

Pulmonary Edema With Predilection of the Right Upper Lobe

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Abstract

Parahilar alveolar consolidation is a known radiologic pattern found in cardiogenic pulmonary edema. We present a patient with mitral insufficiency with usual clinical findings but unusual radiologic pattern. The radiographic examination showed cardiomegaly with airspace consolidation predominantly in the right upper lobe. The clinical and radiologic picture recovered after treatment with diuretics.

We conclude that localized pulmonary edema secondary to mitral insufficiency should be suspected in the presence of any type of airspace consolidation predominantly in the right upper lobe.

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Introduction

Various radiographic patterns occur in patients with pulmonary edema. Pulmonary parenchymal manifestations of mitral valve disease are the results of either pulmonary venous hypertension in mitral stenosis or abnormal regurgitant flow into pulmonary veins in mitral insufficiency. Radiographic findings of mitral insufficiency depend on the acuteness of the disease. Acute insufficiency is characterized by acute left ventricular failure with pulmonary vascular engorgement and interstitial or alveolar pulmonary edema but limited cardiac enlargement (1). Chronic mitral insufficiency is characterized by marked signs of left ventricular failure. Pulmonary edema can have an asymmetric distribution with predilection of right upper lobe (2,3). We report an unusual case with predominantly right upper lobe edema secondary to mitral insufficiency.

Case Report

A 45-year-old man with no previous history of pulmonary and cardiac disease presented with severe orthopnea, sputum production and cough of two weeks' duration. He had a history of thirty pack-year of cigarette smoking, but quit smoking ten years ago. Bilateral pretibial edema, systolic ejection murmur grade of 2/6 at the apex of the heart radiating toward the axilla and bilateral basal rales were found on physical examination. The blood pressure was 130/80 mmHg, the

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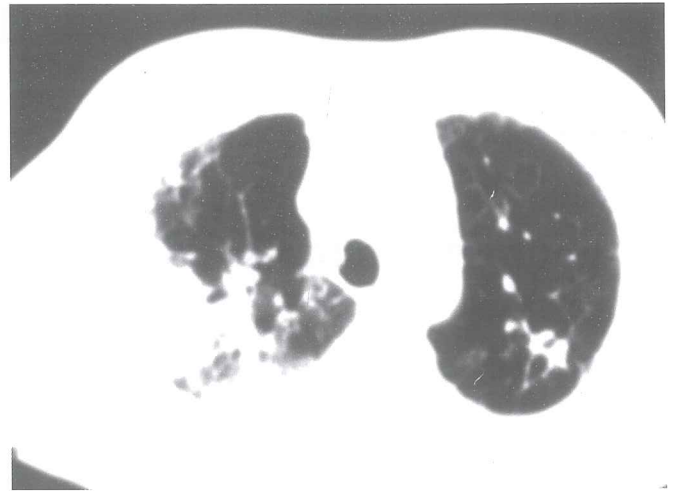
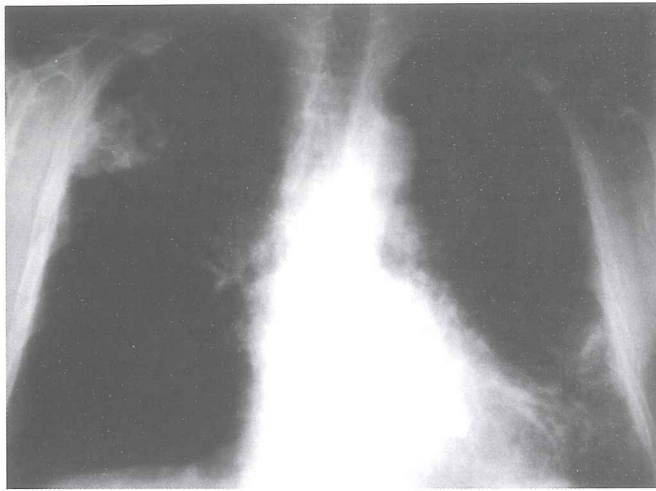


Figure 1 a, b. Chest X-ray (panel a) and CT scan (panel b) showing cardiomegaly and airspace consolidation predominantly in the right upper lobe and a small infiltrate in the left paracardiac area.

pulse was 102/minutes with regular rhythm and the body temperature was 36.4°C. While breathing room air, his arterial oxygen saturation, as measured by pulse oximetry, was 96%. Routine blood and urine analyses were normal. He had pathologic q waves at the precordial derivations on the electrocardiogram. On admission the chest X-ray revealed cardiomegaly and airspace consolidation predominantly in the right upper lobe and minimal infiltration in the left paracardiac area (Figure 1a). The thorax CT scan showed similar findings (Figure 1b).

