

A Case of Pneumoconiosis Accompanied by Tuberculosis

Tüberkülozun Eşlik Ettiği Pnömokonyoz Olgusu

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This study was presented as a poster case report at the National Lung Health Congress (UASK) with International Participation of the Lung Health and Intensive Care Association (ASYOD) on March 15–18, 2023.

ABSTRACT

Silicosis is the most common occupational lung disease worldwide and its association with mycobacterium tuberculosis infection is common. The risk of developing pulmonary tuberculosis is 3–39 times higher in silicosis patients compared to healthy individuals; the risk of developing extrapulmonary tuberculosis was also found to be 3.7 times higher. A 62-year-old male patient applied to our clinic with complaints of the right chest pain and shortness of breath for 4 years. In his occupational history, it was learned that he worked as a sapper and a miner in the mine, where lead and zinc were extracted for 30 years, and that he was engaged in blasting with dynamite and retired in 2013. In his history, it was learned that he was evaluated in the pulmonary diseases outpatient clinic with cough and sputum complaints in 2018, and he received antituberculosis treatment after the sputum was positive for acid-fast bacillus. We presented a case of pneumoconiosis presenting with pulmonary tuberculosis accompanied by radiological eggshell calcification.

Keywords: Pneumoconiosis, silicosis, tuberculosis.

ÖZ

Silikozis, dünya genelinde en yaygın mesleki akciğer hastalığı olup Mycobacterium tuberculosis enfeksiyonu ile birlikteliğine sık rastlanmaktadır. Silikozis hastalarının, sağlıklı bireylerle karşılaştırıldığında akciğer tüberkülozu gelişme riski 3 ile 39 kat arası; akciğer dışı tüberküloz gelişme riski de 3,7 kat daha yüksek bulundu. Altmış iki yaşındaki erkek hasta kliniğimize 4 yıldır devam eden sağ göğüs ağrısı ve nefes darlığı şikayeti ile başvurdu. Meslek öyküsünde 30 yıl boyunca kurşun ve çinko çıkarılan madende kazmacı, lağımçı olarak çalıştığı, dinamit ile patlatma işi yaptığı ve 2013 yılında emekli olduğu öğrenildi. Öz geçmişinde 2018 yılında öksürük ve balgam şikayeti ile göğüs hastalıkları polikliniğinde değerlendirildiği, balgam asido dirençli basil pozitif olarak gelmesi üzerine, antitüberküloz tedavi aldığı öğrenildi. Bu yazıda, akciğer tüberkülozu ile prezente olan, radyolojik olarak yumurta kabuğu kalsifikasyonunun eşlik ettiği bir pnömokonyoz olgusu sunuldu.

Anahtar kelimeler: Pnömokonyoz, silikozis, tüberküloz.

Cite this article as: Özgün S, Koyuncu A, Sari G, Şimşek C. A Case of Pneumoconiosis Accompanied by Tuberculosis. Journal of Izmir Chest Hospital 2023;37(2):103–106.

Received (Geliş): March 21, 2023 **Accepted (Kabul):** June 05, 2023 **Online (Çevrimiçi):** August 10, 2023

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INTRODUCTION

Pneumoconiosis is the general name of fibrosis and other parenchymal tissue reactions that develop in the lungs due to exposure to dust, smoke or fibrous mineral, and inorganic substances mostly originating from the industrial environment. Silicosis, coal worker's pneumoconiosis, asbestosis, mixed dust pneumoconiosis, hard metal lung disease, berylliosis, and talcosis are the most common pneumoconiosis, but many other agents (such as barium, tin, and zirconium) can also cause pneumoconiosis.^[1,2] Pneumoconioses are examined in two main groups according to their radiological appearance as simple and complicated. Simple pneumoconiosis is defined as the presence of round or linear opacities <1 cm in the chest X-ray. Progressive massive fibrosis (PMF), also known as complicated pneumoconiosis, is defined as the appearance of opacities larger than 1 cm with small opacities on chest X-ray.^[3,4]

