

## HRCT FINDINGS IN DELAYED DIAGNOSIS OF TUBERCULOSIS WITH CYSTIC BRONCHIECTASIS AND BRONCHIOLE ECTASIS

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### ABSTRACT

Bronchiectasis is an abnormal, chronic enlargement of the bronchi and associated with a clinical syndrome of cough, sputum production and respiratory infections. Bronchiectasis may appear in association with pulmonary tuberculosis. A 69 years old woman who had recurrent cough since 3 years ago and treated with the diagnosis of allergic bronchitis. Since 5 months ago she had complained cough and shortness of breath. She was admitted to Intensive Care Unit with reduced consciousness and used ventilator for almost a month, had chronic hypercapnea and no response with antibiotic therapy and inhalation. After two weeks, she had improved by tuberculosis treatment and macrolid antibiotics even though pCO<sub>2</sub> levels were difficult to decreased.

**Keywords:** Bronchiectasis, HRCT, Hypercapnea, Tuberculosis,

### ABSTRAK

Bronkiektasis merupakan abnormal, pelebaran kronik pada bronkus dan ditandai dengan sindroma batuk, produksi suputum dan infeksi saluran pernapasan. Bronkiektasis dapat disebabkan karena infeksi tuberkulosis. Pasien kami yaitu wanita, usia 69 tahun memiliki riwayat batuk berulang sejak tiga tahun yang lalu dan didiagnosis serta mendapatkan terapi sesuai dengan bronkitis alergi. Semenjak lima bulan yang lalu, pasien mengeluhkan batuk disertai sesak napas. Pasien dirawat di ruang ICU dengan penurunan kesadaran dan menggunakan ventilator selama hampir sebulan, memiliki hiperkapnea kronik dan tidak respons dengan terapi antibiotik dan inhalasi. Setelah 2 bulan, kondisi pasien membaik dengan terapi anti tuberkulosis dan antibiotik makrolida meskipun tingkat pCO<sub>2</sub> pada darah sulit untuk membaik.

**Kata kunci :** Bronkiektasis, HRCT, Hiperkapnea, Tuberkulosis

### INTRODUCTION

Bronchiectasis is a chronic disorder characterized by permanent dilatation of the bronchi, followed by inflammatory process on bronchial wall and surrounding pulmonary parenchyma. The clinical manifestation of primary bronchiectasis is recurrent, chronic, or refractory infection with the residual symptoms include cough with blood, chronic respiratory tract obstruction, and progressive breathing disorder.<sup>1,2</sup> The prevalence of bronchiectasis is reported to increase, whereas the United States reported an increase of prevalence each year, from 2000 to 2007 with 8.74%, peaked in 80-84 years of age, predominantly found in women and Asian. Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis*, which can attack various organs, especially the lungs. In Indonesia, the proportion of pulmonary

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TB patients is confirmed to have significant increase from 1999 to 2003, from 7% to 13%. This indicator tended to decrease from 2003 to 2014. In 2015, it increased again to 14%. A large study conducted in India showed that the etiology of bronchiectasis is different from those observed in Europe and the United States. Tuberculosis, which has high prevalence in India, became one of the most frequent etiology of bronchiectasis, combined with other severe infections comprising of 58% of bronchiectasis cases. Cystic bronchiectasis image is often found in patients with bronchiectasis caused by tuberculosis in India.<sup>3</sup> Previous disease history and high-resolution computed tomography (HRCT) imaging can be useful in determining the underlying cause.<sup>4</sup>

### CASE ILLUSTRATION

A 69 years old woman who had recurrent cough since 3 years ago and treated with the diagnosis of allergic bronchitis. Since five months ago she had complained cough and shortness of breath. She had decreased the awareness and treated for two weeks in Respiratory Intensive Care Unit with diagnosis of infected bronchiectasis. She were only treated with antibiotics without tuberculosis examination. She was admitted to Intensive Care Unit with reduced consciousness and used ventilator for almost a month, had chronic hypercapnea and no response with antibiotic therapy and inhalation. Chest X-ray shows broad infiltrate and ectasis accompanied by bilateral pleural effusion (Figure 1).

