



Endobronhial Tuberculosis: A Report of Three Cases

Endobronşiyal Tüberküloz: Üç Olgunun Sunumu

Gülbanu Horzum Ekinci, Osman Hacıömeroğlu, Murat Kavas, Adnan Yılmaz

Abstract

The researchers of the current study aimed to evaluate the clinical, radiological, and bronchoscopic findings, and the therapeutic outcome of the disease in three patients with endobronchial tuberculosis (EBTB). Two females and one male were included in the study, and their ages were younger than 45 years. Computed tomography of the thorax showed cavity in one patient, a mass lesion and atelectasis in one patient, and multiple parenchymal nodules and enlargement mediastinal lymph nodes in the other patient. Smear examinations of sputum samples were negative for acid-fast-bacilli in all patients. Flexible bronchoscopy revealed microbial and histopathological diagnosis of endobronchial tuberculosis in three patients. While the bronchial lavage smear was positive for acid-fast-bacilli in two cases, the culture examination for tuberculosis bacilli was positive in all patients. The patients were started on anti-tuberculosis treatment. Bronchoscopy was repeated after treatment and revealed complete resolution of the endobronchial lesions in the patients. In conclusion, the eradication of tubercle bacilli and prevention of bronchostenosis are two important goals of EBTB treatment. Early diagnosis and effective treatment of this disease are required to achieve these objectives.

Key words: Endobronchial tuberculosis, bronchoscopy, diagnosis, treatment.

Özet

Endobronşiyal tüberkülozlu üç olgunun klinik, radyolojik ve bronkoskopik bulguları ile tedavi sonuçlarının incelemeyi amaçladık. Olguların ikisi kadın, biri erkek olup, yaşları 45 yaşın altında idi. Bilgisayarlı toraks tomografisi bir olguda kavite, bir olguda kitle ve ateletazi ve diğer olguda multipl parenkimal nodül ve mediasten lenf bezi büyümesi gösteriyordu. Hastalarda balgam yayma incelemeleri aside-dirençli basil açısından negatif bulundu. Fiberoptik bronkoskopi ile hastalarda endobronşiyal tüberkülozun mikrobiyolojik ve histopatolojik tanısını elde edildi. Bronş lavaj yayma incelemesi tüberküloz basili açısından iki olguda pozitif iken kültür incelemesi tüm hastalarda pozitif bulundu. Hastalara anti-tüberküloz tedavi başlandı. Tedavi sonunda bronkoskopi tekrarlandı ve hastalarda endobronşiyal lezyonların tam olarak düzeldiği saptandı. Sonuç olarak, tüberküloz basilinin eradikasyonu ve bronkostenozun önlenmesi, endobronşiyal tüberküloz tedavisinin iki önemli amacıdır. Bu amaçlara ulaşmak için hastalığın erken tanısı ve etkin tedavisi gerekir.

Anahtar Sözcükler: Endobronşiyal tüberküloz, bronkoskopi, tanı, tedavi.

Clinic of Chest Diseases, Süreyyapaşa Center for Chest Diseases and Thoracic Surgery Training and Investigation Hospital, İstanbul, Turkey

Süreyyapaşa Göğüs Hastalıkları ve Göğüs Cerrahisi Eğitim ve Araştırma Hastanesi, Göğüs Hastalıkları Kliniği, İstanbul

Submitted (Başvuru tarihi): 22.02.2014 **Accepted (Kabul tarihi):** 25.04.2014

Correspondence (İletişim): Gülbanu Horzum Ekinci, Clinic of Chest Diseases, Süreyyapaşa Center for Chest Diseases and Thoracic Surgery Training and Investigation Hospital, İstanbul, Turkey

e-mail: gulbanuh@hotmail.com



Endobronchial tuberculosis (EBTB) is defined as a tuberculous infection of the tracheobronchial tree with microbial and histopathological evidence, with or without parenchymal involvement (1). It was first described by the English physician Richard Morten in 1698 (2). In spite of great progress in the diagnosis, treatment, and prevention in the past several years, EBTB continues to be an important health problem for many reasons. Firstly, pulmonary tuberculosis is easily diagnosed by bacteriological means and radiological findings. However, the diagnosis of EBTB is more difficult because of variable clinical manifestations. Secondly, its diagnosis is frequently delayed because of a low index of awareness of this disease. Thirdly, EBTB may cause serious complications such as bronchial stenosis, despite anti-tuberculosis treatment. Lastly, this disease is frequently misdiagnosed as pneumonia, asthma, or lung cancer (2-4). Early diagnosis and effective treatment of EBTB are important to decrease secondary complications, such as bronchial stenosis (1,3). The current study presents the clinical, radiological, and bronchoscopic findings, and the therapeutic outcome of the disease in three patients.

