

CASE REPORT

A Rare Cause of Crazy-Paving and Mediastinal Lymphadenopathy: Congestive Heart Failure

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ABSTRACT

Crazy-paving sign is a pattern seen on multislice computed tomography images of the lungs. It is characterized by a reticular pattern superimposed on ground-glass opacity. It was first described in the late 1980s in patients with pulmonary alveolar proteinosis, but has now been described in some other diseases of the lung. Enlarged mediastinal lymph nodes can be seen in infectious and specific inflammatory diseases and malignancies. The present report describes a case of a 44-year-old man in whom congestive heart failure presented with a crazy-paving appearance and enlarged lymph nodes of the lungs on the chest computed tomography scan.

Key words: Congestive heart failure, crazy-paving sign, mediastinal lymphadenopathy

INTRODUCTION

Crazy-paving pattern is a nonspecific radiologic sign on computed tomography of the lungs. This pattern consists of scattered or diffuse ground-glass attenuation with superimposed interlobular septal thickening and intralobular lines. The classic radiographic finding of the crazy-paving pattern is bilateral, symmetric alveolar consolidation or ground-glass appearance. It has been

reported rarely in congestive heart failure. We report a case of a 44-year-old man in whom congestive heart failure presented with a crazy-paving appearance and enlarged lymph nodes of the lungs.

CASE REPORT

A 44-year-old man presented to our department with a 1-month history of dyspnea and cough. There was no history of sputum, fever, loss of weight, and chest pain. He had smoked one pack cigarettes a day for 35 years. He had had mitral valve replacement 10-years ago and pericardiectomy 5-years ago. His current medications included diltiazem, warfarin, and digoxin.

On physical examination, he appeared cyanotic. Blood pressure was 100/70 mmHg, heart rate was 116 beats/min, body temperature was 36.7°C. His arterial

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oxygen saturation on room air was 84%. Auscultation of the chest revealed inspiratory crackles bilaterally. His abdominal examination was unremarkable. There was obvious (+2) pitting edema on pretibial region. Laboratory findings revealed were normal except Na: 121 mmol/L, K: 4.8 mmol/L, aspartate aminotransferase (AST): 204 U/L, alanine aminotransferase (ALT): 203 U/L, lactate dehydrogenase (LDH): 808 U/L.

The plain chest radiograph demonstrated diffuse opacities affecting both lungs. Thorax computed tomography (CT) scans revealed multiple mediastinal lymphadenopathies up to 22 mm [Figure 1]. In both upper lobes; there were diffuse, multifocal, patchy, ground-glass opacities resulting in a crazy-paving appearance [Figure 2].

There was no pathological finding of 18-fluorodeoxyglucose (18-FDG) uptake on positron emission tomography (PET) scan.

There were biatrial dilatation, prosthetic mitral valve, and second-degree tricuspid insufficiency on his echocardiography. Pulmonary artery pressure was 45-50 mmHg, ejection fraction of the left ventricle was 60%, and so confirmed diastolic dysfunction.

The patient underwent endobronchial ultrasound (EBUS) with bronchoalveolar lavage and lymph node transbronchial fine needle aspiration biopsies (TBNA) were performed to mediastinal lymph nodes bigger than 2 cm [Figure 3]. The lavage fluid was evaluated for routine cytology, gram stain and bacterial culture, acid fast stain and mycobacterial culture; all tests were negative. The cytology of bronchoalveolar lavage showed inflammatory features. Periodic acid Schiff (PAS) stain was performed for differential diagnosis of pulmonary alveolar proteinosis, but did not stain. The lymphadenopathy biopsies demonstrated no pathological changes. There were blood cells, bronchus epithelium cells, and lymphocytes.

The patient was treated with intravenous furosemide and he improved rapidly. The largest lymphadenopathy size decreased to 9 mm and the ground-glass opacities disappeared on CT scan obtained 1 month after the diagnosis [Figure 4].