Laboratory results showed pCO<sub>2</sub> 115, Hb 8,3, neutrophil 95, lymphocyte 3%, potassium 2,3, albumin 2,6, platelets 114.000, rate of blood sedimentation 105, while examination of TB diagnostic support such as IGRA, AFB, pleural fluid analysis and culture showed negative. High-resolution computed tomography findings revealed right lung segment consolidation of pleural segment 2 with centrilobular nodule, cystic bronchiole ectasis of right medius, left lingual and bronchiole ectasis of right sub pleura (Figure 2), classification of right lobular medius, pan lobular emphysema, and enlargement of lymph node (region 4R). Old tuberculosis with bronchioectasis, bronchiole ectasis,

and centrilobular of both lungs suggestive bronchiolitis and the different diagnosis was hypersensitivity pneumonitis. After two weeks, she had improved by tuberculosis treatment and macrolid antibiotics even though pCO<sub>2</sub> levels were difficult to decreased.



Figure 1. Chest X ray of the patient

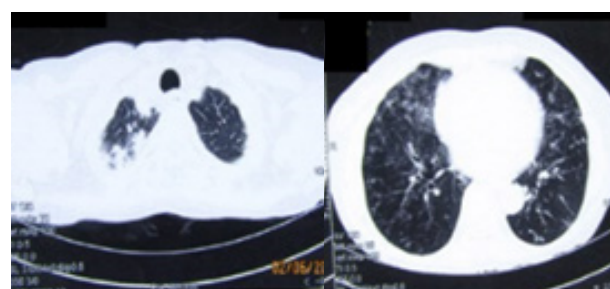
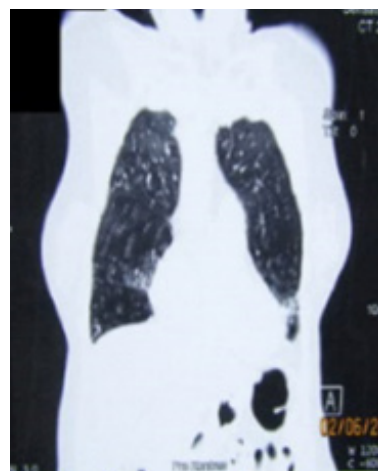


Figure 2. High Resolution Computed Tomography of the patient

### DISCUSSION

Bronchiectasis is a chronic disorder characterized by irreversible airway dilation, accompanied by inflammatory process on

bronchial wall and the surrounding pulmonary parenchyma, which can be local or diffused and can be categorized as cylindrical or tubular (the most common type), varicose or cystic. Bronchiectasis can be infection-derived or non-infection-derived. The etiology of bronchiectasis can be characterized by the pattern of involved lungs. Focal bronchiectasis lead to local bronchiectatic changes on the affected lung area and can be caused by airway obstruction due to intrinsic (tumor or foreign substance in the airway, stenotic airway, and bronchial atresia) and extrinsic (pressure from nearest lymphadenopathy or parenchymal tumor mass) factors. Diffused bronchiectasis is mostly caused by systemic disease or the process of infectious disease. Involvement of upper lung fields is common in cystic fibrosis and is observed in post-radiation fibrosis. Bronchiectasis with predominant involvement on lower lung fields is usually caused by recurrent chronic aspiration (such as esophageal motility disorder in scleroderma patients). Bronchiectasis caused by infection from non-tuberculous mycobacteria (NTM) is often caused by *Mycobacterium avium*-intracellular complex (MAC), which usually affects the middle lung. In many cases, the etiology of bronchiectasis is often unknown. In the United States, the prevalence of bronchiectasis keeps increasing. Bronchiectasis caused by MAC infection often attacks non-smoker women with age range of >50 years old.<sup>5</sup> Generally, the incidence of bronchiectasis will increase along with age. It is more dominant in female compared to male. In regions with high prevalence of tuberculosis, bronchiectasis often occurs as a sequela of granulomatous infection. Especially in tuberculosis reactivation, parenchymal destruction from infection can cause diffused bronchiectasis area. The mechanism of infectious bronchitis is “vicious cycle hypothesis”, whereas infection vulnerability of an individual and mucociliary clearance disorder causes colonization of microbes in the bronchial tree. The clinical symptom of bronchiectasis is persistent productive cough. During physical examination, crackles and wheezing was found during pulmonary auscultation and several patients showed clubbing of the digits. Mild

