Radiology Case Reports 17 (2022) 4700–4703

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

An unusual cause of pulmonary infiltrates mimicking pulmonary edema: metastatic calcifications ☆

Chun Hong Suen, MBBS, FRCR[a,*], *Kin Wai So, MBBS, FRCR, FHKCR, FHKAM*[b], *Anthony Wing Tsung Chin, MBChB, FRCR, FHKCR, FHKAM*[a], *Yu Wai Hon, MBBS, FRCR, FHKCR, FHKAM*[a]

[a] *Department of Radiology and organ imaging, United Christian Hospital, Hong Kong SAR, China*
[b] *Department of Radiology, Princess Margaret Hospital, Hong Kong SAR, China*

ARTICLE INFO

Article history:
Received 27 August 2022
Revised 8 September 2022
Accepted 13 September 2022

Keywords:
Metastatic calcification
Renal failure
Pulmonary edema mimic

ABSTRACT

Metastatic calcification is an uncommon condition with underlying abnormal bone and calcium metabolism, leading to ectopic deposition of calcium in soft tissues. The lung is a common site of involvement, and can mimic pulmonary edema in radiographic findings, especially in clinical context of end-stage renal failure. Recognition of such condition is important to avoid unnecessary diuretic therapy and extra dialysis sessions and guides correct treatment of underlying metabolic disorder. This article, therefore, serves to illustrate such condition with emphasis to radiological and clinical features suggestive of such condition.

Introduction

Metastatic calcification is an uncommon condition with underlying abnormal bone and calcium metabolism, leading to ectopic deposition of calcium in soft tissues. The lung is a common site of involvement and can mimic pulmonary edema in radiographic findings. Recognition of such condition is important to guide correct treatment of underlying metabolic disorder. Bone scintigraphy can offer noninvasive confirmation.

Case presentation

A 29-year-old Chinese man, with end-stage renal failure of unknown etiology on ambulatory peritoneal dialysis, presented with 1-week history of nonproductive cough, before the Covid-19 pandemic. There were no associated viral symptoms, such as runny nose or malaise. He had no chest pain, shortness of neither breath nor fever. He was a nonsmoker, who had no recent travel or contact with animals.

☆ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

* Corresponding author.
E-mail address: calixsuen@yahoo.com.hk (C.H. Suen).

https://doi.org/10.1016/j.radcr.2022.09.049

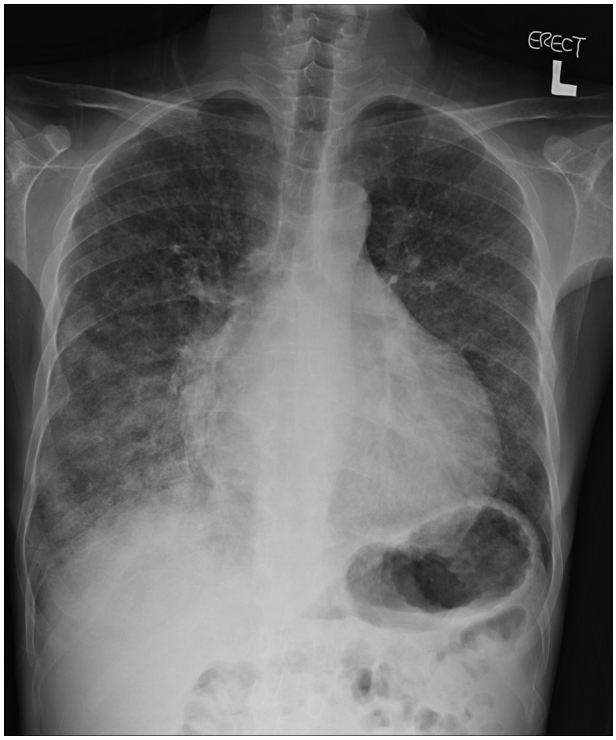

Fig. 1 – Initial chest X-ray shows bilateral ill-defined opacities with high density (ie, can be visualized through ribs).

He was afebrile on presentation. His vital signs were stable, with saturation of 98% on room air. On examination, there were no clinical features of edema. Auscultation revealed normal breath sounds without added sound.

Initial chest X-ray showed bilateral ground glass opacities and consolidations (Fig. 1). Blood tests showed normal white cell count, C-reactive protein, and elevated calcium of 2.60 mmol/L (reference: 2.10-2.55 mmol/L) and phosphate of 2.40 mmol/L (reference: 0.81-1.45 mmol/L). Nasopharyngeal aspirate for respiratory viruses was negative. The patient had no sputum available for culture.