DISCUSSION

Left-sided congestive heart failure is a very common clinical situation. Although, pulmonary edema or pleural effusion are the most common radiologic and clinical findings, crazy-paving pattern and lymph node enlargement in congestive heart failure remain unrecognized in daily



Figure 1: 44-year-old man with dyspnea and cough diagnosed as having congestive heart failure. Thorax computed tomography scans reveals multiple mediastinal lymphadenopathies up to 22 mm (arrow).

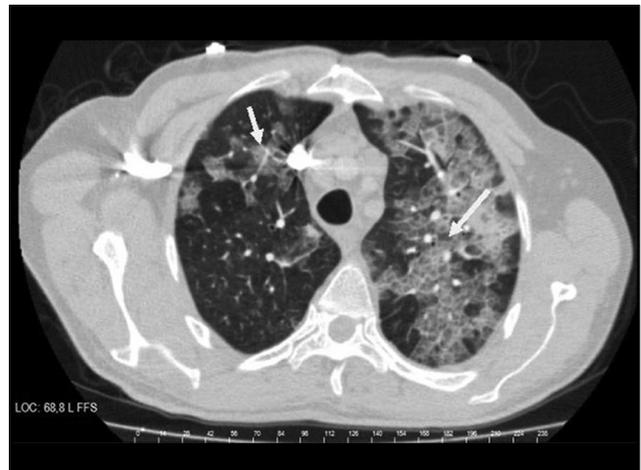


Figure 2: 44-year-old man with dyspnea and cough diagnosed as having congestive heart failure. CT of the thorax shows diffuse, multifocal, patchy, ground-glass opacities (arrow).



Figure 3: 44-year-old man with dyspnea and cough diagnosed as having congestive heart failure. Endobronchial ultrasound reveals enlarged right paratracheal lymph node (arrow).

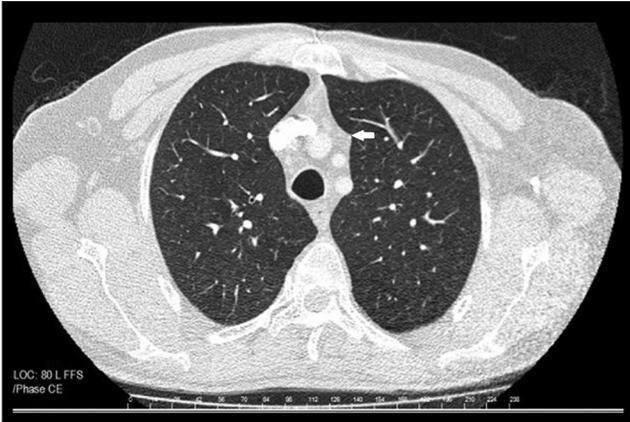


Figure 4: 44-year-old man with dyspnea and cough diagnosed as having congestive heart failure after treatment with furosemide. Computed tomography of the thorax shows both lymphadenopathies had decreased and the ground glass opacities had disappeared (arrow).

practice and have been little studied.^[1] However, at least 50% of patients with congestive heart failure are likely to develop enlarged mediastinal lymph nodes without evidence of an infectious, tumor-related, or specific inflammatory cause.^[2]

