

A Case Report: Coexistent Pulmonary Tuberculosis and Lung Cancer Diagnosed from the Same Specimen

Rispan Pratama^{1*}, Bintang Yinke Magdalena Sinaga¹

¹Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Sumatera Utara
H.Adam Malik General Hospital, Medan, Indonesia.

Keywords: Pulmonary Tuberculosis, Lung Cancer

Abstract: Pulmonary tuberculosis and cancer are common causes of morbidity, mortality and major public health problem worldwide, Tuberculosis can coexist with lung malignancy making the underlying disorder leading to delay in diagnosis and management. Here we present an interesting case of a 58-year-old woman who on initial presentation was diagnosed with tuberculosis but did not a response to antituberculosis therapy. Further investigation revealed underlying lung cancer. The patient was then treated according to the latest guideline.

1 INTRODUCTION

Cancer and tuberculosis are common causes of morbidity and mortality, and a major public health problem worldwide. The interaction between lung cancer and active tuberculosis is known for many years. The first description of 'cancerous phthisis' was reported by Bayle in 1815. Tuberculosis is an important risk factor for cancer. The dormant bacilli may activate due to disturbed defense mechanisms. Pulmonary cancer mortality was higher in people with tuberculosis than in those without. Diagnosis may be a delay and the patient's survival may be shorter (Beyhan, Aydin, 2018, p 33-37).

One-third of the world population is infected with *Mycobacterium Tuberculosis* bacillus. According to the WHO 2016 global tuberculosis report, tuberculosis affects more than 9 million people and caused death in 1.8 million people, especially in developing countries (WHO, 2017). Worldwide, there were approximately 14 million new cancer cases, 8.2 million death-related cancer and 32.6 million people living with cancer in 2012. Among men, the three most common cancer are lung, prostate, and colorectal cancer, and among women, breast, colorectal and lung cancer as the three most common causes (WHO, 2016).

Pulmonary tuberculosis and lung malignancy are a common disease, especially in endemic areas including Indonesia, This often requires special

attention to enforce the diagnosis. Clinicians often find difficulties to identify due to similar symptoms, which result in one disease or the other to be a delay to be treated.

In this case report, there was a coexist pulmonary tuberculosis and lung malignancy in one sample diagnosed from Bronchoalveolar lavage (BAL) from bronchoscopy procedure.

2 CASE

A 58-year-old female came to Adam Malik General Hospital on 29 December 2018 with complaints of shortness of breath since the previous two months, which had gotten worse in the previous one month. It became worse when she performed an exercise. Cough occurred since the previous month with whitish sputum production. Left chest pain also occurred for a month before admission, and worsened on a deep breath in and heavy coughing. Hoarseness occurred for a month. Loss of body weight for about 3 kgs was observed in the last 2 months. The patient was a farmer for 20 years. History of biomass exposure was found with pesticide and mosquito coils. The patient was diagnosed with Diabetes Mellitus in the previous year.

Before admitted to Adam Malik General Hospital, patients were treated in another hospital in

November 2018, and had pleural fluid an amount of 3000 ml aspirated from the left pleura. The patient was started on category I Anti Tuberculosis Therapy (ATT) in November 2018. The patient also received medication from a pulmonologist, based on chest X-ray and clinical presentation.

On examination on 14 January 2019, the patient was alert, blood pressure was 110/80 mmHg, pulse rate was 104 times/minute, respiratory rate was 24 times/minute, the temperature was 36,5°C, and SpO₂ was 97% at room air,

On chest examination, there was an asymmetrical chest movement, delayed movement on the left hemithorax, decreased of the tactile fremitus on the left hemithorax, dullness on the left hemithorax and diminished breath sound on the left hemithorax without additional sound. Enlargement of the liver was found, tenderness of the liver was found.

