Case Report

**Rapid Progression of Metastatic Pulmonary Calcification Diagnosed by \(^{99m}\text{Tc-MDP} \text{Scintigraphy}\)**

Department of Diagnostic Radiology, Hyogo Prefectural Amagasaki General Medical Center\(^1\)
Institute of Advanced Clinical Medicine, Kindai University\(^2\)
Department of Respiratory Medicine, Hyogo Prefectural Amagasaki General Medical Center\(^3\)

Genki Fukumoto M.D.\(^1\), Makoto Hosono M.D., Ph.D.\(^2\), Mitsunori Kanagaki M.D., Ph.D.\(^1\),
Tomoaki Otani M.D.\(^1\) and Shunkichi Ikegaki M.D.\(^3\)

**Corresponding author**

**Affiliation**

Department of Diagnostic Radiology, Hyogo Prefectural Amagasaki General Medical Center,
2-17-77, Higashinaniwa-cho, Amagasaki, Hyogo, Japan
Telephone: +81-6-6480-7000, Fax: +81-6-6480-7001,
Genki Fukumoto M.D.
E-mail: fukumoto0707@gmail.com

Category

JLD

© 2019 Genki Fukumoto

Abstract

Metastatic pulmonary calcification (MPC) is calcium deposition in normal pulmonary parenchyma due to abnormal calcium metabolism. We present a case report of rapid progression of MPC due to primary hyperparathyroidism with hypercalcemia and acute renal failure. CT demonstrated rapidly progressive high-attenuation consolidation predominately in the upper lung fields. Bone scan revealed bilateral diffuse lung uptake suggesting MPC.

Rapid progression of MPC is rare and may be misdiagnosed as air-space disease. Bone scan is useful for diagnosis of MPC, particularly when CT finding is atypical.

Key words

Metastatic pulmonary calcification, Rapid progression, \(^{99m}\text{Tc-MDP} \text{scintigraphy}, \text{Bone scan}, \text{Parathyroid adenoma}\)

Ethical comments

Written informed consent was obtained from the patient in accordance with the Code of Ethics of the World Medical Association.

All procedures performed in this retrospective study were in accordance with the ethical standards of our institutional research committee and with the principles of the 1964 Declaration of Helsinki and its later amendments our comparable ethical standards.
Conflicts of interest statement
Funding None.
Conflicts of interest None
Introduction
Metastatic pulmonary calcification (MPC) is calcium deposition in normal pulmonary parenchyma due to abnormal calcium metabolism, commonly associated with chronic renal disease, and generally progresses slowly [1]. We present a case report of rapid progression of MPC with hypercalcemia and acute renal failure.

Case Report
A 48-year-old woman was admitted to our hospital with cough and severe dyspnea. Laboratory data showed WBC 21700/μL, Alb 2.4g/dL, Ca 13.6mg/dL (normal range: 8.8-10.1), P 4.7mg/dL (normal range: 2.7-4.6), Cre 4.89mg/dL (normal range: 0.46-0.79), CRP 27.63mg/dL, and intact-PTH 3464.3pg/mL (normal range: 15.0-68.3). CT showed bilateral diffuse ground glass opacity (GGO) predominately in the upper lung fields (Figs. 1A and B), and a left inferior parathyroid tumor. She was diagnosed with hypercalcemia due to hyperparathyroidism, acute renal failure, pneumonia, septic shock, and acute respiratory distress syndrome and was treated. Four weeks later, although hypercalcemia and renal failure remained, her symptoms improved while CT demonstrated bilateral high-attenuation consolidation in the lung (Figs. 1C and D). Five weeks after admission, bone scan, performed 3 h after intravenous injection of 99mTc-MDP (740 MBq), demonstrated bilateral diffuse lung uptake, which suggested MPC (Fig. 2). Six weeks after admission, MPC progressed (Figs. 1E and F), then, the parathyroid lesion was surgically resected and pathological findings were consistent with parathyroid adenoma. Ten weeks after admission and four weeks after parathyroidectomy, hypercalcemia resolved, and MPC slightly improved (Figs. 1G and H). MPC remained until 6 and 9 months after admission (Figs. 1I, J, K, and L).

Discussion
We presented a case of rapid progression of MPC due to primary hyperparathyroidism. Patients with MPC are typically associated with secondary hyperparathyroidism and asymptomatic, and do not require intervention, but treatments have been suggested in patients with symptomatic MPC. Normalization of calcium and phosphate is attempted, and parathyroidectomy is indicated if a patient is unresponsive to medical therapy [1]. After parathyroidectomy, MPC can improve, but not completely [2]. CT findings with MPC are described often as diffuse or patchy areas of GGO, but CT rarely demonstrates consolidation [3]. Bone scan typically shows bilateral diffuse lung uptake.
Several reports describe rapidly progressive MPC [2, 4-7], but the pathogenesis is largely unknown. Respiratory infection in a patient with hypercalcemia may trigger the rapid development of MPC [2, 5].
The present case demonstrated several unusual manifestations: she had primary hyperparathyroidism due to parathyroid adenoma; CT demonstrated atypical findings in the lung; calcification progressed rapidly. However, diffuse uptake on bone scan revealed calcification not only in the consolidation, but also in the whole lung. This finding was consistent with MPC. When CT finding is atypical, bone scan is useful to differentiate MPC from air-space disease such as pneumonia. In the present case, although her symptoms improved, calcification progressed, which was also consistent with MPC.

Conclusion
Rapid progression of MPC in the lung is rare and may be misdiagnosed as air-space disease of the lung. Bone scan is useful for diagnosis of MPC, particularly when CT finding of the lung is atypical.
Fig. 1 On admission, CT showed bilateral diffuse GGO (A and B). Four weeks later, CT demonstrated bilateral high-attenuation consolidation (C and D). Six weeks after admission, MPC progressed (E and F). Four weeks after parathyroidectomy, MPC slightly improved (G and H). However, MPC remained until 6 months (I and J) and 9 months (K and L) after admission.
Fig. 2 $^{99m}$Tc-MDP scintigraphy showed bilateral diffuse lung uptake suggesting MPC. Note absent renal uptake, which might be attributable to intense lung uptake.
References