He was treated empirically for chest infection with amoxicillin-clavulanate empirically, without improvement on serial chest radiographs. As the patient's radiographical findings might also suggest pulmonary edema, he was then treated for such with diuretics and extra sessions of hemodialysis, again without improvement on serial chest radiographs.

High-resolution computed tomography showed diffuse ground glass opacities at both lungs with lower lobe predominance (Fig. 2), with density measuring −200 to −150 Hounsfield units. Blood test for hypercalcemia workup showed elevated parathyroid hormone of 101.5 pmol/L (reference: 1.6-6.9 pmol/L).

The patient was initially planned to undergo flexible bronchoscopy with bronchoalveolar lavage to evaluate the nature of pulmonary infiltrates. In the meanwhile, the patient underwent bone scintigraphy for evaluation of hyperparathyroidism. Bone scan revealed intense tracer uptake at bilateral lungs, generalized increased uptake in the entire skeletal sys-

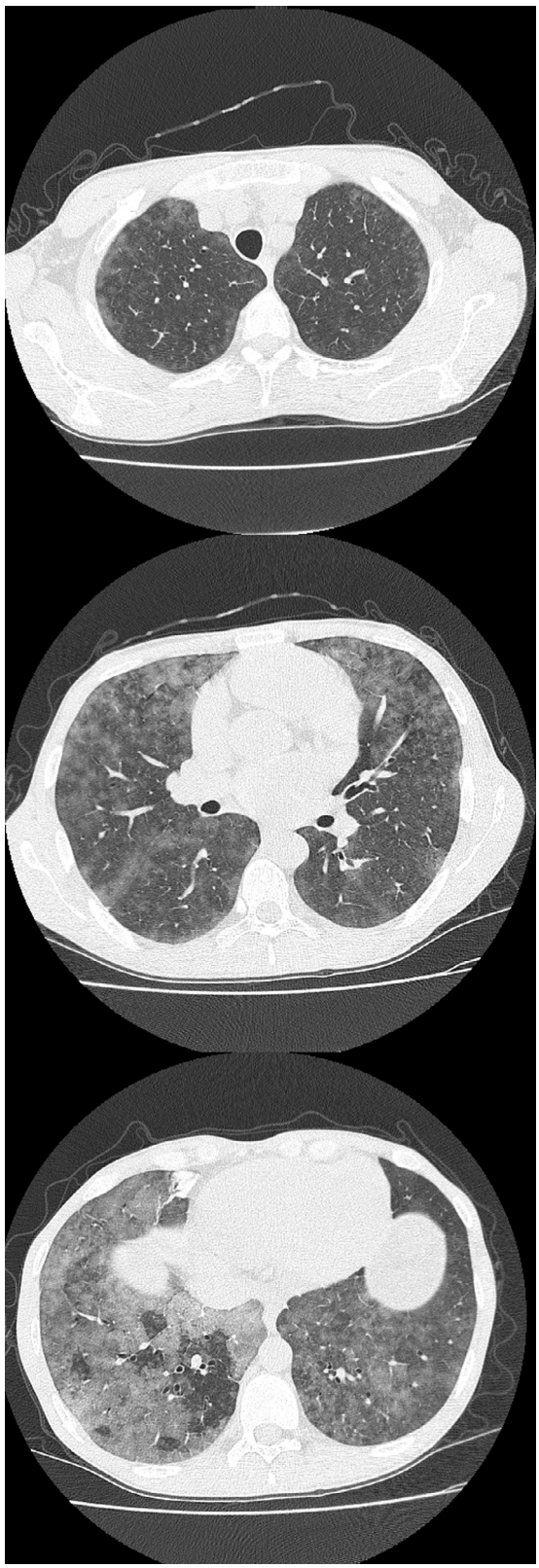

Fig. 2 – (Upper, middle, and lower) HRCT thorax shows multifocal areas of centrilobular and diffuse ground-glass opacities.