Laboratory findings on 29 February 2019 showed haemoglobin 14.0 g/dl, leukocyte $21.910 \times 10^3 / \text{mm}^3$, erythrocyte $4.98 \times 10^6 / \text{mm}^3$, hematocrite 39.1%, platelet $323.000 / \text{mm}^3$, ad random blood glucose 400 mg/dL, natrium 131 meq/ml, kalium 2.8 meq/ml, chloride 93 meq/ml, and nonreactive Elisa Test for HIV.

Radiological finding from 14 January 2019 showed homogenous consolidation appearance. Thorax CT-Scan on 8 January 2019 showed left lung tumor, enlarged perihilar lymph node, left pleural effusion T2aN3M1b (liver) (Figure 1).

Bronchoscopy finding showed infiltrative stenosis in lingula and left lower lobe. Biopsy results were in line with the image of adenocarcinoma, cytology with a malignant smear (C5). Results from cytology of BAL revealed an impression of adenocarcinoma, with a malignant smear (C5). Similar findings were also shown in pleural fluid cytology with C3 atypic smears but tend to be clear on the impression of reactive mesothel.

GeneXpert analysis of bronchoalveolar lavage showed *Mycobacterium tuberculosis* susceptible to rifampicin. Epidermal Growth Factor Receptor (EGFR) analysis on 17 January 2019 showed no mutation detected.

2.1 Working Diagnose

We diagnosed this patient with left lung adenocarcinoma T4N3M1c (pleura, hear) stage IVb PS I with a new case of pulmonary tuberculosis, and diabetes mellitus.

2.2 Treatment

Tuberculosis treatment consisted of two months of RHZE (R: rifampicin, H: isoniazide E: ethambutol, Z: pyrazinamide) plus 7 months of RH daily until complete TB treatment. The evaluation was performed two months after the initiation of treatment including clinical and physical examinations, chest x-ray, and AFB smear.

The patient also received chemotherapy with platinum-based therapy such as carboplatin and paclitaxel. Chemotherapy was planned for 6 cycles and would be evaluated every 2 cycles.

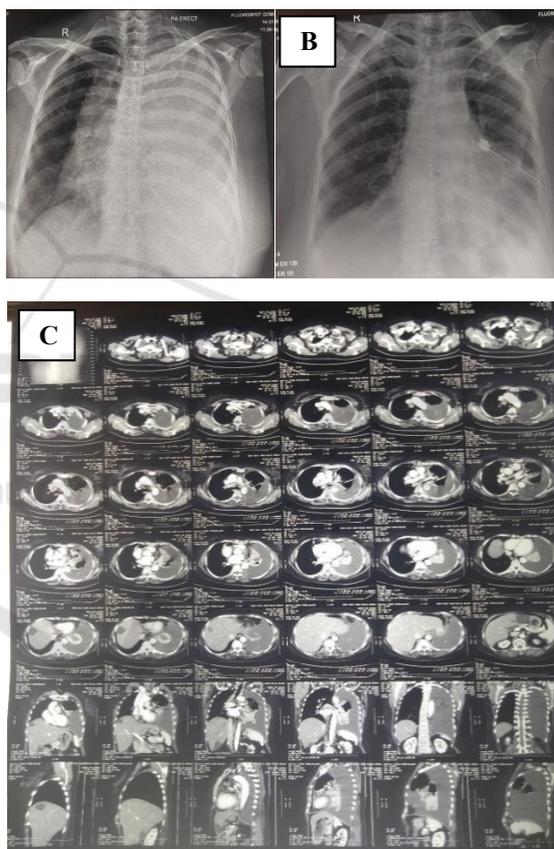


Fig 1: Radiological findings. (A) shows homogenous consolidation, large pleural effusion, (B) after insertion of water sealed drainage (WSD) in Adam Malik Hospital. (C) Thorax CT-Scan