CASE

Case 1: A 44-year-old Turkish female was admitted to the hospital with a history of coughing for 2 months prior to admission. Her past medical history was unremarkable. A chest x-ray revealed a prominent right hilum, but did not reveal any lung infiltrate. The physical examination was normal. Urine analyses and blood investigations including blood count, renal, and hepatic functions were within normal ranges. Erythrocyte sedimentation rate was 55 mm/hr. C-reactive protein measured 112 mg/mL. Smear examinations of two sputum samples were negative for acid-fast bacilli. Computed tomography of the thorax showed consolidation with few air bronchogram and a cavity in the superior segment of the right lower lobe. Flexible bronchoscopy revealed necrotic material in the superior segment and proximal part of the right lower lobe bronchus. Mucosa was hyperemic in appearance. Bronchial lavage and endobronchial biopsies were performed. The smear examination of the bronchial lavage was positive for acid-fast bacilli. The pathological examination of bronchial biopsies revealed granulomas with caseating necrosis compatible with tuberculosis. The patient was started on anti-tuberculosis treatment with four drugs including isoniazid, rifampicin, pyrazinamide, and ethambutol for two months. The bronchial lavage culture was positive for *Mycobacterium tuberculosis*,

which was sensitive to all anti-tuberculosis drugs. The patient was administered two drugs, including isoniazid and rifampicin for another four months. Six months later, the bronchoscopy was repeated and revealed complete resolution of the endobronchial lesions.

Case 2: A 31-year-old non-smoking Turkish male presented to our outpatient department with complaints of coughing, sputum production, and sweating for four weeks. His past medical history was unremarkable. A chest x-ray revealed consolidation in the upper left zone. The physical examination was normal. Urine analyses and blood investigations including blood count, renal, and hepatic functions were within normal ranges. Erythrocyte sedimentation rate was 100 mm/hr. C-reactive protein measured 6 mg/mL. Computed tomography of the thorax revealed a mass lesion with punctate calcification in the left hilum and atelectasis in the upper left lobe. The smear examinations of the three sputum samples were negative for acid-fast bacilli. Flexible bronchoscopy revealed white multiple extensive caseating lesions from the distal two-thirds of the trachea to the distal end of the left main bronchi (Figure 1). A bronchial lavage and multiple biopsies of the lesions were performed. The smear examination of lavage fluid was negative for acid-fast bacilli. The bronchial biopsy revealed granulomas with caseating necrosis compatible with tuberculosis. The patient was started on anti-tuberculosis treatment with four drugs including isoniazid, rifampicin, pyrazinamide, and ethambutol for two months. The bronchial lavage culture was positive for *Mycobacterium tuberculosis*, which was sensitive to all anti-tuberculosis medications. The patient was administered two drugs including isoniazid and rifampicin for another four months. Six months later, the bronchoscopy was repeated and revealed complete resolution of the tracheal and bronchial lesions (Figure 2).

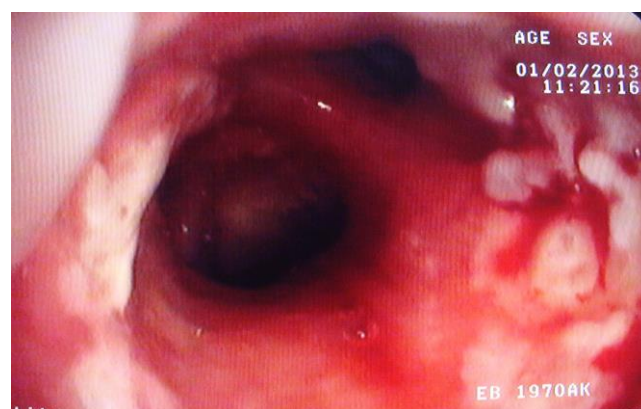


Figure 1: Bronchoscopic examination shows white multiple extensive caseating lesions from the distal two-thirds of the trachea to the distal end of the left main bronchi



Figure 2: Bronchoscopic examination after treatment shows complete resolution of the tracheal and bronchial lesions