Silicosis develops with inhalation of the crystalline form of silica (silicon dioxide). Silica is one of the main components of rock and sand, and many different business lines carry the risk of silicosis.^[5] In chronic silicosis, silicotic nodules form in the lung parenchyma and hilar lymph nodes. In a minority of cases, lesions in the hilar lymph nodes may be calcified in an "eggshell" pattern.^[6]

The risk of developing pulmonary tuberculosis is 3–39 times higher in silicosis patients compared to healthy individuals; the risk of developing extrapulmonary tuberculosis was also found to be 3.7 times higher.^[7] In experimental studies on the increased risk of tuberculosis development in patients with silica exposure and silicosis diagnosis, it was found that silica altered the immune response in the lungs, impairing the functions of alveolar macrophages and causing apoptosis of macrophages. Thus, it has been shown to reduce local resistance against tuberculosis.^[8]

Here, a 62-year-old male patient with complicated chronic silicosis presenting with pulmonary tuberculosis accompanied by PMF and eggshell calcification is presented.

CASE REPORT

A 62-year-old male patient applied to our clinic with complaints of the right chest pain and shortness of breath for 4 years. He had no complaints such as cough, sputum, hemoptysis, and night sweats. He has been diagnosed with chronic obstructive pulmonary disease for 4 years and has been receiving inhaler treatment. He had a 7 pack/year smoking history and had not smoked for 30 years. On physical examination, his general condition was good, his vital signs were stable, and his lung sounds were bilaterally diminished on chest examination. Laboratory values at admission were within normal limits. When bilateral reticulonodular lesions were detected in the PA chest X-ray, he was hospitalized and examined (Fig. 1). Lymph nodes containing mostly calcification (eggshell calcification) were observed in the mediastinal and hilar areas in the simultaneous lung high-resolution computed tomography (HRCT) (Fig. 2a, b). Irregular soft-tissue densities that extend from the hilus to the periphery, extending from the hilus to the periphery in the upper zones of both lungs-consolidated appearances with diffuse centrilobular nodular weight infiltrative densities, peribronchial thickenings, bronchiectasis, interseptal thickenings in places, scattered calcific



Figure 1: Chest X ray showed bilateral reticulonodular lesions, bilateral hiluses are prominent, a mass lesion of approximately 4 cm in diameter in the right lung midzone.

nodules, and peripheral small areas of collapse were observed (Fig. 3a, b). In his occupational history, it was learned that he worked as a sapper, a miner and blasted with dynamite in the mine where lead and zinc were extracted for 30 years. In his history, it was learned that he was evaluated in the chest diseases outpatient clinic with cough and sputum complaints in 2018, and he received antituberculosis treatment after the sputum was positive for acid-fast bacillus. Endoscopic ultrasonography was performed for mediastinal lymphadenopathies in 2018, and it was reported as anthracotic lymph node fragments. Transthoracic biopsy was performed for the pneumoconiotic lesion in the upper lobe of the right lung in 2018, and it was reported as benign pathology. The patient was diagnosed with pneumoconiosis and staging and reporting was done.

DISCUSSION

The type of pneumoconiosis with the highest risk of tuberculosis is silicosis.^[9] In addition, silicosis patients are more likely to relapse latent tuberculosis infection compared to the general population. It is known that the risk of tuberculosis infection increases because silica acts as an iron source and activates dormant mycobacteria bacilli, and the combination of silica-mycobacteria infection accelerates the progression of pneumoconiosis with a synergistic effect. Therefore, screening and prophylaxis of latent tuberculosis infection in silicosis patients are of great importance for the prevention and control of tuberculosis.^[10,11] Yang et al.^[12] found a history of latent tuberculosis infection in 50.6% of silicosis patients and a history of tuberculosis in 21.0% of them in a study conducted in China. Algranti et al.^[13] found that multiple factors increase susceptibility to tuberculosis in PMF. It was thought that factors such as macrophage toxicity and long-term survival of bacillus in lung tissue due to insufficient lymphatic drainage and possible chemical effect of silica on bacillus proliferation were effective. In the study of Sari et al.,^[14] concomitant pulmonary tuberculosis was found in 22% of silicosis patients and the

