

## Case report

# Diffuse pulmonary calcification syndrome - a case report

Monu Yadav\*, Gopinath R, Shantveer G Uppin, Sundaram C

Email: monubalbir@yahoo.co.in

### Abstract

Diffuse pulmonary calcification can be (1) metastatic, in which the calcium deposits occur in normal tissues, or (2) dystrophic, in which calcification occurs on injured lung tissue. The pathogenesis of these abnormalities is not fully understood, but hypercalcemia, hyperphosphatemia, alkalosis, and lung damage predispose to calcification and ossification. Standard digital radiography and high resolution computed tomography (HRCT) offer excellent diagnostic sensitivity in the detection of small calcifications inside the lung. We describe the case of a 35 year old male admitted with acute respiratory failure due to acute on chronic lung pathology. His blood culture and bronchial wash cultures were sterile throughout the illness. Bronchial wash culture was negative for acid fast bacilli (AFB), on Gram staining and for any fungal growth. Smears were negative for malignancy. CT scan of the chest showed multiple nodules bilaterally. As all the cultures were sterile, in view of history of unexplained fever, weight loss and unexplained finding of pulmonary nodular lesions, the patient was further investigated on the lines of vasculitic syndromes and the possibility of these syndromes was also ruled out. Postmortem biopsy revealed a diagnosis of diffuse pulmonary calcification syndrome. Diffuse pulmonary calcification is a progressive, normally asymptomatic disease but can lead to critical and fulminant respiratory failure.

**Keywords:** Calcification, diffuse, nodular, opacities, pulmonary, syndrome.

### Introduction

Diffuse pulmonary calcification is a progressive, normally asymptomatic disease but can lead to critical and fulminant respiratory failure.<sup>1,2</sup> The term calcification refers to the deposition of calcium salts in tissues, whereas ossification indicates calcium deposition in the collagen matrix or bone formation. These ectopic calcifications can involve the chest wall, pleura, lung parenchyma, hilum, mediastinum,

and pulmonary vasculature. Here, we describe a case of diffuse pulmonary calcification syndrome who presented to us in respiratory failure.

### Case description

A 35 year old male patient was admitted with complaints of breathlessness for 3 months, which was insidious in onset and had gradually progressed from Grade 3 to 4. At the time of admission patient was in severe respiratory distress with in type 2 respiratory failure [arterial oxygen tension ( $PO_2$ ) 39.7 mm Hg and pulse oximetry ( $SpO_2$ ) reading of 66.6%) and arterial carbon dioxide tension ( $PCO_2$ ) of 67 mm Hg]. He was immediately intubated and mechanical ventilatory support was initiated.

He had been symptomatic for 3 months and was currently having an acute exacerbation of this chronic illness. He also had low grade fever for the same duration, which was not associated with chills and rigors. History of loss of weight and appetite

**Monu Yadav**, MD

Assistant Professor, Department of Anesthesiology & Critical Care

**Gopinath R**, MD, DA (UK), FFARCSI

Prof and Head, Department of Anesthesiology & Critical Care

**Shantveer G Uppin**, MD

Assistant Professor, Department of Pathology

**Sundaram C**, MD

Prof and Head, Department of Pathology

Nizam's Institute of Medical Sciences, Hyderabad, India.

**How to cite this article:** Yadav M, R Gopinath, Uppin SG, C Sundaram. Diffuse pulmonary calcification syndrome - a case report. *Ind J Resp Care* 2013; 2:332-5.

was present. There was no history of reduced urine output, facial puffiness, abdominal distension, pain abdomen, jaundice, altered bowel habits or any bleeding manifestations. He was a nonsmoker, nonalcoholic and not a known case of diabetes, hypertension, tuberculosis or asthma. He gave a history of irregular treatment in a private hospital. According to the available details, he was treated on the lines of cor pulmonale with diuretics, digitalis and antibiotics. He was also prescribed steroids which he apparently took for one month and stopped by himself.

On general examination, he was conscious, coherent and afebrile. Pulse rate was 92/min, blood pressure 100/70 mm Hg and respiratory rate 32/min. On systemic examination, lung auscultation revealed bilateral coarse crepitations and rhonchi. Examination of the cardiovascular system and abdomen revealed no relevant findings. On examination of the extremities, all peripheral pulses were palpable and bilateral pedal oedema was present.

