal dissemination of bacteria from a parenchymal focus, dissemination via the blood or lymph.² Clinical and radiographic findings are usually nonspecific and endoscopy findings may be similar to those of bronchial neoplasm.²⁻⁴

The aim of this study was to review the clinical, radiographic, and bronchoscopy findings of 73 patients diagnosed with bronchial tuberculosis in the pneumology department of a university general hospital.

Case Descriptions

We performed a retrospective review of 73 patients (30 men and 43 women) diagnosed with bronchial tuberculosis between 1973 and 2000. The mean age was 41.5 (24) years (range, 2-80 years). Four patients were infected with the human immunodeficiency virus (HIV). All examinations included bronchial aspiration and biopsy. Clinical diagnosis of bronchial tuberculosis required both the presence of caseating granulomas in the bronchial biopsy and positive bacteriology findings for *Mycobacterium tuberculosis* in sputum, bronchial aspirate, or biopsy specimens. Bronchoscopy was performed using a rigid bronchoscope under general anesthesia in 5 children. In all other cases, bronchoscopy was performed using a fiberoptic bronchoscope under local anesthesia (2% lidocaine, to a maximum dose of 20 mL). Patients were premedicated with subcutaneous atropine (0.5 mg to 1 mg, depending on age and weight). Bronchoscopy was performed on 1139 patients with active pulmonary tuberculosis during the study period. A diagnosis of bronchial tuberculosis was made in 73 cases (6.4%). This percentage refers only to the subgroup of patients in the hospital in whom tuberculosis was detected and who underwent bronchoscopy either because a sputum test was negative or because another diagnosis was suspected.

The most common symptom was cough ($n=36$) with or without expectoration; other symptoms were fever ($n=15$), constitutional syndrome ($n=11$), and hemoptysis ($n=8$) (Table 1). These clinical

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Manuscript received July 6, 2005. Accepted for publication September 25, 2007.

symptoms were mild and of variable duration (between 2 weeks and several months). Three patients were asymptomatic. The 4 patients infected with HIV presented only fever.

The most common radiographic images were localized alveolar pattern (35 cases [48%]), with cavitation in 2 of them, and obstructive pneumonitis or atelectasis (28 cases [38%]). The chest radiograph was normal in 6 patients. A localized alveolar pattern was observed in 14 of the patients under the age of 16 years and obstructive pneumonitis was observed in the other 8. A radiographic finding of obstructive pneumonitis or atelectasis was observed in 3 of the 4 HIV patients and 1 HIV patient showed a localized alveolar pattern. Findings of computed tomography of the chest were not evaluated as this examination was performed on few patients.

Table 2 shows a summary of the bronchial lesions. We distinguished 4 different types of endoscopy finding: *a*) granuloma (a localized protrusion of the bronchial mucosa, often cone shaped, erythematous, and with a smooth surface and white tip); *b*) simple bronchitis (thickened, erythematous bronchial wall with a smooth surface); *c*) granulomatous bronchitis (thickened bronchial wall of irregular color and an irregular and occasionally papillary surface); and *d*) ulcerative bronchitis (thickened bronchial wall with irregular, papillary surface and ulcerations coated with a dense white material). Granuloma was significantly more frequent ($P<.025$) in patients under 16 years of age (9 patients out of 14 [64%]) than in adults (13 patients out of 59 [22%]). Granulomatous or ulcerative bronchitis was significantly more common ($P<.005$) in adults (39 patients out of 59 [66%]) than in patients under 16 years of age (4 patients out of 14 [28%]). Simple bronchitis—the most nonspecific lesion—was only observed in 8 cases (11%). Endoscopy results showed no extrinsic compression. Bronchial stenosis was caused by the ulcerative bronchitis lesions. Endoscopy showed the sites of the tuberculous lesions of the bronchial tree to be highly variable. Of the 73 cases of bronchial tuberculosis, 37 involved the right bronchi and 36 involved the left bronchi. The main bronchi were affected in 11 cases. In 30 cases, the lesions were in the upper lobe bronchi, and in 32 cases lesions were in intermediate, middle lobe, or lower lobe bronchi. Lesions were limited to upper lobe bronchi in 5 patients and to the lower lobe bronchi in 7 patients. Bronchoscopy was generally well tolerated. Five patients (0.4%) who underwent bronchoscopy developed fever following the procedure.

The χ^2 test was used in the statistical analysis. When the endoscopy results of children were compared with those of adults, findings of granuloma were significantly more common ($P<.025$) in children than in adults and granulomatous or ulcerative bronchitis was significantly more common ($P<.005$) in adults than in children.

