

Imaging Features of Metastatic Calsification; Pulmonary and Different Tissue Involvement

Metastatik Kalsifikasyonun Pulmoner ve Farklı Dokulardaki Tutulumunun Görüntüleme Bulguları

Ömer Faruk Topaloğlu, Mustafa Alper Bozkurt, Fatih Ateş, Ayşe Arı, İbrahim Altındaş, Nimet Ersöz Polat, Halil Özer

Department of Radiology, Selcuk University, Faculty of Medicine, Konya, Turkey

ABSTRACT

Metastatic calcification is the accumulation of calcium deposits in various tissues, especially in the lung, as a result of elevated serum calcium levels. Hyperparathyroidism secondary to chronic renal failure is the most common underlying cause. Although poorly defined nodular opacities can be seen on chest radiography, CT is more sensitive in demonstrating findings. Recognition of the imaging findings of the lesions is important to prevent unnecessary further interventional procedures and to plan the treatment. In this article, we aimed to present the imaging findings of metastatic calcification lesions in both lungs in a chronic renal failure patient.

Keywords: Metastatic calcification, chronic renal failure, hyperparathyroidism, computed tomography

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ÖZET

Metastatik kalsifikasyon serum kalsiyum seviyesindeki yükseklik sonucu başta akciğer olmak üzere çeşitli dokularda kalsiyum depozitlerinin birikmesidir. Kronik renal yetmezliğe sekonder hiperparatiroidizm en sık altta yatan nedendir. Akciğer radiografisinde belirsiz sınırlı nodüler opasiteler görülebilse de, BT bulguları göstermede daha duyarlıdır. Lezyonların görüntüleme bulgularının tanınması gereksiz ileri girişimsel işlemleri önlemek ve tedaviyi planlamak için önemlidir. Biz bu yazıda kronik renal yetmezlik hastasında, her iki akciğerdeki metastatik kalsifikasyon lezyonlarının görüntüleme bulgularını sunmayı amaçladık.

Anahtar Sözcükler: Metastatik kalsifikasyon, kronik renal yetmezlik, hiperparatiroidizm, bilgisayarlı tomografi

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ORCID IDs: Ö.F.T. 0000-0002-2331-1923, M.A.B. 0000-0001-5171-3295, F.A. 0000-0002-2693-4616, A.A.0000-0001-5778-115X, İ.A.0000-0002-8107-679X, N.E.P. 0000-0002-6089-5411, H.Ö. 0000-0003-1141-1094

Address for Correspondence / Yazışma Adresi: Ömer Faruk Topaloğlu, MD Department of Radiology Selçuk University Faculty of Medicine, Konya, Turkey E-mail: oft54@hotmail.com

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INTRODUCTION

The term metastatic calcification defines the accumulation of calcium deposits in parenchymal organs secondary to an increased serum calcium level. Although it is most commonly seen in secondary hyperparathyroidism due to chronic renal failure, it can also be seen in other pathologies causing hypercalcemia such as exogenous calcium therapy and massive osteolysis. The lungs are the parenchymal organ most frequently affected by metastatic calcification. Most of the patients are asymptomatic, but clinical pictures leading to pulmonary insufficiency have been reported (1, 2). The most common radiological finding is poorly defined nodular opacities in the upper lobes. These findings correspond to diffuse interstitial calcium deposition. Radiography may be negative in the early stages, computed tomography (CT) gives more accurate information in detecting and characterizing calcifications (3, 4). In this case, we aimed to present the findings of pulmonary metastatic calcification in a case of chronic renal failure with renal transplantation.

CASE REPORT

A 45-year-old man with chronic renal failure presented at our hospital with dyspnea. The patient had a 5-year history of hemodialysis. There was no significant feature in clinical examination findings. Laboratory studies revealed serum creatinine 3.18 (0.30-1.35) mg / dl, BUN 30 (7.00-25.00) mg / dl, calcium 9.85 (8.35-10.20) mg / dl, phosphorus 5.9 (2.70- 4.50) mg / dl and parathormone 270 (10-65) pg / ml. Other laboratory tests were normal. On chest radiography, patchy opacities were detected in the upper zone of the right lung (Fig. 1). On axial CT section and coronal maximum intensity projection (MIP) image, centrilobular, patchy ground-glass opacities and calcified nodules were observed in the right upper lobe apical segment and left lung upper lobe apicoposterior segment (Fig. 2). Except pulmonary involvement, calcifications in blood vessels, splenic capsule, kidneys and omentum were observed on abdominal non-contrast CT scans (Fig. 3). No other accompanying pulmonary parenchyma and mediastinal pathology was found. No signs of malignancy or inflammation were detected in the bronchoalveolar lavage sampling performed by bronchoscopy. The patient's clinical history, laboratory tests and imaging findings were evaluated together and a diagnosis of metastatic pulmonary calcification was

made. The patient then underwent renal transplantation and underwent subtotal parathyroidectomy for signs of hyperparathyroidism that did not resolve with medical therapy. After the operations, the clinical and laboratory findings of the patient improved. The routine follow-up of the patient continues.



Figure 1: On chest radiography, patchy opacities are seen in the upper zone of the right lung (arrow).

