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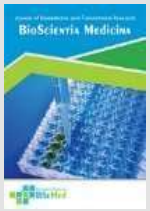

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Aspergilloma Mimicry of Lung Cancer: A Case Report

Muhammad Bagus HS[1*], Irvan Medison[2], Dewi Wahyu Fitrina[1], Dessy Mizarti[2]

[1]Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Andalas, Padang, Indonesia

[2]Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Dr. M. Djamil General Hospital, Padang, Indonesia

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***Corresponding author:**
Muhammad Bagus HS

E-mail address:
bagussakti25@gmail.com

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A B S T R A C T

Background: Aspergilloma and lung cancer have similar risk factors, clinical features, and supporting features. Special supporting examinations are needed to rule out the differential diagnosis of aspergilloma. **Case presentation:** A 52-year-old male patient with coughing up blood and risk factors for smoking had a chest X-ray and computed tomography scan (CT scan) of the thorax and found a picture of a lung tumor. Bronchoscopy was carried out, and a bronchial lavage culture was carried out for the impression of Aspergillosis, given 1x150 mg of fluconazole for 6 months with improved clinical results and chest radiographs as well as negative sputum culture results. **Conclusion:** This patient showed the condition of aspergilloma mimicking lung cancer.

1. Introduction

Infectious diseases are still a major health problem in Indonesia, one of which is lung fungal infections (mycosis). The type of pulmonary mycosis that is often reported is aspergillosis, which is 95% caused by *Aspergillus fumigatus*. Pulmonary aspergilloma is a clinical form of aspergillosis, where aspergilloma is a saprophytic fungal infection in the form of colonization in the lung cavity, which can be caused by various underlying diseases. This colonization will form a mass-like formation called a fungus ball or mycetoma. Aspergilloma consists of Aspergillus hyphae, fibrin, mucus, inflammatory cells, blood, and epithelial cell components.[1,2]

Aspergilloma is often found in post-pulmonary tuberculosis patients, both those who have just recovered and those who have recovered for a long period of time. Most studies report that lung cavities in aspergilloma are caused by tuberculosis. Aspergilloma is also found in cavities caused by various underlying diseases such as sarcoidosis, bronchiectasis, cystic fibrosis, lung cysts, and lung cancer.[2-4] The prevalence of aspergilloma resembling lung cancer is still not widely reported. There is a study by Josephine et al. 2020 which shows that of 134 lung biopsies/resections with fungal hyphae, 8 showed as solid lung nodules on imaging and could not be classified as a well-recognized form of aspergillosis, where malignancy was clinically suspected in all cases the research.[5,6]

2. Methods

The patient is a 52-year-old male with the main complaint of coughing up blood since 1 week ago,

sticky sputum. I have had a cough since 1 month that comes and goes. Shortness of breath increased since 1 week before admission to hospital. Shortness of breath did not decrease, it increased with activity and coughing. The previous history of shortness had been felt since 2 months ago. Complaints of discomfort in the right chest have been felt since 2 months ago. Hoarseness and swallowing disorders are absent. There has been a decrease in appetite and body weight by 3 kg since 2 months ago; there are no complaints of nausea, vomiting, or indigestion. The patient works daily as an internet content creator at home, smoking 12 cigarettes/day for 32 years. Cement house floor, no cracks, no well in the house, living in an urban environment. There is no family history of similar complaints. There is a history of diabetes mellitus in the patient's family. History of installing 2 heart rings 4 years ago. There is no history of pulmonary tuberculosis, no asthma, no heart disease. Physical examination: the patient appeared moderately ill, with consciousness compos mentis cooperative, blood pressure 114/63 mmHg, pulse 84x/minute, breathing 22x/minute, temperature 36.8°C O_2 saturation 98% free air. The patient has a body mass index (BMI) of 18.38. There were no enlarged lymph nodes in the supraclavicular, colli, axillary and inguinal regions. Thoracic examination and chest inspection are symmetrical, and palpation of the right fremitus is relatively lower than the left. A percussion examination was not carried out, and auscultation revealed reduced breathing sounds at the level of the 5th rib space.

