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Case Report

Lung abscess preceded by fever of unknown origin: a case report

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ABSTRACT

Lung abscess is a condition that characterized by formation of pus or tissue necrosis in lung parenchyma. The prevalence of lung abscess in Indonesia is still unknown, but the incidence seems to be decreased. Lung abscess could be categorized in many forms based on the duration, etiology and the way of spreading. Early sign and symptoms usually cannot be differentiated from pneumonia. Lung abscess also could be preceded by fever of unknown origin, so it could be challenging to diagnose. This case report presented a-57-years old man that preceded by fever of unknown origin. Chest X-ray show unspecified lung infiltrate, thus treated as a pneumonia. Further X-ray showed the clear image of cavities with abscess. Lung CT-scan was performed and bronchiectasis also lung abscess were found. Comprehensive history taking, physical examinations and diagnostic tests were done in this patient until the diagnosis is established.

Keyword: Lung abscess, Bronchiectasis, Infectious disease

INTRODUCTION

Lung abscess is a microbial infection of lung parenchyma that results in circumscribed area of pus or tissue necrosis. This could lead to cavities formation. Lung abscess could be categorize based on the duration, etiology and way of spreading. According to the duration, lung abscess could be divided into acute (less than 6 weeks) and chronic (more than 6 weeks). According to the etiology, lung abscess could be divided into primary (no underlying pulmonary lesions) and secondary (presence of underlying pulmonary lesions). Based on the way of spreading, lung abscess could be divided into bronchogenic or hematogenic origin.[1-6] Lung abscess could be challenging to diagnose, rather it is a rare disease found in clinical setting. Early sign and symptoms cannot be differentiated from pneumonia, such as fever, cough and dyspnea.[4-6] Fever may last for couple of weeks or recurs, with no established causes and findings on early routine diagnostic tests. This is known as fever of unknown origin.[7,8] This paper reported about lung abscess that preceded by fever of unknown origin.

CASE REPORT

A-57-year-old man was admitted to hospital emergency unit with a two-days history of fever, cough, dizziness, nausea and fatigue. The patient had recurrent episodes of bloating, odynophagia and sinusitis before symptoms occur. He had smoking history but discontinued for almost 20 years. He denied dental or peri dental problems, alcohol consumption and recreational drug use. He had a known history of diabetes type 2 and hypertension, managed with amlodipine 10 mg OD and gliquidone 30 mg BID. His physical examinations revealed: BMI of 28.6 kg/m^2 (obese), blood pressure of 143/81 mmHg, pulse of 92 bpm, respiratory rate of 20 breaths per minute (no tachypnea), body temperature of 37.8^0 C and oxygen saturation of 98% on room air. Physical examination revealed a coarse-crackles on both lungs. Initial laboratory examinations revealed leucocytosis (19500/µl) dominated by segmented-neutrophyl (88%), suggesting bacterial infection. The SARS-CoV-2 PCR test was negative. Other blood examination revealed normal level. Early chest X-ray examination demonstrated bronchopneumonia with

slight cardiomegaly (Figure 1). Patient initially diagnosed with pneumonia, hypertension and type-2 diabetes. Patient then admitted to hospital ward and treated with intravenous ceftriaxone 2 grams OD, azythromicin 500 mg OD, amlodipine 10 mg OD, gliquidone 30 mg BID, and other symptomatic drugs. Patient underwent sputum examination for tuberculosis. Patient's sputum examination was negative for tuberculosis bacteria. Fever persisted until day four and production of sputum were increased. Repeated laboratory tests still revealed leukocytosis (19900/µl). Thus, azythromicin discontinued and intravenous levofloxacin 750 mg OD was added. The cough started to resolved on day-five but the fever still intermittently recur until day-eight, with maximum body temperature of 38.6^{0}C. Laboratory tests still revealed leukocytosis (17900/µl) and elevated CRP level (121 mg/l), so patient was added ampicillin-sulbactam 1.5 g QID to his regimen. Other focused infection was assessed, such as abdominal ultrasound examination and revealed no infection sign. After 24 hours of ampicillin-sulbactam regimen, resolution of fever and cough were achieved. Patient discharged from hospital with amoxicillin-clavulanic acid 625 mg TID, levofloxacin 750 mg QID, and other routine antihypertension and oral hypoglycemic drug.

Figure 1: Chest X-ray showing bronchopneumonia with slight cardiomegaly. Cavitating mass was difficult to figure out.