Laboratory studies revealed the following: haemoglobin 12.6 g/dL; haematocrit 37 %; total leukocyte count 13,100/mm<sup>3</sup>; differential leucocyte count – neutrophil 67%, lymphocyte 27%, monocyte 3%, eosinophil 3%; platelet count 2.5 lakhs/mm<sup>3</sup>; erythrocyte sedimentation rate 88 mm in the first hour; blood glucose 118 mg/dL; blood urea 25 mg/dL; serum creatinine 0.9 mg/dL; sodium 129 mmol/L; potassium 4.9 mmol/L; chloride 80 mmol/L; aspartate aminotransferase 40 U/L, alanine aminotransferase 12 U/L, alkaline phosphatase 189 U/L, serum bilirubin 0.5 mg/dL, total serum proteins 6.9 g/dL, serum albumin 2.9 g/dL, prothrombin time 13 sec and activated partial thromboplastin time 48 sec. A 2D echocardiogram showed a normal sized left atrium and ventricle, ejection fraction of 60%, dilated right atrium and ventricle, severe tricuspid regurgitation, severe pulmonary arterial hypertension, no right ventricular dysfunction and no pulmonary embolism, clot or vegetations. Electrocardiogram showed sinus tachycardia. Blood and urine culture were sterile throughout. Bronchial wash culture was negative for

acid-fast bacillus and Gram stain was negative. There was no fungal growth and smears were negative for malignancy. Serum aspergillus galactomannan and serum antineutrophil cytoplasmic antibody (ANCA) were positive showing perinuclear ANCA (P-ANCA) but antimyeloeroxidase (anti-MPO) antibodies and antiproteinase 3 (anti-PR3) antibodies were negative. Chest radiograph showed multiple ill-defined nodular opacities scattered throughout the lung fields bilaterally, with a few showing central necrosis (*Figure 1*). He also had bilateral pleural effusion, more on the right side than the left. Chest tomography scan showed bilateral multiple nodules suggestive of sarcoidosis. Bronchoscopy showed inflammation of tracheobronchial tree. Tracheobronchial biopsy showed mainly blood clot with few ciliated columnar cells.

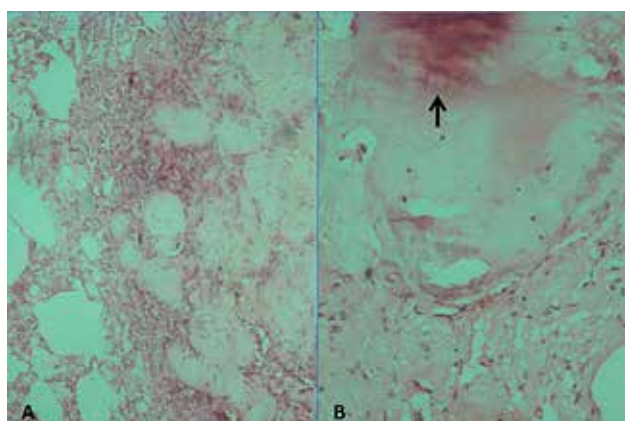


**Figure 1:** Chest radiograph showing multiple ill-defined nodular opacities scattered throughout the lung fields bilaterally, with a few showing central necrosis.

As he was in severe respiratory distress with type 2 respiratory failure, he was immediately intubated and connected to the ventilator. Along with mechanical ventilatory support, he was treated with antibiotics (carbapenems, fluoroquinolones and tricyclic glycopeptides), antifungals and other supportive measures as per requirement.

During the second week, he could be weaned on to pressure support and positive end-expiratory pressure (PEEP). However, he later developed hypercarbia and deterioration in oxygenation. He was switched on to synchronised intermittent mandatory

ventilation (SIMV) mode but did not show much improvement in his respiratory parameters. During the first two weeks of his admission, there was only little variation in his laboratory parameters. During the third week of his admission, there was a rise in his total leukocyte count to a maximum of 26,400/mm<sup>3</sup> and in the differential count, neutrophil count increased to 88%, blood urea and creatinine raised to a maximum of 142 mg/dL and 2.8 mg/dL respectively. He became febrile with temperature up to 101°F. He further deteriorated and developed severe hypotension unresponsive to inotropes. Later, he had cardiopulmonary arrest and could not be revived even with all possible resuscitation measures. Postmortem biopsy of the lung revealed a diagnosis of diffuse pulmonary calcification syndrome (*Figure 2*).