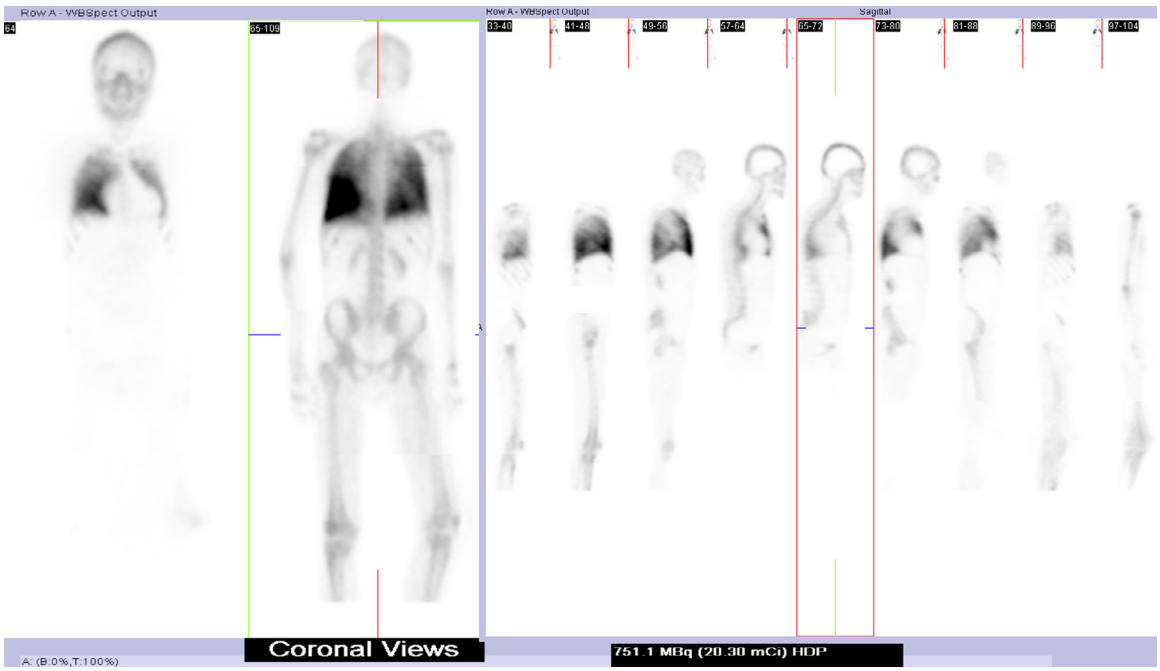

Fig. 3 – Bone scintigraphy shows intense tracer uptake at both lungs, uptake at skeleton with reduced renal activity.

tem, and reduced bilateral renal parenchymal uptake (Fig. 3). Such imaging findings are compatible with metastatic calcifications in both lungs, as well as a superscan pattern due to underlying renal osteodystrophy and end-stage renal failure. Disproportional radiological findings in relatively stable patients are also features of pulmonary metastatic calcifications.

The patient's drug record was reviewed, and the cough was likely related to recent prescription of lisinopril for blood pressure control, which was reported in up to 10% of patients on angiotensin-converting enzyme inhibitors.

Lisinopril was changed to another antihypertensive drug with subsequent resolution of cough. Repeated blood tests showed normal white cell count and inflammatory markers, and nasopharyngeal swabs remained negative. Empirical antibiotics were stopped due to lack of evidence of infection.

The treatment plan was directed towards management of renal osteodystrophy, with optimization of dialysis, and cinacalcet with good response. Calcium level was normalized while parathyroid hormone level was improved.

The patient was worked up for parathyroid hyperplasia and planned for parathyroidectomy, while a cadaveric renal graft was available 2 years after the presentation of metastatic calcification. The parathyroid hormone and bone profile were normalized 6 months after renal transplantation. The patient was able to wean off all medications for hyperparathyroidism. Chest radiograph of this patient 6 months after transplant showed resolution of pulmonary infiltrates (Fig. 4).

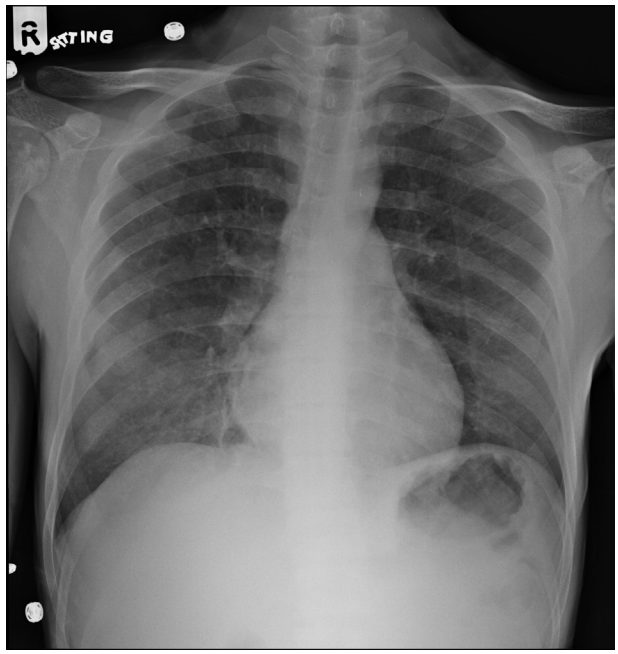

Fig. 4 – Chest X-ray after renal transplant shows resolution of lung infiltrates.