Discussion

Bronchial tuberculosis appears to be rare but its real incidence is difficult to determine.^{1,5,6} A firm diagnosis requires bronchoscopy and this procedure is not necessary in most patients with tuberculosis. In this study, diagnoses of bronchial bronchitis accounted for 6.4% of patients with tuberculosis who underwent bronchoscopy and they were a nonrepresentative portion of all cases of tuberculosis diagnosed in the hospital. Although the results of other studies are not comparable as they include different populations and use different diagnostic criteria, frequencies of bronchial tuberculosis described in patients who underwent bronchoscopy have varied from 15%⁷ to 33%¹ In our series, 4 patients were infected with HIV, and other

TABLE 1
Bronchial Tuberculosis: Clinical Findings in 73 Patients

Clinical	N	%
Cough and expectoration	36	49
Fever	15	21
Constitutional syndrome	11	15
Hemoptysis	8	11
Asymptomatic	3	4

TABLE 2
Bronchial Tuberculosis: Endoscopy Findings in 73 Patients, by Age

Endoscopy Finding	Age, y		Overall, n	%
	<16 (n=14)	>16 (n=59)		
Granuloma	9	13	22	30
Simple bronchitis	1	7	8	11
Granulomatous bronchitis	2	18	20	27
Ulcerative bronchitis	2	21	23	32

studies also report isolated cases of bronchial tuberculosis in HIV patients.⁸⁻¹¹ Our series consisted of 30 men and 43 women and therefore does not suggest the clear predominance of this entity in women (3.8 times greater) that was reported by Lee et al¹² in their study of 121 patients. As in most studies, the clinical and radiographic signs of bronchial tuberculosis were generally nonspecific.^{7,13}

Signs indicating localized bronchial lesions are observed only occasionally: Hoheisel et al⁶ reported 6 cases of localized wheeze out of the 38 patients in their study and our study found 8 cases of hemoptysis. The most common radiographic images in our study were a localized alveolar pattern, with or without cavitation, and atelectasis; these images can be explained by concomitant pulmonary involvement and/or bronchial stenosis. Other studies report similar findings.^{12,14} A normal x-ray, as was found in 6 of our patients, has been shown not to rule out bronchial tuberculosis.¹⁴ The low frequency of cavitation (2 cases in our study) has also been described in other studies,^{2,7} attributable to the fact that bronchoscopy is rarely necessary to establish a diagnosis in cases of cavitary tuberculosis.

The pathogenic mechanisms of bronchial tuberculosis include a variety of processes that are also generally related to different endoscopy results. Lymph node perforation into the bronchi, more characteristic of primary infection, tends to produce a finding of granuloma.¹⁵ Endoluminal dissemination or dissemination via the lymphatic system to the bronchial wall from a separate focus of infection is more likely to produce more extensive lesions in the form of granulomatous or ulcerative bronchitis.² Endoscopy results in our series revealed granuloma in 22 cases and bronchitis—mostly granulomatous or ulcerative—in the rest. This distribution may be due to the characteristics of the study population, which consisted of 14 children under 16 years of age and 59 adults. The relatively high percentage of granulomas

found in the adult population, also reported by other authors,² suggests that primary infection is currently uncommon in adults. It cannot be said that bronchial lesions are found predominantly located at any single site. Pulmonary tuberculosis has traditionally been described as showing a preference for the lower segments of the upper lobes,¹² but in our study, lower apical segments were affected in 6 patients. This finding, together with the not uncommon location in the lower lobes, may indicate the extension of the disease due to secretions from a parenchymal focus. Endoscopy, either alone or in combination with clinical symptoms, is insufficient to establish a diagnosis of bronchial tuberculosis.⁶ The endoscopy findings of granuloma and granulomatous or ulcerative bronchitis may be similar to those of neoplastic lesions with necrotic areas.^{3,4} Findings of simple bronchitis may simulate a commonplace inflammatory process. Some lesions may lead to a suspicion of a tuberculous origin: *a*) granuloma with a smooth, erythematous surface and white tip; and *b*) ulcerative bronchitis with abundant white material that is more dense than a purulent secretion and less dense than necrotic tumoral material. The latter lesion is accompanied by large numbers of bacteria. Even in these cases, however, the diagnosis requires histology and microbiology studies.^{16,17}

The results of this study suggest several conclusions. Bronchial tuberculosis is not exceptional, though its frequency is unknown. The figures mentioned in the literature range from 15%¹ to 33%⁷ of cases of pulmonary tuberculosis where bronchoscopy is performed. Clinical and radiographic signs are nonspecific. Diagnosis requires bronchoscopy combined with histology and microbiology studies of the bronchial lesions. The decision to perform bronchoscopy should be based on clinical and/or radiographic findings suggestive of localized bronchial lesions or tuberculosis unconfirmed by microbiology studies.

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