Localized Right Upper Lobe Edema*

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One of the lesser known atypical forms of radiographic presentation of pulmonary edema is the isolated or predominant affection of the upper right lobe in patients with mitral valve insufficiency. As a possible cause of this distribution, it has been established that the regurgitation jet during the ventricular systole may be directed selectively toward the orifice of the right upper lobe vein, locally accentuating the forces responsible for edema formation. There are few cases with these characteristics in the literature reviewed. We present an additional three cases, concluding that localized pulmonary edema secondary to mitral insufficiency should be suspected in the presence of any type of airspace consolidation in the right upper lobe, with or without associated affection of the middle lobe, in patients with a history of mitral valve insufficiency, especially when there are radiologic signs of left heart failure.

(Chest 1995; 107:274-76)

RUL=right upper lobe

Key words: heart failure, lung, fluid, mitral valve, regurgitation

It is well known that pulmonary edema can, with some frequency, have an atypical distribution (unilateral, basal, etc). Recently there have been descriptions of a predominant, or even isolated, affection of the right upper lobe (RUL) in patients with mitral valve insufficiency, resulting from the special disposition of the orifices of the pulmonary veins in the left atrium.\(^1,2\)

The objective of this work is to report three new cases of localized pulmonary edema in the RUL that we had the opportunity to study in recent months. At the same time, we present a review of the literature dealing with this subject.

**CASE REPORTS**

**CASE 1**

A 34-year-old woman with no previous clinical history of interest presented to the Emergency Service with cough, yellowish sputum, dyspnea, orthopnea, and with face and lower limb edema of 1-week's duration.

All the microbiologic tests were negative; the chest radiograph showed a moderate cardiomegaly as well as a pulmonary infiltrate with alveolar characteristics in the RUL, a slight pleural effusion on the same side, and septal lines (Fig 1, top).

On suspicion of atypical pulmonary edema caused by mitral valve insufficiency, echocardiography was performed, confirming the presence of moderate mitral valve regurgitation and left ventricular overload. With diuretic treatment, the clinical parameters returned to normal and the radiologic pattern improved visibly in slightly more than 48 h (Fig 1, bottom).

![Image of chest radiographs](http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21706/)
CASE 2

A 65-year-old woman with a history of insulin-dependent diabetes mellitus, arterial hypertension, and mitral insufficiency consulted the Emergency Service with complaints of dyspnea, chest pain, and cough with a pinkish, nonhemoptoic sputum without fever.

The physical examination revealed bilateral rales and atrial fibrillation. Blood laboratory tests showed hyperglycemia as the only pathologic finding.

A chest radiograph taken at the time of hospital admission showed cardiomegaly and airspace disease in the RUL and in the middle lobe (Fig 2).

A slight to moderate mitral valve insufficiency without stenosis and moderate dilation of the left atrium was documented by echocardiogram.

The clinical-radiologic picture was normalized after treatment with diuretics.

CASE 3

A 57-year-old woman with a diagnosis (at 8 years of age) of acute polyarticular rheumatism and mitral valve insufficiency consulted the Emergency Service as a result of an increase in her customary dyspnea with orthopnea.

Atrial fibrillation, diastolic mitral murmur, and bilateral basal rales were observed on physical examination. No alterations were found in the routine blood laboratory tests.

The radiographic examination showed cardiomegaly, with enlargement predominantly in the left atrium, as well as airspace consolidation in the RUL and middle lobe (Fig 3).

Cardiac ultrasound examination showed the presence of severe mitral valve stenosis with moderate insufficiency.

As in the preceding cases, the administration of diuretics brought about complete normalization of the chest radiographic findings.

DISCUSSION

Alveolar or mixed pulmonary involvement, with a bilateral, diffuse distribution with predilection for the parahilar zones ("butterfly shadows") is a known radiologic pattern found in cardiogenic pulmonary edema secondary to left heart failure. In certain situations, however, the lung may be affected in a less homogeneous fashion. This type of "atypical" radiologic presentation has been amply described in the literature3-5 in relation to various causes: (1) gravitational effect (prolonged lateral decubitus); (2) alterations in lung perfusion (pulmonary thromboembolism, chronic obstructive pulmonary disease, Swyer-James syndrome); (3) alterations in pulmonary venous drainage (unilateral veno-occlusive disease, atrial myxoma); (4) alterations in intrapleural pressure (abrupt pneumothorax re-expansion); and (5) alterations in pulmonary ventilation (bronchial obstruction), etc.

There have been few reports of pulmonary edema selectively located in the RUL.1,6,7 Recently, however, Schnyder et al2 found radiographic signs of vascular congestion and edema restricted to or predominantly in the RUL in 12 of 131 patients (9 percent) with severe mitral regurgitation during a 3-year period, raising the possibility that RUL pulmonary edema could be more frequent than previously thought.

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.1,2,8

The associated affection of the middle lobe with the RUL does not rule out the diagnosis of localized edema since the middle lobar vein frequently empties in the left atrium in a joint venous confluent, together with the right upper lobar vein. In fact, two of our patients presented with affection of both pulmonary lobes.