Case 3: A 39-year-old Turkish female smoker was admitted to our inpatient department with a history of coughing, sputum production, and chest pain for one month. She lost nearly 8 Kg over the last one year. Her past medical history revealed anemia for four years. On admission, she was thinly built and nutritional status was poor. A chest x-ray showed consolidation in the left lung. Upon examination of the respiratory system, auscultation revealed crackles in the middle and lower zones of the left lung. Erythrocyte sedimentation rate was 60 mm/hr. Serum hemoglobin level was 7.6 gr/dL. C-reactive protein level measured 10 mg/mL. Routine biochemical analyses were within normal limits. Sputum smear examination was negative for acid-fast bacilli for two consecutive days. Computed tomography of the thorax revealed consolidation in the lingual lobe, bilaterally multiple parenchymal nodules, and multiple enlargement mediastinal lymph nodes (Figures 3a and b). Flexible bronchoscopy detected infiltration from the distal one-third of the left main bronchi to the left upper lobe bronchi and narrowed lingual segment bronchi due to infiltration. Bronchial lavage and biopsy were performed. The smear examination of the lavage sample was positive for acid-fast bacilli. The bronchial biopsy revealed a diagnosis of endobronchial tuberculosis. The patient was started on anti-tuberculosis treatment with four drugs including isoniazid, rifampicin, pyrazinamide, and ethambutol for two months. The bronchial lavage culture was positive for *Mycobacterium tuberculosis*, which was sensitive to all anti-tuberculosis medications. The patient was administered two drugs including isoniazid and rifampicin for another four

months. Six months later, the bronchoscopy was repeated and revealed complete resolution of the endobronchial lesions.

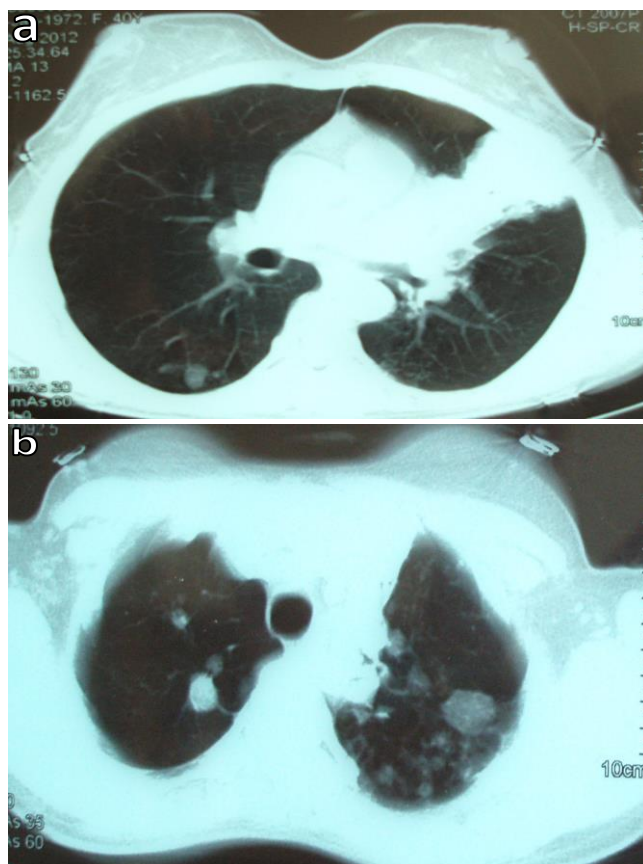


Figure 3a, b: Computed tomography of the thorax shows consolidation in the lingual lobe and bilaterally multiple parenchymal nodules

DISCUSSION

Pulmonary tuberculosis is one of the major health problems worldwide. EBTB is a special form of pulmonary tuberculosis (5). The true incidence of EBTB is unknown because bronchoscopy is not routinely performed in all patients with pulmonary tuberculosis (6). EBTB is present in 10-40% of patients with active pulmonary tuberculosis (5). In the 1940s, an incidence of 42% was reported in an autopsy study (7). The exact pathogenesis is not completely understood. Possible mechanisms include direct implantation of tubercle bacilli into the bronchus from an adjacent parenchymal lesion, the direct infiltration by the tuberculous focus of adjacent mediastinal lymph node, the rupture of the tuberculous intrathoracic lymph node into the bronchus, lymphatic spread along the tracheo-bronchial tree by lymphatic drainage, and haematogenous spread (3,6).