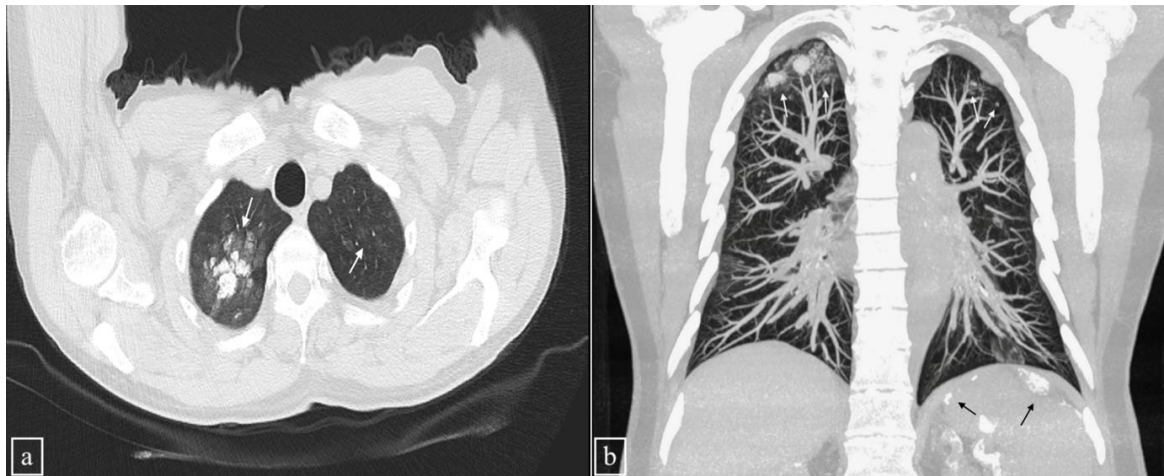


Figure 2: Axial chest CT section (a) and coronal MIP image (b) shows centrilobular, patchy ground-glass opacities and calcified nodules in both lung apices, more prominent on the right (white arrows). Splenic capsule calcifications can be seen in the image on b (black arrows).

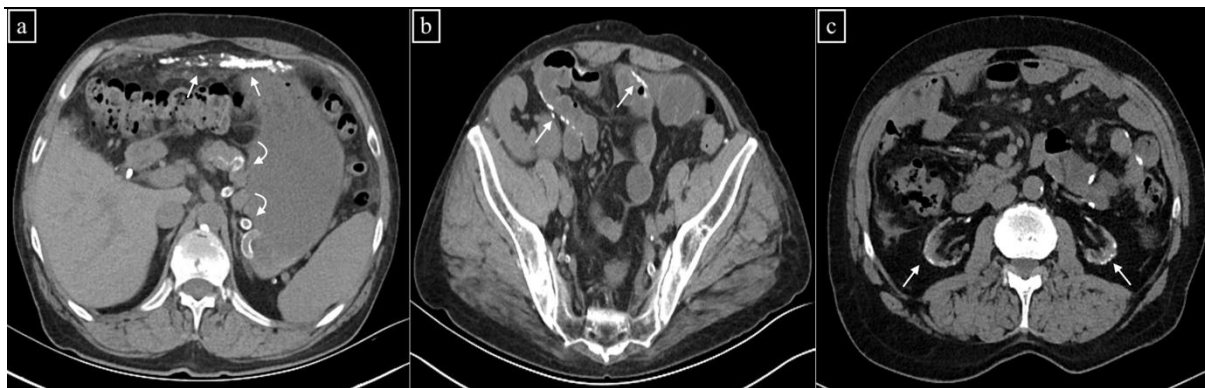


Figure 3: Non-contrast abdominal CT images show calcifications in blood vessels (curved arrows on a), omentum (arrows on a), intestinal mucosa (arrows on b) and atrophic renal parenchyma (arrows on c).

DISCUSSION

There were two types of calcification, metastatic and dystrophic. Calcification that occurs in normal tissue in the case of hypercalcemia is metastatic, calcification seen in abnormal and damaged tissues at normal serum calcium level is called dystrophic calcification(4, 5). Pulmonary involvement is the most common in metastatic calcification. Blood vessels, heart, kidneys, gastric mucosa are other frequently affected areas. The liver, spleen, intestinal tissues and peritoneal cavity are less commonly involved (6). Metastatic pulmonary calcification is a disease characterized by calcium accumulation in normal lung tissue as a result of hypercalcemia. It most commonly accompanies secondary hyperparathyroidism due to chronic renal failure. Histologically, deposition of calcium salts is observed in the lung interstitium, especially in the basement membrane of the alveolar epithelium (7). There is a high ventilation – perfusion rate in the upper lobes of the lungs, and consequently, there is a more alkaline environment. Accordingly, calcification is more common in the upper lobes. Chest radiography is not sensitive to show small amounts of calcification and may be normal or patchy bilateral opacities may be seen in the upper zones (8, 9). CT is more sensitive in characterizing parenchymal involvement and evaluating its extent, especially in detecting calcification. Different CT appearance patterns have been described in the literature. Diffuse or patchy centrilobular ground glass opacities, mostly containing calcification, are the most common. More rarely, it may mimic pneumonia by involvement in the form of lobar consolidation (7, 10). The main approach in the treatment of metastatic pulmonary calcification is to treat the underlying disease. Imaging findings of the disease may not always be specific enough to be diagnostic alone. It is necessary to evaluate the patient's clinical history together with radiological imaging. It is important for radiologists to be aware of the findings of this disease in order to avoid unnecessary interventional procedures and misdiagnosis (10). Our patient also had a diagnosis of chronic renal failure, and CT findings showed patchy ground glass opacities and accompanying calcifications in the upper lobes of both lungs and other rare abdominal region involvements.

CONCLUSION

Metastatic pulmonary calcification is a pathology that causes calcium deposition in the lung parenchyma, most commonly seen in patients with chronic renal failure. Imaging findings are valuable for the diagnosis of the disease. It is important to know the imaging features of the disease, to prevent misdiagnosis and treatment, and to avoid unnecessary invasive procedures.

Conflict of interest

No conflict of interest was declared by the authors.

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