If ultrasound examination is performed once the acute episode of heart failure has passed, this may give normal results and fail to show mitral regurgitation in those patients in whom the valvular insufficiency is due to transitory reversible causes.

In our opinion, there are certain signs and symptoms
Impairment in Gas Exchange After Granulocyte Colony Stimulating Factor (G-CSF) in a Patient With the Adult Respiratory Distress Syndrome*

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We describe the previously unreported finding of reproducible arterial desaturation after successive injections of granulocyte colony stimulating factor in a orthotopic liver transplant recipient with the adult respiratory distress syndrome and antibiotic-induced neutropenia.

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ANC=absolute neutrophil count; ARDS=adult respiratory distress syndrome; Fio₂=fractional inspired oxygen content; G-CSF=granulocyte colony stimulating factor; GM-CSF=granulocyte-macrophage colony stimulating factor; OLT=orthotopic liver transplant.

Colony stimulating factors, namely granulocyte colony stimulating factor (G-CSF) and granulocyte-macrophage colony stimulating factor (GM-CSF), are used in a variety of clinical settings where absolute neutropenia complicates otherwise standard chemotherapeutic regimens, and in primary diseases of the bone marrow (ie, myelodysplasia).1-3 Their use is less well described in antibiotic-induced neutropenia, a finding often seen in critically ill patients. Besides inducing neutrophil proliferation, both G-CSF and GM-CSF stimulate neutrophil activation.4,5 The development of adult respiratory distress syndrome (ARDS) in patients treated with GM-CSF has been reported.6 To our knowledge, this is the first report of a deterioration in pulmonary function due to G-CSF administration in a neutropenic patient with ARDS.

CASE REPORT

A 28-year-old woman with necrotizing hepatitis B infection, cirrhosis, and renal failure requiring hemodialysis, underwent orthotopic liver transplant (OLT). Immunosuppressive therapy with steroids and cyclosporine was instituted. The postoperative course was complicated by anorexia for upper gastrointestinal bleeding (postoperative day [POD] 6), peritonitis with Enterococcus faecium and Candida albicans (POD 13), and an anastomotic biliary leak repaired with exteriorization of the common bile duct (POD 21). Ampicillin-sulbactam, gentamicin, and amphotericin B were used to treat peritonitis. On the 27th day post-OLT, the patient developed fever and respiratory distress. An alternative antibiotic regimen of imipenem-cilastatin and vancomycin was used successfully to treat a lebar pneumonia. A liver biopsy specimen demonstrated no evidence of rejection. Seven weeks after liver transplantation, a choledochojunostomy was performed for reinsertion of the common bile duct. Two days

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REFERENCES


4 Calenoff L, Kruglik GD, Woodruff A. Unilateral pulmonary edema. Radiology 1978; 126:19-24

5 Milne ENC, Pistolesi M, Miniati M, Giuntini C. The radiological distinction of cardiogenic and noncardiogenic edema. AJR 1985; 144:879-94

6 Bahrs P, Oliver GC, Rockoff SD, Parker BM. Localized unilateral pulmonary edema: an unusual presentation of left heart failure. Chest 1971; 60:277-50


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which may help with the differential radiologic diagnosis of this entity with respect to other processes with an identical presentation:

1. Patients with mitral valve insufficiency and pulmonary edema localized in the RUL usually present with clinical symptoms of left heart failure. All our patients reported dyspnea and cough.

2. In the presence of a personal history of mitral valve prolapse, atypical localized pulmonary edema in the RUL should be considered as the first possibility and ultrasound examination should be performed routinely.

3. If there is no additional infection, fever or other infectious signs are absent. In fact, none of our patients presented with an increase in body temperature.

4. Since this entity is just another, although atypical form of left heart failure, the observation of an increase in the cardiac silhouette on radiograph, and especially left atrial enlargement, is not uncommon. All our patients presented with cardiomegaly.

5. For this reason, one expects to find radiologic signs associated with postcapillary pulmonary hypertension (inverted blood flow distribution, pulmonary vascular blurring, central peribronchial cuffing, septal lines, pleural effusion, etc). All of our cases were accompanied by at least one of these additional radiologic findings.

6. In some cases, the special distribution of the edema fluid, in a central disposition, unlike that which one would expect to find in an infectious process, may provide additional diagnostic information.

CONCLUSION

We believe that, in the presence of any process of consolidation of the pulmonary airspace, selectively or predominantly localized in the RUL, with or without associated involvement of the middle lobe, the possibility of localized pulmonary edema secondary to mitral valve insufficiency should be considered, particularly if there are additional clinical or radiologic data of left heart failure.

REFERENCES


4 Calenoff L, Kruglik GD, Woodruff A. Unilateral pulmonary edema. Radiology 1978; 126:19-24

5 Milne ENC, Pistolesi M, Miniati M, Giuntini C. The radiological distinction of cardiogenic and noncardiogenic edema. AJR 1985; 144:879-94

6 Bahrs P, Oliver GC, Rockoff SD, Parker BM. Localized unilateral pulmonary edema: an unusual presentation of left heart failure. Chest 1971; 60:277-50