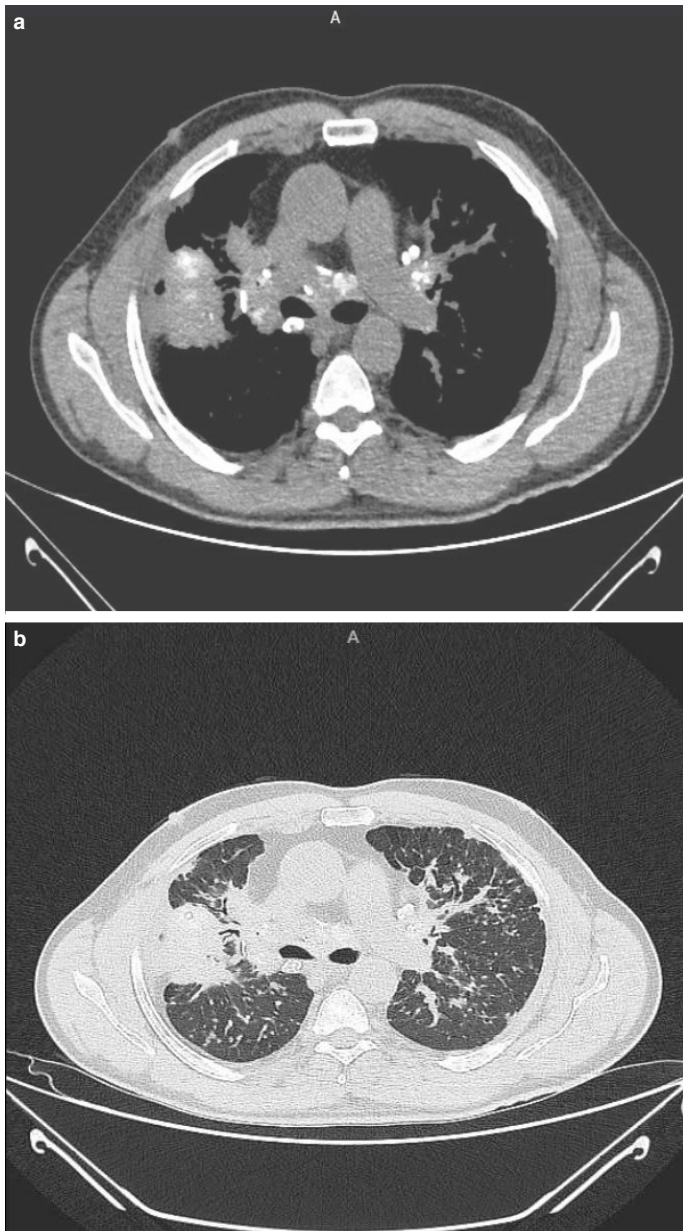


Figure 2: (a, b) On thoracic computed tomography, lymph nodes mostly containing calcification (eggshell calcification) in mediastinal and hilar areas.

importance of tuberculosis infection as a risk factor for the development of PMF was confirmed. In case of symptoms such as fever, fatigue, cough, night sweats, and weight loss in patients with silicosis, attention should be paid to tuberculosis. Our case with a diagnosis of silicosis also had a history of pulmonary tuberculosis.

PMF is a pathologically advanced form of chronic pneumoconiosis. PMF in silicosis is formed by clustering of silicotic nodules fused with connective tissue. PMF in coal worker's pneumoconiosis is a cluster of coal macules surrounded by fibrous tissue.^[15] PMF is defined as a large opacity exceeding 1 cm in diameter on standard chest radiograph in the radiological pneumoconiosis classification made by the International Labour Organization.