On the echocardiographic examination, moderate mitral insufficiency with a left ventricular ejection fraction of 50% was found. He had no signs of infection. Because of presence of upper lobe infiltrates, three sputum samples were examined for *M. tuberculosis* and both the smears and cultures were negative. The patient was thought to have left heart failure and diuretic therapy was administered. With this treatment, the pretibial edema decreased immediately, the consolidated area in right upper lobe, and the minimal infiltrate in the left lung resolved almost completely. A chest X-ray obtained one week later showed total resolution (Figure 2).

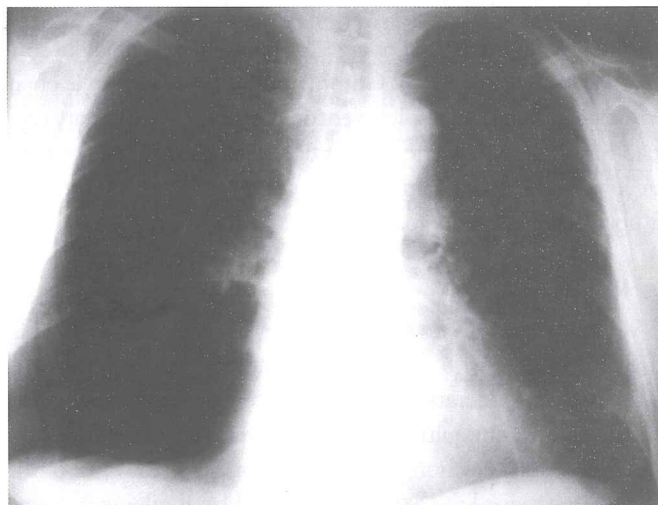


Figure 2. Control chest X-ray showing the resolution of the pulmonary edema.

Discussion

Bilateral and diffuse distribution (butterfly pattern) with predilection for the parahilar zones is a known radiologic pattern found in cardiogenic pulmonary edema secondary to left heart failure. An unusual but well-documented manifestation of acute mitral insufficiency is asymmetric right upper lobe pulmonary edema (2,4). The pathogenic mechanism that has been suggested is a regurgitation jet produced in the left ventricular systole in patients with mitral valve insufficiency, with a retrograde flow toward the left atrium. This jet is oriented especially toward the orifice of the right upper pulmonary vein. The blood flow, so directed, will increase the formation of edema by accentuating the Starling Forces. Chronic mitral insufficiency is characterized by marked left ventricular enlargement and massive left atrial dilation as well as signs of left ventricular failure (1). Schnyder et al (4) found radiographic signs of vascular congestion and edema restricted to predominantly right upper lobe in 12 of 131 patients (9%) with severe mitral regurgitation during a three-year period. Preferential flow of the regurgitant jet has been confirmed in an echocardiographic study of patients with mitral regurgitation (5). A single case report of a regurgitant jet oriented toward the origin of the right pulmonary veins has been documented by transoesophageal echocardiography in a patient with asymmetric right upper lobe edema (6). In this case, the patient had an upper lobe airspace consolidation. Although it was an atypical localization for pulmonary edema, the patient demonstrated orthopnea, systolic murmur, bilateral basal rales, pretibial edema and radiologically confirmed airspace consolidation with no signs of infection including tuberculosis. After effective diuretic treatment, clinical and radiological signs of pulmonary edema resolved immediately. This is another case demonstrating predominantly right upper lobe edema having similar findings reported in the literature (2,3).

Conclusion

In conclusion, in the presence of consolidation predominantly localized to the right upper lobe, the possibility of pulmonary edema should be considered, particularly if there are additional clinical or radiologic findings suggestive of left heart failure.

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