Discussion

Patients with end-stage renal failure are susceptible to catheter- or non-catheter-related infections, and infection-related mortality [1]. Atypical infections or common infections with atypical presentations are also common in patients on dialysis. Empirical treatment for infection could be reasonable even without microbiological proof, and alternative techniques such as bronchoalveolar lavage to collect respiratory secretion could be done.

Metastatic calcification is a condition of ectopic deposition of calcium in soft tissues, usually related to underlying abnormality of bone and calcium metabolism. It is reported in patients with renal osteodystrophy, lymphoma, multiple myeloma, vitamin D intoxication, parathyroid neoplasm, and milk alkaline syndrome. The lung is a common site of involvement, while involvement of joints, liver, spleen, vessels, and many other sites are also reported.

Patients are usually asymptomatic despite profound calcium deposition in tissues radiologically, though serious complication such as tissue infarction due to vessel involvement is also reported. In most cases, treatment is directed towards correction of hypercalcemia and treatment of underlying causes, rather than local therapy targeting involved tissues.

On high-resolution computed tomography, ground glass opacification is a predominant feature. Some of the ground glass opacities show relative sparing around interlobular septa (ie, centrilobular distribution), while some appear confluent. These features are typical of pulmonary metastatic calcifications, with one pictorial review of 23 cases reported centrilobular ground-glass opacities in 60.9% and diffuse ground-glass opacities in 21.7% of patients [2].

Cinacalcet, a calcium-mimic, is used to suppress parathyroid hormone secretion and was used in our case. Though the effect of long-term cinacalcet use was proven to last for at least 3 years in one study, with 52% of subjects having parathyroid hormone of less than 32 pmol/mL at 100-week [3], more effective and long-lasting treatment for secondary hyperparathyroidism in renal failure patients was parathyroidectomy [2].

Another clinical significance of pulmonary metastatic calcification is that it mimics pulmonary congestion and creates diagnostic challenge, as in our case. High-density shadows [4], nonresponsiveness to diuretics, discrepancy between radiological and clinical findings, and underlying disorder of bone and calcium metabolism are suggestive features of pulmonary metastatic calcifications. High index of suspicion in such setting can avoid unnecessary diuresis or bronchoscopic procedures. Bone scintigraphy can offer noninvasive diagnostic confirmation if in doubt [5].

Though pulmonary metastatic calcifications could be permanent in some patients, chest radiograph of this patient six months after transplant showed resolution of pulmonary infiltrates. Complete resolution of calcifications was also reported with medical treatment other than renal transplant for hypercalcemia and hyperphosphatemia, as well as intensified dialysis.

Patient consent

Consent was obtained from the patient.

REFERENCES

[1] Wang HE, Gamboa C, Warnock DG, Muntner P. Chronic kidney disease and risk of death from infection. Am J Nephrol 2011;34(4):330–6.

[2] Belém LC, Souza CA, Souza AS, Escuissato DL, Hochhegger B, Nobre LF, et al. Calcificação pulmonar metastática: Achados na tomografia computadorizada de alta resolução de 23 casos. Radiol Bras 2017;50(4):231–6.

[3] Moe SM, Cunningham J, Rgen Bommer J, Adler S, Rosansky SJ, Urena-Torres P, et al. Long-term treatment of secondary hyperparathyroidism with the calcimimetic cinacalcet HCl. Nephrol Dial Transplant 2005;20:2186–93. [Internet][cited 2022 Aug 1]Available from: https://academic.oup.com/ndt/article/20/10/2186/1934483 .

[4] Belém LC, Zanetti G, Souza AS, Hochhegger B, Guimarães MD, Nobre LF, et al. Metastatic pulmonary calcification: state-of-the-art review focused on imaging findings. Vol. 108. In: Respiratory Medicine. W.B. Saunders Ltd; 2014. p. 668–76.

[5] Venkatesh N, Polcyn RE, Norback DH. Metastatic calcification: The role of bone scanning. Radiology 1978;129(3):755–8. doi:10.1148/129.3.755.