



Case Report

Volume 6 Issue 2 – October 2017  
DOI: 10.19080/OAJS.2017.06.555683

Open Access J Surg

Copyright © All rights are reserved by Sushila Ladumor B

# Case Report: Uncommon cause of “Crazy-Paving” on X-ray Chest



Sushila Ladumor<sup>1\*</sup> and Adham Darweesh<sup>2</sup>

<sup>1</sup>Consultant Radiologist, Clinical Imaging Department, