Pulmonary Alveolar Microlithiasis: Case Report

Pulmoner Alveolar Mikrolitiazis

Sevinç SARINÇ ULAŞLI, MD,[a]
Nilgün KALAÇ,MD,[a]
Feza UĞURMAN, MD,[b]
Nilgün Özlem ALPTEKİNOĞLU,MD,[b]
Esra ÖZAYDIN, MD[c]

[a]Department of Pulmonary Diseases,
Başkent University Faculty of Medicine,
Clinics of
[b]Chest Diseases,
[c]Pathology,
Atatürk Chest Diseases and
Chest Surgery Education and
Research Hospital, Ankara

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Yazışma Adresi/*Correspondence:*
Sevinç SARINÇ ULAŞLI, MD
Başkent University Faculty of Medicine,
Department of Pulmonary Diseases, Ankara,
TÜRKİYE/TURKEY
sevincsarinc@gmail.com

ABSTRACT Pulmonary alveolar microlithiasis (PAM) is a rare disease of unknown etiology characterized by extensive intraalveolar calcium and phosphate deposition. Here, we present a case of PAM in a 26-year-old female. The patient had persistent dry cough. Clinical presentation, radiological findings and transbronchial biopsy results were consistent with PAM. Scintigraphy revealed the absence of Tc-99m methylenediphosphonate uptake of lungs. Familial occurrence was observed. Radiological findings, pulmonary functions, and clinical status of the patient have remained stable for 24 months. Tc-99m uptake may not be observed at the early stages of this disease. Our case is at the early stage of the disease with regard to clinic, radiographic and scintigraphic findings. Family screening of PAM index cases to detect the disease in early asymptomatic stage is important.

Key Words: Lung diseases; radionuclide ımaging; radiology; biopsy

ÖZET Pulmoner alveolar mikrolitiazis (PAM) her iki akciğerde yaygın intraalveolar kalsiyum ve fosfat birikmesi ile karakterize etyolojisi bilinmeyen nadir bir hastalıktır. Burada PAM tanısı konulan 26 yaşındaki bayan hastayı sunuyoruz. Hastanın inatçı kuru öksürük yakınması vardı. Klinik, radyolojik bulgular ve transbronşiyal biyopsi sonuçları PAM ile uyumluydu. Sintigrafide Tc-99m metilendifosfonat akciğerlerde tutulumu izlenmedi. Hastanın ailesinde PAM tanısı alan hastalar da vardı. Radyolojik bulguları, solunum fonksiyon testleri ve klinik durumunda 24 ay boyunca değişiklik izlenmedi. Hastalığın erken döneminde Tc-99m tutulumu izlenmeyebilir. Hastamız klinik, radyolojik ve sintigrafik bulguları göz önünde bulundurulduğunda hastalığın erken dönemindeydi. PAM indeks vakalarında aile taraması erken semptomsuz dönemde hastalığın tesbiti için önemlidir.

Anahtar Kelimeler: Akciğer hastalıkları; radyonuklit görüntüleme; radyoloji; biyopsi

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Pulmonary alveolar microlithiasis (PAM) is a rare, chronic lung disease with unknown etiology characterized by extensive intra-alveolar spherical calcium and phosphate deposition.[1] Patients with PAM have micronodular infiltration marked in the lower zones and are asymptomatic.[1,2] Uptake of Tc-99m on bone scintigraphy of the lung is regarded as a pathognomonic finding.[2,3]

This case report reviews the clinical, radiological and scintigraphic manifestations of PAM, and the lack of technetium uptake of the lung.

CASE REPORT

A 26-year-old women presented to the outpatient clinic of our hospital with a 6-week history of cough. On chest radiograph, micronodular infiltration particularly marked in bilateral lower zones of the lung was seen (Figure 1). Her physical examination findings were unremarkable. The patient was hospitalized to determine the etiology of these nodular infiltrations, and the differential diagnosis included miliary tuberculosis, sarcoidosis, metastatic calcifications and PAM was given.

Her past medical history was unremarkable. She had no history of systemic diseases or other lung diseases, tobacco use, recent travel, change in her home environment, or a new pet. Her two cousins had the diagnosis of PAM two years previously in different centers.