The patient underwent a hematological supporting examination with the results: hemoglobin 11.7 gr/dl, leukocytes 10,830/mm^3, hematocrit 37%, platelets 410,000/mm^3, differential count 0/3/1/1/61/29/6**,** PT/APTT/INR: 10.2/24.1/0.94, D-dimer 1225 ng/ml**,** ureum 21 mg/dl, kreatinin 1,0 mg/dl**,** sodium 142 mmol/l, potassium 4.3 mmol/l, chloride 110 mmol/l, total protein 7.4 g/dl, albumin 3.7 g/dl, globulin 3.7 g/dl, SGOT 15 u/l and SGPT 20 u/l. Chest X-ray showed a right perihilar mass, irregular borders, and irregular edges accompanied by surrounding infiltrates, suggesting the presence of a right lung tumor. The patient has been diagnosed with right lung cancer of unknown cell type T3NxMx minimum stage IIIa PS ECOG I with paraneoplastic syndrome (leukocytosis, hypercoagulopathy) with a differential diagnosis of pulmonary tuberculosis (TB) and pulmonary mycosis.

Figure 1. (A) Chest X-ray October 4th, 2022; (B) Chest X-ray January 10th, 2023; (C) Chest X-ray March 1st, 2023.

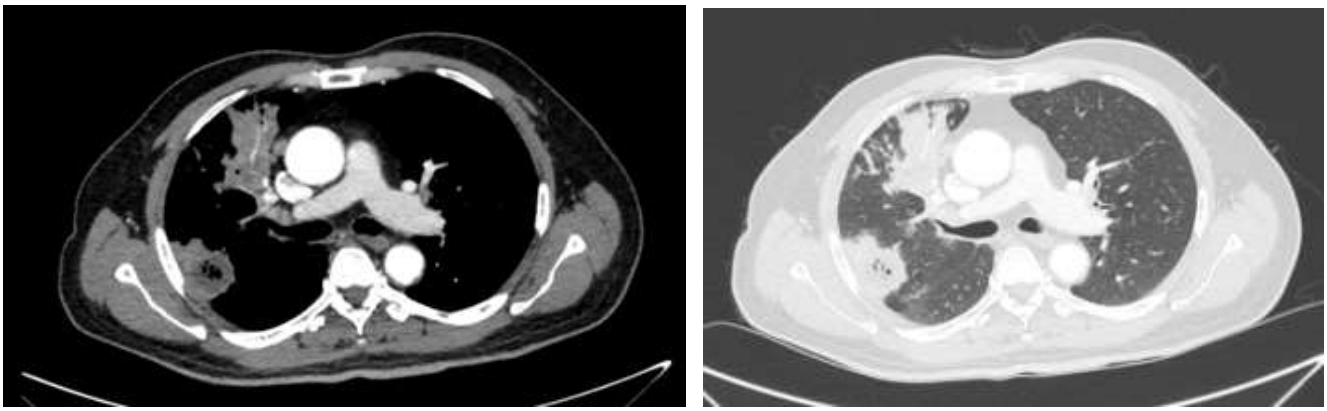

Figure 2. Thoracic CT scan image on September 16th, 2022.

Therapy given is 0.9% NaCl infusion / 12 hours, 3x500 mg tranexamic acid injection, and 3x1 Vitamin K injection. Planned to check the rapid molecular test (TCM) *mycobacterium tuberculosis* (MTB) sputum cytology. The patient was sent home with a plan to undergo a thoracic CT scan with supra-renal contrast and bronchoscopy. The results of the TCM MTB examination were not detected, no signs of malignancy were found from sputum cytology, and a chest CT scan showed an impression suggestive of pulmonary aspergillosis (invasive aspergillosis) with a differential diagnosis of right lung tumor accompanied by multiple ipsilateral nodules. Bronchoscopy was carried out with the impression of hyperemia in the bronchus 2, 4, and 6 of the right lung, washing was carried out, and the bronchi were connected. Transbronchial needle aspiration (TBNA), TCM, MTB culture, and fungal culture from bronchial lavage, then the patient is sent home and scheduled for control at the polyclinic, bringing the results of the examination that has been carried out.

Control during outpatient treatment resulted in bronchial rinsing and brushing results *bronchial reactive*, and no malignant tumor cells were found; no malignant cells were found in TBNA, TCM MTB was not detected, and fungal culture showed the impression of aspergillosis. The patient was diagnosed with Aspergilloma of the right lung, given the drug fluconazole 1x150mg, N. acetylcysteine 2x200mg, tranexamic acid 3x500mg scheduled for control, and fungal culture checks every month. In the first month of control, fungal culture results were obtained: no growth, complaints of coughing up blood are still present occasionally, and there is no shortness of breath. Therapy was continued, and the fungal culture was repeated the following month. Adapted from fungal culture resulted in no growth until the end of the 6th month, then another chest X-ray was carried out with results of a decrease in the size of the lesion in the right lung, an impression of improvement. Antifungal medication was discontinued.