**Figure 2:** Sections show a nodular lesion with adjacent normal lung parenchyma. The nodular area shows eosinophilic acellular matrix with foci of ossification and calcification (black arrow) [H&E stain; AX100, BX200]

## Discussion

Calcium deposits in lungs may be limited or diffuse. Diffuse calcification can be (1) metastatic, in which the calcium deposits occur in normal tissues, or (2) dystrophic, in which calcification occurs on injured lung tissue. The pathogenesis of these abnormalities is not fully understood, but hypercalcaemia, hyperphosphataemia, alkalosis and lung damage predispose to calcification and ossification. Standard digital radiography and HRCT offer excellent diagnostic sensitivity in the detection of small calcifications inside the lung.<sup>3,4</sup>

Radiological findings of the chest could be indicative of various acute conditions superimposed on chronic disease process such as infections (disseminated tuberculosis, fungal or viral infections)<sup>5</sup> or hypersensitivity pneumonitis.<sup>6</sup> In view of chronic progression of disease, conditions to be considered can be interstitial lung diseases, sarcoidosis, pneumoconioses, hypersensitivity pneumonitis, Wegener's granulomatosis, bronchoalveolar carcinomatosis and metastasis.<sup>7,8</sup>

Due to negative serological tests, we ruled out diagnoses of infectious lung diseases, especially viral pneumonia and tuberculosis. In view of absence of any environmental or occupational exposure hypersensitivity pneumonitis can be ruled out. Bronchial wash smears were negative for malignant cells and so diagnosis of bronchoalveolar carcinoma was ruled out. Due to absence of any primary malignancy, possibility of secondaries was also ruled out. There was no history of intake of any medications such as nitrofurantoin, methotrexate, amiodarone and bleomycin that can cause lung inflammation and diffuse lung disease.<sup>9</sup>

As all the cultures were sterile, in view of history of unexplained fever, weight loss and unexplained finding of pulmonary nodular lesions patient was further investigated on the lines of vasculitic syndromes.<sup>10</sup> In systemic vasculitis, pulmonary involvement can be in Wegener's granulomatosis (WG), Churg Strauss syndrome (CSS) and microscopic polyangiitis (MPA). As ANCA was positive with pANCA pattern, specific antigenic reactivity of ANCA was assessed for antiproteinase – 3 (anti-PR3) and antimyeloperoxidase (anti-MPO), which came out to be negative. So possibility of WG, CSS and MPA was also ruled out.

As we could not reach any definite diagnosis, despite all the available investigations, the patient was treated symptomatically with antibiotics, ventilatory support and other supportive therapy. Ultimately, the patient deteriorated and developed severe hypotension and was started on inotropes but did not respond to any of the resuscitation measures and succumbed.

## References

1. Kuhlman FE, Ren H, Hutchins GM, Fishman EK. Fulminant pulmonary calcification complicating renal transplantation: CT demonstration. *Radiology* 1989; **173**:459-60.
2. Villalobos SR, Becerra RE, Naranjo BF, Martín Juan J. Metastatic pulmonary calcification: a rare cause of interstitial lung disease. *Arch Bronconeumol* 2003; **39**:184-6.
3. Morkos SK. Regarding metastatic pulmonary calcification in renal failure. *Br J Radiol* 2002; **75**:711-2.
4. Miyoshi I, Saito T, Kobayashi M, Taguchi H. Pulmonary calcinosis in adult T-cell leukaemia. *Br J Haematol* 2004; **126**:164.
5. Collins J. CT signs and patterns of lung disease. *Radiol Clin North Am* 2001; **39**:1115-35.
6. Patel AM, Ryu JH, Reed CE. Hypersensitivity pneumonitis: current concepts and future questions. *J Allergy Clin Immunol* 2001; **108**:661-70.
7. British Thoracic Society, Standards of Care Committee. The diagnosis, assessment and treatment of diffuse parenchymal lung disease in adults. *Thorax* 1999; **54**:S1-S28.
8. Reynolds HY. Diagnostic and management strategies for diffuse interstitial lung disease. *Chest* 1998; **113**:192-202.
9. Limper AH, Rosenow EC III. Drug-induced interstitial lung disease. *Curr Opin Pulm Med* 1996; **2**:396-404.
10. Chandrashekharan AN. Assessment and management of vasculitis. *Postgrad Medicine* 1994;8.