On admission, her white blood cell count and other biochemical test results were in normal limits. Six induced sputum samples were obtained in the consecutive early mornings. Acid-fast bacilli (AFB) smear examination and tuberculosis culture results of sputum samples were negative. High resolution computed thoracic (HRCT) scan revealed subpleural interstitial thickening, interlobular septal thickening, and diffuse micronodules in bilateral lower lobes (Figure 2). Pulmonary function tests, diffusion capacity and arterial blood gas analysis results were in normal limits.

An echocardiogram revealed normal systolic and diastolic functions and no pulmonary hypertension. AFB smear of bronchoalveolar lavage specimen was negative, and there was no growth of AFB in tuberculosis culture of bronchoalveolar lavage fluid. Results of transbronchial biopsy showed concentric lamellar microliths (Figure 3). The patient's presentation and results of the bronchoscopy were consistent with PAM. Scintigraphy revealed the absence of Tc-99m methylenediphosphonate uptake of lungs. Her two cousins had PAM diagnosis. Radiological findings, pulmonary functions, and clinical status of the patient have remained stable for 24 months. Radiological and clinical follow-up of the patient continues.

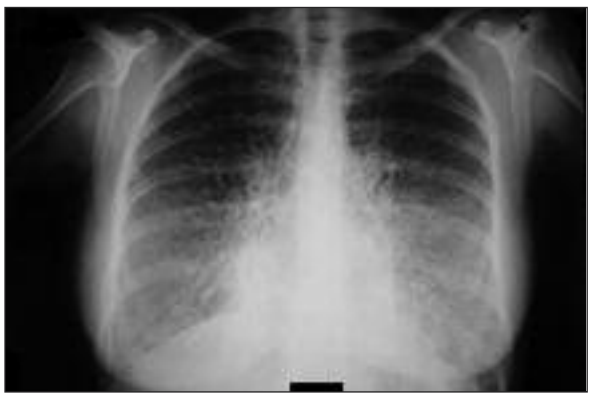

FIGURE 1: Chest X-ray: micronodular infiltration particularly marked in bilateral lower zones of the lung.

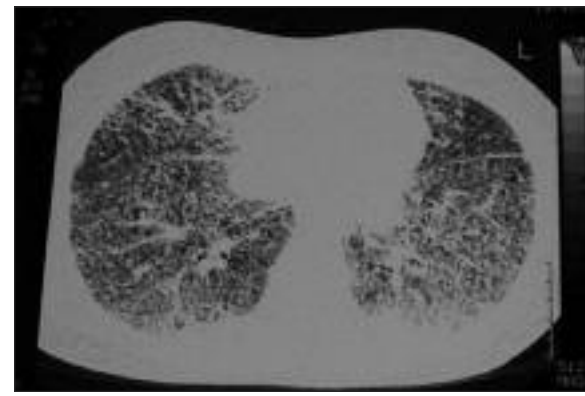

FIGURE 2: High resolution computed thoracic (HRCT) scan: subpleural interstitial thickening, interlobular septal thickening, and diffuse micronodules in bilateral lower lobes.

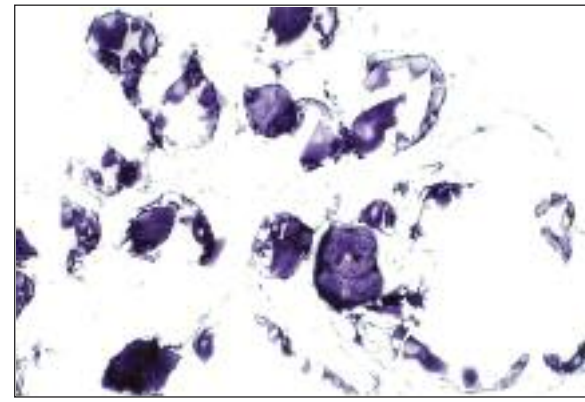

FIGURE 3: Transbronchial biopsy: concentric lamellar microliths. Hematoxylin-eosin. ×40.

DISCUSSION

PAM is a rare disorder and a significant number of the cases who have been reported up to date are from Turkey.[3,4] Studies on this autosomal disorder

continue to find the responsible gene. Corut et al. found the responsible gene for the disease as SLC34A2 (the type IIb sodium-phosphate cotransporter gene), which is involved in phosphate homeostasis in several organs and identified six homozygous exonic mutations in the seven unrelated patients with PAM.[5] Our patient had two cousins with the same disease and her parents were consanguineous, however none of them had genetic mapping. Family screening of PAM index cases by chest X-ray to detect the disease in early asymptomatic stage is important.