to moderate airway obstruction can be seen during pulmonary function examination. Acute exacerbation of bronchiectasis is often marked by changes in volume and color of sputum. The diagnosis of bronchiectasis can be seen from persistent chronic cough, followed by the production of sputum and radiological image. Although thoracic radiography is less sensitive, the existence of “tram tracks” can indicate airway dilation, representative to bronchiectasis. Computed tomography is more specific for this disease and is the imaging modality of choice to diagnose bronchiectasis. The management of infectious bronchiectasis include infection control, improving secretion clearance, bronchial hygiene and therapy according to etiology.<sup>5</sup>

Tuberculosis (TB) is the most common cause of death in the world. WHO estimated around 9 million new TB cases in 2013. Tuberculosis in bronchus and bronchioles can cause damage to the airway. Endobronchial and peribronchial damage in the airway can cause obstruction and pooling of secretion with secondary infection which lead to further damage and bronchiectasis. The damage can be reversible or irreversible.<sup>3</sup> Bronchiectasis may occur as a result of opportunist mycobacterial infection. Opportunist mycobacteria is found in 2% to 10% of random sputum specimens from patients with bronchiectasis. However, the clinical significance is not clear. Patients with MAC infection can develop into bronchiectasis over years. However, in population with many tuberculosis cases, tuberculosis can be a secondary complication in cases of post-tuberculosis bronchiectasis due to endogenous reactivation caused by poor nutrition and pulmonary damage or exogenous reactivation.<sup>3</sup> In Indonesia, which is a developing country, tuberculosis cases is very high. Therefore, bronchiectasis caused by tuberculosis may occur and should be assess carefully, using HRCT and sputum examination. Cystic bronchiectasis image is often found in patients with bronchiectasis due to TB. In our patient, the result of HRCT showed cystic bronchiolectasis of right medius. Our patient showed clinical improvement after anti-tuberculosis therapy, who previously did not respond with antibiotics even though anti-

TB examination showed negative. This may be due to inadequate specimen collection.

## CONCLUSION

Centrilobular nodule both lungs, cystic bronchiolectasis and bronchiole ectasis results from old tuberculosis with late diagnosis and treatment. Early management in patients with a diagnosis of allergic bronchitis or prolonged cough will reduce the risk of lung damage and chronic hypercapnea.

## REFERENCES

1. McShane PJ, Naureckas ET, Tino G, Strek ME, medicine cc. Non-cystic fibrosis bronchiectasis. *Am J Respir Crit Care Med*. 2013;188(6):647-56.
2. Bilton D, Jones A. 1 Bronchiectasis: Epidemiology and causes. *European respiratory monograph*. 2011;52:1-10.
3. Dhar R, Singh S, Talwar D, Mohan M, Tripathi SK, Swarnakar R, et al. Bronchiectasis in India: results from the European Multicentre Bronchiectasis Audit and Research Collaboration (EMBARC) and Respiratory Research Network of India Registry. *Lancet Glob Health*. 2019;7(9):e1269-e79.
1. 4. Contarini M, Finch S, Chalmers JD. Bronchiectasis: a case-based approach to investigation and management. *Eur Respiratory Soc*. 2018;27(149):180016.
2. 5. Baron RM, Barshak MB. *Harrison's Pulmonary and Critical Care Medicine* 3rd Edition. 2017.