Crazy-paving pattern is a nonspecific radiologic sign on CT of the lungs. This pattern consists of scattered or diffuse ground-glass attenuation with superimposed interlobular septal thickening and intralobular lines. It was initially described in cases of pulmonary alveolar proteinosis (PAP). In alveolar proteinosis, the ground-glass attenuation reflects the low density intra-alveolar material (glycoprotein), whereas the superimposed reticular attenuation is due to infiltration of the interstitium by inflammatory cells.^[3] Pulmonary alveolar proteinosis manifests as filling of the alveoli by a proteinaceous material that is positive at PAS staining and rich in lipid, in association with an inflammatory response in the adjacent interstitium.^[4] The classic radiographic finding is bilateral, symmetric alveolar consolidation or ground-glass appearance. It may also be seen in patients with a variety of other diseases. The differential diagnosis of crazy-paving sign includes *Pneumocystis jirovecii* (carinii) pneumonia, mucinous bronchioloalveolar carcinoma, sarcoidosis, lipid pneumonia, adult respiratory distress syndrome, pulmonary hemorrhage syndromes, usual interstitial pneumonia, pulmonary hemorrhage, acute radiation pneumonitis, drug-induced pneumonitis, and cardiogenic edema. Among them, *P. jirovecii* pneumonia is the most common one.^[5,6] It has been reported rarely in congestive heart failure. Histologically, three processes lead to the crazy-paving pattern: An alveolar filling process, interstitial fibrosis, and a combination of these.^[7]

On multislice CT, the most common manifestation of cardiogenic pulmonary edema is ground-glass opacity. CT also may show thickening of the interlobular septa. The ground-glass opacity associated with hydrostatic edema often will have a central, perihilar distribution, and be associated with enlarged pulmonary vessels and an enlarged heart.

The mechanisms underlying the pathogenesis of lymphadenopathy in cardiogenic pulmonary edema are unclear. Lymphadenopathy in such cases is the expression of diffuse intrathoracic edema affecting the pulmonary parenchyma and neighboring structures, including the mediastinum and associated lymph nodes.^[8] Ngom et al., reported benign lymphadenopathies caused by congestive heart failure which short-axis diameter was between 10 and 17 mm.^[2] In our case, there were diffuse lymphadenopathies up to 22 mm in aortopulmonary window and subcarina and they disappeared after furosemide treatment.

Although congestive heart failure and cardiogenic pulmonary edema are common situations, they have been reported as a cause for crazy-paving appearance in only four cases previously.^[7] Crazy-paving appearance in congestive heart failure was thought to be an uncommon radiological finding by clinicians and radiologists. We think this finding is reported in very few cases because most congestive heart failure patients do not undergo chest CT scan before treatment. Although, crazy-paving is a nonspecific finding and it may be seen in various other diseases, and in combination with other radiological findings, history, and clinical presentation can often lead to appropriate diagnosis.

CONCLUSION

In chest CT scans that show crazy-paving appearance of lungs with mediastinal lymphadenopathies in patients with heart problems, heart failure should be considered in differential diagnosis. Invasive diagnostic procedures can be applied if lymphadenopathies and crazy-paving appearance do not improve after the treatment of heart failure.

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REFERENCES

1. Maimon N, Heimer D. The crazy-paving pattern on computed tomography. *CMAJ* 2010;182:1545.

2. Ngom A, Dumont P, Diot P, Lemarié E. Benign mediastinal lymphadenopathy in congestive heart failure. *Chest* 2001;119:653-6.
3. Rossi SE, Erasmus JJ, Volpacchio M, Franquet T, Castiglioni T, McAdams HP. "Crazy-paving" pattern at thin-section CT of the lungs: Radiologic-pathologic overview. *Radiographics* 2003;23:1509-19.
4. Wang BM, Stern EJ, Schmidt RA, Pierson DJ. Diagnosing pulmonary alveolar roteinos. A review and an update. *Chest* 1997;111:460-6.
5. Lee CH. The crazy-paving sign. *Radiology* 2007;243:905-6.
6. Algin O, Gökalp G, Topal U. Signs in chest imaging. *Diagn Interv Radiol* 2011;17:18-29.
7. Maimon N, Paul N, Downey GP. Progressive dyspnea associated with a crazy-paving appearance on a chest computed tomography scan. *Can Respir J* 2006;13:269-71.
8. Chabbert V, Canevet G, Baixas C, Galinier M, Deken V, Duhamel A, et al. Mediastinal lymphadenopathy in congestive heart failure: A sequential CT evaluation with clinical and echocardiographic correlations. *Eur Radiol* 2004;14:881-9.

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