PAM can be asymptomatic for a long time. Thus, patients are generally diagnosed in the elder ages. As the disease progresses, patients may complain of dyspnea, non-productive cough, hemopthysis and symptoms of cor pulmonale. Cough and expectoration are uncommon, but occasionally produce diagnostic microliths.[2,3] Our patient had persistant non-productive cough and she did not expectorate any microliths. Physical signs are usually absent, as in our case. In advanced cases, crackles can be heard and finger clubbing can be seen on physical examination.[3]

Patients with PAM show sand like micronodular infiltration particulary marked in the lower zones predominantly at paracardiac areas in their chest X-rays. Pulmonary parenchyma can be examined in detail with HRCT. Almost all HRCT findings of interstitial lung diseases can be seen in PAM.[6,7] Subpleural interstitial thickening, interlobular septal thickening, and diffuse micronodules in bilateral lower lobes were observed in our case.

Pulmonary functions remain normal or only slightly impaired for a long time period. Restrictive ventilatory defect, reduced diffusion capacity and hypoxia become obvious with progressive involvement and development of fibrosis.[2] Our patient's pulmonary function tests and diffusion capacity were in normal limits and she had no hypoxemia.

Türktas et al. and Sahin et al. have reported case reports of PAM with absence of Tc-99m methylenediphosphonate uptake of lungs.[8,9] Although uptake of Tc-99m methylenediphosphonate on bone scan is pathognomonic, negative scintigraphy results can be seen at the early stages of the disease, as in our case. The intensity of uptake of Tc-99m methylenediphosphonate correlates with the amount of microliths in lungs.[9,10] At early stages of the disease, negative scintigraphy results may be due to smaller amount of microliths.

Histopathologic examination of transbronchial and/or open lung biopsy specimens is essential for the diagnosis of PAM.[1] Extracellular and intracellular concentrically layered purple-brown, round-to-oval microliths can be also seen in bronchoalveolar lavage fluid.[1,2] Our patient's diagnosis was confirmed with transbronchial biopsy.

In conclusion, our case is at the early stage of the disease with regard to clinic, radiographic and scintigraphic findings and pathogenesis of PAM. Absence of Tc-99m methylenediphosphonate uptake of lungs does not exclude the diagnosis of PAM. The diagnosis of PAM should be kept in mind even in asymptomatic patients with the absence of Tc-99m methylenediphosphonate uptake.

REFERENCES

1. Moran CA, Suster S. Unusual non-neoplastic lesions of the lung. Semin Diagn Pathol 2007;24(3):199-208.
2. Deniz O. [Pulmonary alveolar microlithiasis]. Tuberk Toraks 2005;53(3):293-8.
3. Castellana G, Lamorgese V. Pulmonary alveolar microlithiasis. World cases and review of the literature. Respiration 2003;70(5): 549-55.
4. Ucan ES, Keyf AI, Aydilek R, Yalcin Z, Sebit S, Kudu M, et al. Pulmonary alveolar microlithiasis: review of Turkish reports. Thorax 1993;48 (2):171-3.
5. Corut A, Senyigit A, Ugur SA, Altin S, Ozcelik U, Calisir H, et al. Mutations in SLC34A2 cause pulmonary alveolar microlithiasis and are possibly associated with testicular microlithiasis. Am J Hum Genet 2006;79(4):650-6.
6. Deniz O, Ors F, Tozkoparan E, Ozcan A, Gumus S, Bozlar U, et al. High resolution computed tomographic features of pulmonary alveolar microlithiasis. Eur J Radiol 2005;55(3):452-60.
7. Okumus N, Kuyucu N, Tanir G, Yoney A. [A case of pulmonary alveolar microlithiasis was misdiagnosed as miliar tuberculosis]. Turkiye Klinikleri J Pediatr 2002;11(3):148-51.
8. Turktas H, Ozturk C, Guven M, Ugur P, Erzen C. Pulmonary alveolar microlithiasis with the absence of technetium-99m MDP uptake of lungs. Clin Nucl Med 1988;13(12):883-5.
9. Sahin U, Yildiz M, Bircan HA, Akkaya A, Candir O. Absence of pulmonary uptake of Tc-99m methylenediphosphonate in alveolar microlithiasis. Ann Nucl Med 2004;18(8):695-8.
10. Chan ED, Morales DV, Welsh CH, McDermott MT, Schwarz MI. Calcium deposition with or without bone formation in the lung. Am J Respir Crit Care Med 2002;165(12):1654-69.