3. Discussion

Aspergilloma is a fungal colonization *intracavitary* forming like a mass caused by *Aspergillus spp.* Aspergilloma can occur at any age but is more common in older people, namely between 34-65 years, and is dominant in men. Aspergillus colonization is a frequent occurrence due to TB, especially in countries where TB is endemic. There were also images that resembled aspergilloma, namely bronchiectasis, emphysematous bullae, sarcoidosis, lung abscess, lung fibrosis, and possibly a picture that resembled necrotic lung cancer.4,6,7The patient included in the epidemiology was a 52-year-old male but had no history of TB or previous treatment.

Infections caused by aspergillus are divided into allergic bronchopulmonary aspergillosis (ABPA), chronic pulmonary aspergillosis (CPA), and invasive pulmonary aspergillosis (IPA) and aspergilloma. Allergic bronchopulmonary aspergillosis is caused by

a pulmonary hypersensitivity reaction due to inhalation of aspergillus, and usually, this condition occurs in people who have a previous history of asthma or cystic fibrosis. Chronic pulmonary aspergillosis is a special condition of aspergillus infection that occurs in local invasion of the lungs in people with a previous history of chronic lung disease. Invasive pulmonary aspergillosis is found in immunocompromised conditions or subsequent diseases such as chronic obstructive pulmonary disease (COPD), liver cirrhosis, long-term use of steroids, and a history of long-term intensive care. Aspergilloma is a non-invasive form of pulmonary aspergillosis that forms fungal balls and develops in the lung cavity.[8-15]

The prevalence of cancer-like aspergilloma has not been widely studied. Research by Josephine et al. by looking at archives of lung biopsy/resections with fungal hyphae on histopathological examination, out of 134 lung biopsy/resection procedures with fungal hyphae, 8 cases showed solid lung nodules with a clinical picture consistent with malignancy.[6] The rare occurrence of pulmonary fungal infections that mimic lung cancer is thought to be due to heterogeneity in etiology. Acquired infections include bacteria, mycobacteria, atypical mycobacteria, and various types of fungi. They can even be caused by viruses, which can manifest similarly to malignancy. Nonspecific symptoms and radiographic findings suggestive of lung cancer add to the difficulty in differentiating these lesions from malignancy.[8,9]

The patient experienced coughing up blood that had been felt since 1 week before entering the hospital, shortness of breath there was also a decrease in appetite and weight loss. It is difficult to differentiate between infection and malignancy because of the similarities between these symptoms. Risk factors that make a patient suspected of having lung cancer are gender, age, coughing up blood, and a history of smoking Index Brinkman currently. Research by Ermayanti et al. obtained data that the incidence of lung cancer was 77.8% in men. Coughing up blood is a symptom that can be found in 17% of lung cancers and 1.1% of aspergillosis.[13,14]

Determining the diagnosis, in this case, must be carried out carefully, starting from anamnesis, such as a history of previous illnesses during childhood, whether the place of residence is an area with a high burden of disease or an endemic area, as well as family history of the disease, must be confirmed to be the basis for a differential diagnosis in conditions of lesions similar to lung cancer.[8,9,11,12] The patient only found the risk factor of smoking since 32 years ago was 12 cigarettes per day. The diagnosis of aspergilloma is usually found accidentally on a chest X-ray of a patient who has no symptoms or to evaluate complaints of coughing up blood. Chest X-ray usually shows the classic appearance of a mass in the cavity, movable and homogeneous, surrounded by a halo or crescent of air.[9,10,12] The patient's initial chest X-ray showed a right perihilar mass with irregular borders, which indicated a suspected right lung tumor.

Other checks that can be carried out are computed tomography (CT) scan, which can confirm the morphological diagnosis and can determine the size of the cavity, the thickness and arrangement of the cavity walls, details of the surrounding parenchyma and pleura, as well as its relationship to the blood vessels.[9,12] The results of the patient's thoracic CT scan showed multiple nodules accompanied by hypodense lesions. An air bronchogram measuring 4.7 cm, which was visible after contrast administration, enhanced the nodule; this makes the differential diagnosis of lung cancer. Bronchoscopy was carried out and showed hyperemia in B2, B4, and B6 of the right lung; bronchial brushing and lavage were carried out, and TBNA was carried out for cytology examination, MTB TCM, MTB culture, and fungal culture. The results of bronchial rinsing and brushing are impressions bronchial reactive, and no malignant tumor cells were found; no malignant cells were found in TBNA, TCM MTB was not detected, and fungal culture showed the impression of aspergillosis.