Patient suggested to revisit clinic next week with evaluation of chest X-ray. Second chest X-ray examination demonstrated cavity on left lung lower zone with air-fluid level suggesting cavitating mass or lung abscess. Chest X-ray result also suggesting pulmonary tuberculosis with minimal left pleural effusion (Figure 2). Compared to the first chest X-ray, the cavity was also shown as unspecified infiltrate on lung because it is covered by cardiac, thus it is difficult to spot on. Patient complained about intermittent fever, night sweat and productive cough with brownish sputum for the first three days after being discharged, but resolved on the day he visiting the doctor. Patient denied any pulmonary disease before. Amoxicillin-clavulanic acid 625 mg TID and clindamycin 300 mg TID were given to the patient for the next 4 weeks. Patient suggested to underwent chest CT-scan examination. Patient revisited clinic with resolved symptoms and chest CT-scan result showing infected bronchiectasis (Figure 3A and B).

Figure 2: Chest X-ray showing cavity on left lung lower zone suggesting cavitating mass or lung abscess. Chest X-ray also suggesting pulmonary tuberculosis with minimal left pleural effusion.

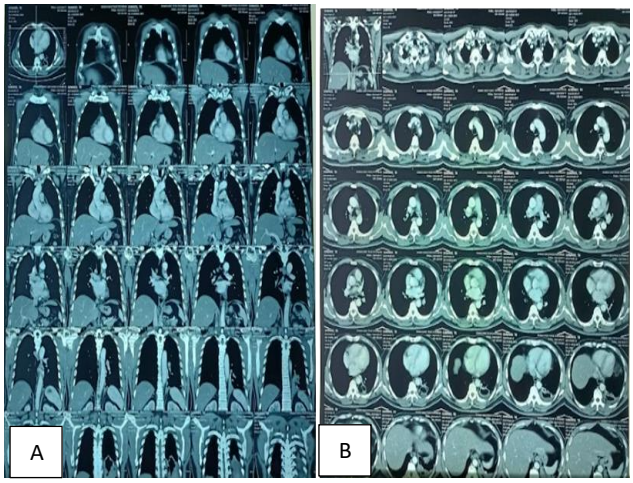

Figure 3 (A and B): Coronal and axial plane chest CT-scan showing enhanced bronchovascular pattern, dilated bronchiolus and a cavity with thick, minimally calcified wall on left lung lower zone. This finding consistent with infected bronchiectasis. Other specific process on the lung still cannot be excluded. Minimal left pleural effusion also can be seen.

After 4 weeks of antibiotic treatment, patient had no fever with minimal cough. Follow-up chest X-ray examination still demonstrated bronchopneumonia with smaller lung cavities on the left lung lower zone suggesting resolving lung abscess (Figure 4). Amoxicillin-clavulanic acid and clindamycin were continued for 6 weeks.

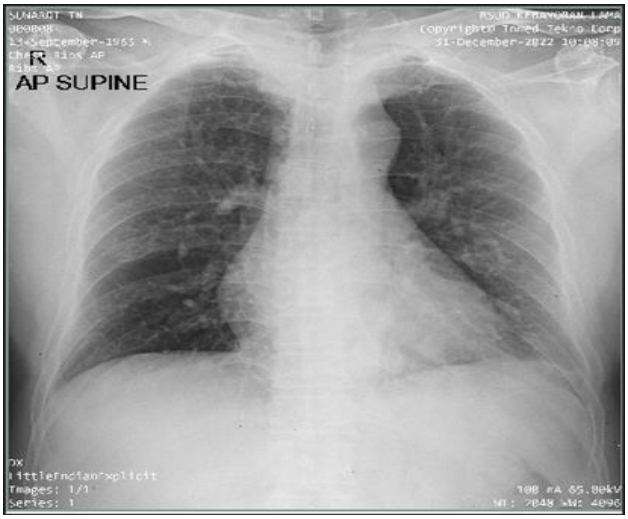

Figure 4: Chest X-ray showing bronchopneumonia with cavity on left lung lower zone suggesting resolved lung abscess.