EBTB is commonly observed in the young and in females (3,4,6). It was reported that the peak incidence of EBTB occurred in the third decade and the female-to-male ratio

was 5.4:1 (4). In a previous study, the mean age was 39.6 years and 38% of the patients were younger than 45 years (6). A recent report showed that its incidence was also high in elderly patients. In this report, 27.3% of patients were older than 60 years (3). The possible reason for female predominance may be due to the implantation of tuberculosis bacilli from infected sputum occurs easily in female subjects since they usually do not expectorate sputum as well as males (6). In the current series, there were two females and one male and their ages were younger than 45 years, consistent with those reports. The patients with EBTB may present with various clinical manifestations. It may have an insidious onset, simulating lung carcinoma, or may be acute, mimicking asthma or pneumonia. The patients may also have delayed diagnosis. The incidence of delayed diagnosis is high in patients with EBTB and ranges from several days to several years (5). The clinical symptoms of EBTB may be observed in other respiratory diseases and are usually not helpful to the early diagnosis of EBTB (3,5). Asymptomatic patients were also reported in many studies (3,8). The current patients were symptomatic and they described non-distinctive symptoms. The duration of symptoms before admission to hospital was shorter than 2 months in the current patients. The radiological features of endobronchial tuberculosis reveal many different patterns such as consolidation, infiltration, cavity, mass, atelectasis, pleural effusion, and hilar enlargement (3,6,9). Radiographic findings are usually non-specific and these radiological findings can make it difficult to diagnose early (8). Approximately 10-20% of the patients may present normal chest x-rays (5). Computed tomography of the thorax reveals endobronchial mass and enlargement lymph nodes precisely. Parenchymal lesions such as cavities or nodules are more clearly identified on computed tomography scans (3,10,11). Chest x-ray findings were consolidation and prominent hilum in our patients. Computed tomography of the thorax showed cavity in one patient, a mass lesion and atelectasis in one patient, and multiple parenchymal nodules and enlarged mediastinal lymph nodes in the other patient.

Bacteriologic confirmation is one of the important diagnostic means of EBTB. Sputum smear and culture examinations should be performed in all patients suspected of EBTB (1,3,6). The yield of sputum smear for acid-fast bacilli is low in patients with EBTB. The incidence of sputum smear positivity in EBTB ranges from 1% to 53.3% (1,11). The low yield of sputum smears may be due to mucus entrapment by proximal granulation tissue (6).

Sputum smear examinations were negative for acid-fast bacilli in the current patients. The most important procedure in the diagnosis of EBTB is bronchoscopy. Bronchoscopy is performed to examine bronchial structures and obtain specimens for diagnosis. The other indication of bronchoscopy is to observe the change of EBTB lesions during treatment (1,12). Lee and Chung (12) classified bronchoscopic findings of EBTB into seven subtypes: actively caseating, fibrostenotic, oedematous-hyperaemic, tumorous, ulcerative, granular, and non-specific bronchitic type. Different bronchoscopic specimens including biopsy, brushing, and washings may be obtained during bronchoscopy (1). Bronchial lavage smears were positive for acid-fast bacilli in 26% of the cases and culture tests for tuberculosis bacilli in the lavage fluid were positive in 39.1% of cases (6). Bronchial biopsies may be positive in 30-84% of patients. The yield of bronchial brushing ranges from 10% to 85% (1,6). In the present series, lesion subtype was caseating in two cases and tumorous in the other case. Bronchoscopic biopsies revealed the pathological diagnosis of EBTB in all patients. The bronchial lavage smear was positive for acid-fast bacilli in two cases. Although the smear examination for acid-fast bacilli was negative, the culture examination for tuberculosis bacilli was positive in the other case. Patients with EBTB are treated with anti-tuberculous chemotherapy with or without the use of corticosteroids (1,2,5,7). Endobronchial stenosis is a common complication of EBTB. It may develop in patients with EBTB despite the use of efficacious anti-tuberculosis chemotherapy (1,2). Other subtypes of EBTB may change into the fibrostenotic type (12). Surgery and bronchoscopic treatment modalities such as cryotherapy, electrocautery, laser ablation, balloon dilatation, and stent implantation are other treatment methods (1,5). Anti-tuberculosis chemotherapy was administered to the patients in the present study for six months. Endobronchial stenosis did not develop in any of the patients.