Figure 2: Bronchoscopy Finding

3 DISCUSSION

The relationship between pulmonary tuberculosis and lung cancer has been known for years. Pulmonary tuberculosis and lung cancer are able to mimic each other, often on clinical symptoms and radiological features. The common symptoms are fever, night sweats, loss of appetite, weight loss, fatigue, and chest pain. Cancer cells invasion in healed tuberculosis lesions might also lead to tuberculosis reactivation by weakening the local immunity. Two diseases may be located in the ipsilateral lung, contralateral lung or same lobe location. Tuberculosis bacilli may live at a dormant status in granulomas and induce tuberculosis sensitivity (WHO, 2016). When the local immunity deteriorates, reactivation of latent TB, primary mycobacterial infection, the new exogenous infection may cause tuberculosis infection. Chronic inflammation like pulmonary tuberculosis process may also lead to carcinogenesis of the lung tissue which can lead to DNA damage by nitric oxide synthase from the infected macrophage. Thus, chronic inflammation and scarring due to tuberculosis can lead to the development of cancer. An occurrence of lung cancer at the site of the scars of old tuberculosis lesions has been shown in other studies (Jacobs, Gu, Chachoua, 2015). According to Harikrishna et al., the possible association between cancer and tuberculosis is a coincidence without any apparent relation, can be a simultaneous development of both tuberculosis and cancer, a metastatic carcinoma developed in an old tuberculosis scar, or a secondary TB infection in cancer (Harikrishna, Sukaveni, Kumar, 2012). The

discordant organ involvement may be by chance without any apparent relation. Smoking is an important risk factor for lung cancer. Chemotherapy, immune dysfunction, radiotherapy, severe malnutrition may lead to immune suppression. Radiotherapy might lead to deregulation of granulomas microenvironment, allowing tuberculosis mycobacteria to proliferate (Wu, et al, 2011). Kurasawa et al. showed that coexistence of lung cancer and pulmonary tuberculosis occurred in about 2 to 4% of lung cancer cases and in about 1 to 2% of tuberculosis cases. Histopathology analysis of lung cancer revealed a more periphery origin and a squamous cell carcinoma. As previously reported (Kurasawa, et al, 1998), the authors concluded that in this case report, lung cancer is comorbid that is most likely to be a risk factor for the decrease in endurance, hence patient became susceptible to tuberculosis.

4 CONCLUSION

In this case report, a patient was diagnosed with pulmonary malignancy and tuberculosis infection. The patient was planned to be continuously observed to evaluate the response of therapy. Although with the worst prognosis, it was expected that appropriate therapy would improve the quality of life. As a clinician, we should be able to make this case report as a reference to be more active in looking the possible risks of tuberculosis and lung cancer to occur together so that treatment of either disease will not be delayed.

REFERENCES

- Beyhan C, Aydin C, *Evaluation of coexistence of cancer and active tuberculosis;16 case series, respiratory medicine case report* 23 (2018) 33-37.
- Harikrishna, J., Sukaveni, V., Kumar, D.P., *Cancer and tuberculosis, J. Indian Acad.Clin.* 13 (2) (2012) 142–144.
- Jacobs R.E., Gu P., Chachoua, A., *Reactivation of pulmonary tuberculosis during cancer treatment, Int. J. Mycobacteriol.* 4 (4) (2015) 337–340.
- Karnak, D., Kayacan, O., Beder, S., *Reactivation of pulmonary tuberculosis in malignancy, Tumori* 88 (2002) 251–254.
- Kurasawa, T., *The coexistence of pulmonary tuberculosis and lung cancer, Nihon Rinsho* 56 (12) (1998) 3167–3170.

- World Health Organization. *Global tuberculosis report. 2016*. Available at <http://who.int/tb/publications/global-report/en/>.
- WHO, *WHO list of priority medical devices for cancer management*, (2017), pp. 9–10 ISBN: 978-92-4-156546-2.
- Wu, C.Y., Hu, H.Y., Pu, C.Y., Huang, N., Shen, H.C., Li, C.P., Chou, Y.J., *Pulmonary tuberculosis increases the risk of lung cancer: a population-based cohort study*, *Cancer* 117 (2011) 618–624.