DISCUSSION

Lung abscess is a localized area of pus or debris of destructed tissue in lung parenchyma, that caused by infection. Early clinical signs and symptoms of lung abscess could be confused with pneumonia, such as fever, cough, dyspnea, malaise, night sweats, weight loss and chest pain.[2,4-6] The patient in this case initially diagnosed with pneumonia but the symptoms only partially resolved with standardized therapies. The patient underwent repeated diagnostic tests until diagnosis is established. Patient with persistent or progressive symptoms of pneumonia (e.g., become hemoptysis) despite optimal therapy should be evaluated for chronic lung diseases (e.g., tuberculosis or structural lesions) and lung abscess.[4,5,9]

There are so many risk or predisposing factors that could contribute to lung abscess formation. These are elderly, predental or dental infections, alcoholism, drug abuse, diabetes mellitus, coma, artificial ventilation, convulsion, neuromuscular disorders with bulbar dysfunction, malnutrition, corticosteroids, cytostatics or immune-suppresant regimen, mental retardation, gastroesophageal reflux disease, bronchial obstruction, history of smoking, unable to cough, coexisting lung disease (e.g., tuberculosis, pneumonia, bronchiectasis) and sepsis. Disrupted clearance mechanism of respiratory tract could be also a risk factor.[1,4-6] The patient in this case has several risk factors, consist of diabetes mellitus, gastroesophageal reflux disease, history of smoking and coexisting bronchiectasis. A retrospective study conducted by Kumar et al. in Pakistan showed the most affected age group was between 41 to 60 years, which is similar to our patient. Diabetes mellitus and history of smoking also had been identified as the most important risk factors for developing lung abscess in this study.[5] Smoking may enhance the occurrence of diseases that may increase the possibility of lung abscess.[10,11] Gastroesophageal reflux disease may cause aspiration of gastric contents, including bacteria into lower respiratory tract and predispose the patient to develop lung abscess. Lung abscess could be categorized into primary or secondary, based on the presence of underlying pulmonary lesions.[1,4,6] This patient had secondary lung abscess from infected bronchiectasis.

Bronchiectasis defined as abnormal thickening and permanent dilatation of bronchial wall incited by many factors, causing clinical syndromes such as persistent cough and sputum production. Bronchiectasis often related with chronic rhinosinusitis, gastrointestinal reflux, dysphagia and aspiration syndromes, which is seen on this patient's recurrent episodes of bloating, odynophagia and sinusitis before symptoms occur.[12,13] This will initiate infection or injury that leads to inflammation process. Inflammation process will recruit neutrophils that produce protease enzymes that damage the airway structure. Destructed airway tissue will cause abnormal mucus production and clearance, which leads to mucus statis and bacterial colonization. In more advanced destruction process, cystic changes and cavitation could be seen as lung abscess.[12,14,15]

Most of lung abscess cases are caused by polymicrobial bacteria. Anaerobic and *Streptococci* bacteria are the most common etiologies in immunocompetent patient.[4,6,16] Empirical antibiotics with extended coverage for anaerobic bacteria should be given. Metronidazole is not recommended to be used as single therapy because it not covers the microaerophilic *Streptococci* that often as a part of the polymicrobial etiology.[3,4,6,17] About 15-20% of anaerobic bacteria that causes lung abscess are resistant to beta-lactam antibiotic only (e.g., penicillin), so it is recommended to use combination of penicillin and clavulanic acid, or penicillin and metronidazole.[6,18] Initially this patient was treated with ceftriaxone, azythromycin and levofloxacin, but resolution of symptoms is not adequately achieved. Ampicillin-sulbactam was given later and resolution of fever and cough were achieved in 24 hours. Ampicillin-sulbactam is equally effective with clindamycin for lung abscess that preceded with aspiration.[4] Upon discharge from hospital, clindamycin and amoxicillin-clavulanic acid were given to this patient for 6 weeks and clinical outcomes is much more improved, despite the cavity that still existed on follow-up chest X-ray examination. Clindamycin has extended coverage for aerobic and anaerobic bacteria. Prospective studies have shown clindamycin superiority beyond penicillin by duration of fever and putrid sputum resolution, also relapse rates.[3,4,16] The recommended duration of therapy was 6 up to 14-16 weeks.[3,4]

CONCLUSION

Most of lung abscess cases require repeated diagnostic tests until diagnosis is established. Patient with persistent or progressive symptoms of pneumonia despite optimal therapy should be evaluated for chronic lung diseases (e.g., tuberculosis or structural lesions) and lung abscess.

Empirical antibiotics with extended coverage for anaerobic bacteria could achieve resolution of symptoms in lung abscess.

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