In conclusion, EBTB is uncommon form of pulmonary tuberculosis. Clinical and radiological findings are usually nonspecific. Bronchoscopy is the most important diagnostic procedure in EBTB. The eradication of tubercle bacilli and prevention of bronchostenosis are two important goals of EBTB treatment. Early diagnosis and effective treatment of this disease are required to achieve these objectives.

CONFLICTS OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Concept - G.H.E., O.H., M.K., A.Y.; Planning and Design - G.H.E., O.H., M.K., A.Y.; Supervision - G.H.E., O.H., M.K., A.Y.; Funding - A.Y., G.H.E., O.H., M.K.; Materials - G.H.E., A.Y., O.H., M.K.; Data Collection and/or Processing - G.H.E., A.Y., O.H., M.K.; Analysis and/or Interpretation - A.Y., G.H.E., O.H., M.K.; Literature Review - A.Y., O.H., G.H.E., M.K.; Writing - A.Y., G.H.E., O.H.; Critical Review - O.H., A.Y., G.H.E.

YAZAR KATKILARI

Fikir - G.H.E., O.H., M.K., A.Y.; Tasarım ve Dizayn - G.H.E., O.H., M.K., A.Y.; Denetleme - G.H.E., O.H., M.K., A.Y.; Kaynaklar - A.Y., G.H.E., O.H., M.K.; Malzemeler - G.H.E., A.Y., O.H., M.K.; Veri Toplama ve/veya İşleme - G.H.E., A.Y., O.H., M.K.; Analiz ve/veya Yorum - A.Y., G.H.E., O.H., M.K.; Literatür Taraması - A.Y., O.H., G.H.E., M.K.; Yazıyı Yazan - A.Y., G.H.E., O.H.; Eleştirel İnceleme - O.H., A.Y., G.H.E.

REFERENCES

1. Kashyap S, Mohapatra PR, Saini V. Endobronchial tuberculosis. *Indian J Chest Dis Allied Sci* 2003; 45:247-56.
2. Al-Maslamani M, Ibrahim W, Chacko K, Al-Khal A. Endobronchial tuberculosis simulating lung cancer and healing without bronchial stenosis. *Libyan J Med* 2008; 3:108-10. [\[CrossRef\]](#)
3. Qingliang X Jianxin W. Investigation of endobronchial tuberculosis diagnoses in 22 cases. *Eur J Med Res* 2010; 15:309-13. [\[CrossRef\]](#)
4. Chung HS, Lee JH. Bronchoscopic assessment of the evaluation of endobronchial tuberculosis. *Chest* 2000; 117:385-92.
5. Xue Q, Wang N, Xue X, Wang J. Endobronchial tuberculosis: an overview. *Eur J Clin Microbiol Infect Dis* 2011; 30:1039-44. [\[CrossRef\]](#)
6. Ozkaya S, Bilgin S, Findik S, Kök HÇ, Yuksel C, Atici AG. Endobronchial tuberculosis: histopathological subsets and microbiological results. *Multidiscip Respir Med* 2012; 7:34. [\[CrossRef\]](#)
7. Teo SK. Endobronchial tuberculosis- a report of 5 cases. *Singapore Med J* 1990; 31:447-50.
8. Miguel Campos E, Puzo Ardanuy C, Burgués Mauri C, Castella Riera J. A study of 73 cases of bronchial tuberculosis. *Arch Bronconeumol* 2008; 44:282-4.
9. Tokur M, Kurul C, Demircan S, Çıtak Ç, Oğuz A, Karadeniz C. Endobronchial tuberculosis following prolonged atelectasis in lymphoma in a pediatric patient. *Turkish Thoracic J* 2008; 9:77-9.
10. Yanardag H, Tetikkurt C, Tetikkurt S, Demirci S, Karayel T. Computed tomography and bronchoscopy in endobronchial tuberculosis. *Can Respir J* 2003; 10:445-8.
11. Gupta PP, Agarwal D, Gupta KB, Sood S. CT evaluation in diagnosis of endobronchial tuberculosis. *Lung India* 2006; 23:126-9. [\[CrossRef\]](#)
12. Lee JH, Chung HS. Bronchoscopic, radiologic and pulmonary function evaluation of endobronchial tuberculosis. *Respirology* 2000; 5:411-7. [\[CrossRef\]](#)