The diagnosis currently depends on the discovery of *Aspergillus* fungus, sputum culture is obtained in only 25-52% or visualization of hyphae in biopsied

tissue (transbronchial biopsy via fiberoptic bronchoscopy or lung biopsy) bronchoalveolar lavage fluid 40%-50%, bronchial galactomannan enzyme immunoassay has a sensitivity of 61-71% and a specificity of 89-93%, and quantitative polymerase chain reaction assay increased sensitivity, namely 94%–98%.[1,9,11] Surgery is the definitive therapy for aspergilloma with recurrent or massive hemoptysis. Itraconazole or voriconazole is the main anti-fungal drug of choice in cases of aspergilloma, given orally at 200 mg every 12 hours.[1,9] The patient received 1x150mg Fluconazole therapy. Fluconazole is a first-generation triazole group, while the main choice, in this case, is itraconazole, which has an activity similar to fluconazole but has activity against *Aspergillus spp* with a maximum dose of 400mg per day. Voriconazole has a broader spectrum against various types of fungi. *Aspergillus* spp is recommended for invasive aspergillosis. The patient's treatment response was successful due to improvement during observation of both clinical symptoms, radiological images, and fungal eradication.[1,10,11]

4. Conclusion

Clinical features such as chronic cough, coughing up blood, decreased appetite, and body weight, as well as supporting examinations that are similar between lung cancer and aspergilloma, can confuse the diagnosis. Other examinations, especially bronchial lavage culture for fungal culture, are needed for a definite diagnosis of aspergilloma. The administration of fluconazole has proven to be effective as a treatment for aspergilloma, although it is not the main choice for this case.

5. References

1. Rozaliyani A, Jusuf A, Handayani D, Syahruddin E, Isbandiyah F, Agustin H et al. Pulmonary mycosis. National guidelines for diagnosis and management in Indonesia PDPI. 2017; 1-28
2. Senja M, Medison I, Russilawati. Pulmonary aspergilloma; a case report. YARSI Med J. 2020; 28(2): 32-40.
3. Soedarsono, Widoretno ET. Aspergilloma in pulmonary tuberculosis. J Resp. 2017; 3(2): 58-65
4. Hicham H, Rabiou S, Ibrahim I, Maroune L, Yassine O, Mohamed S. Pulmonary aspergilloma: from classification to management. Asian Cardiovasc Thorac Ann. 2019; 0(0): 1-6.
5. Baxter CG, Bishop P, Low SE, Amissah K, Denning D. Pulmonary aspergillosis: an alternative diagnosis to lung cancer after positive [18F] FDG positron emission tomography. Thorax. 2011; 66(7): 638–40.
6. Dermawan JK, Ghosh S, Mukhopadhyay S. Expanding the spectrum of chronic necrotising (semi-invasive) aspergillosis: a series of eight cases presenting as radiologically solid lung nodules mimicking malignancy. Histopathology. 2020; 76(5): 685.
7. Gazzoni FF, Severo LC, Marchiori E. Pulmonary diseases with imaging findings mimicking aspergilloma. Lung. 2014; 192(3): 347–57.
8. Schweigert M, Dubecz A, Beron M, Ofner D, Stein H. Pulmonary infections imitating lung cancer: clinical presentation and therapeutical approach. Ir J Med Sci. 2012; 182(1): 73–80.
9. Passera E, Rizzi A, Robustellini M, Rossi G, Pona CD, Massera F et al. Pulmonary aspergilloma. Thorac Surg Clin. 2012; 22(3): 345–61.
10. Patterson F, Thompson G, Denning D, Fishman J, Hadley S, Herbrecht R et al. Clinical infectious disease: Practice Guidelines for the Diagnosis and Management of Aspergillosis. IDSA. 2016; 1-60.
11. Patterson KC, Strek ME. Diagnosis and treatment of pulmonary aspergillosis syndrome. Chest. 2014; 146(5): 1358-68.
12. Park M, Ho DY, Wakelee H, Neal J. Opportunistic invasive fungal infections

mimicking progression of nonsmall cell lung cancer. CLC. 2020: 1-8

13. Ermayanti S, Afriani A, Nikmawati S, Russilawati R, Medison I, Suyastri. Gender disparities in their effects on characteristics and prognostics of lung cancer patients in pulmonary ward of Dr. M Djamil Hospital, Padang. J Respir Indones. 2021; 41(4): 245-51
14. Ittrich H, Bockhorn M, Klose H, Simon M. The diagnosis and treatment of hemoptysis. Dtsch Arztebl Int. 2017; 114(21): 371–81
15. Russo A, Tiseo G, Falcone M, Menichetti F. Pulmonary aspergillosis: an evolving challenge for diagnosis and treatment. Infect Dis Ther. 2020; 9: 511-24.