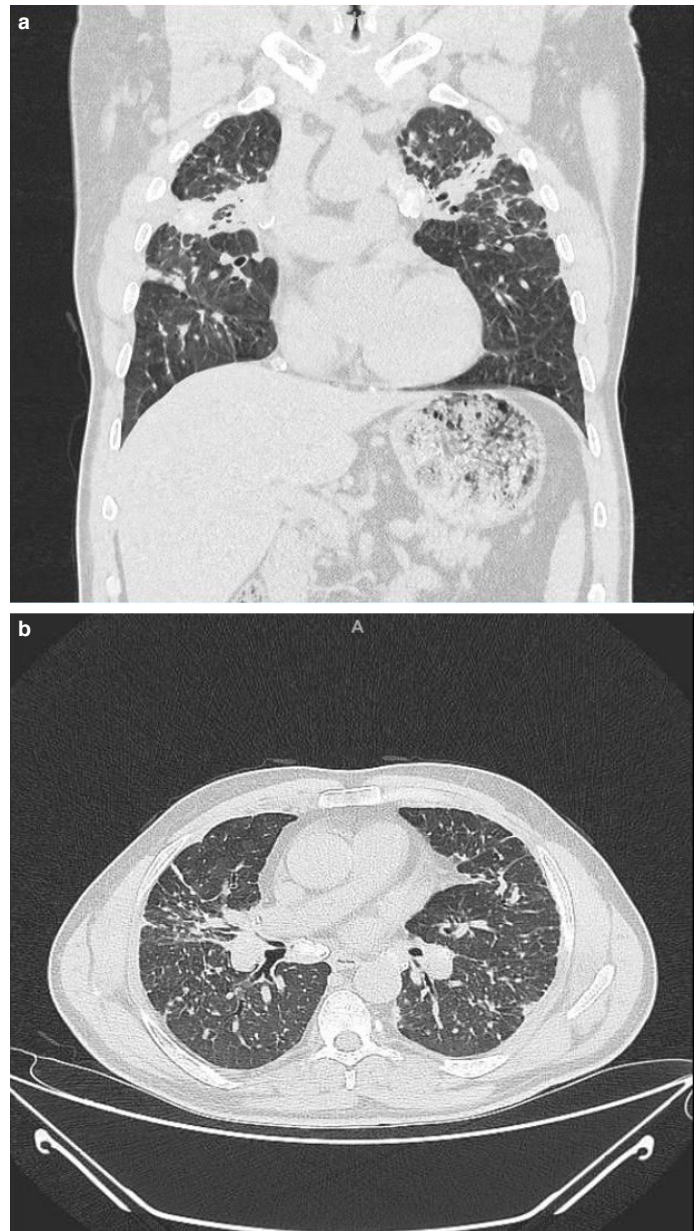


Figure 3: (a, b) On thoracic computed tomography, irregular soft-tissue densities, peribronchial thickenings, bronchiectasis, occasional interseptal thickening, and scattered calcific nodules.

PMF, Category A (one or more opacities >10 mm in diameter but <50 mm), Category B (one or more opacities >50 mm in diameter but not exceeding the upper right region), and Category C (one or more opacities) divided into three categories: More opacity in diameter exceeding the upper right region.^[16] In our patient's HRCT, lymph nodes that mostly contain calcification in the mediastinal and hilar areas, irregular soft-tissue densities with nodularity in places-consolidated appearances, scattered calcific nodules, extending from the hilus to the periphery, which are observed in the upper zones of both lungs, were observed. Our patient, who had 30 years of silica exposure, was compatible with chronic complicated pneumoconiosis when evaluated radiologically.

CONCLUSION

As a result, it should be considered that tuberculosis infection may develop simultaneously in patients with silicosis in the presence of rapid progression in existing pulmonary symptoms, especially the development of B symptoms such as fever, night sweats, weight loss, cavitory appearance on radiological imaging, consolidation, development of asymmetric nodules, and rapid progression of silicosis.

Disclosures

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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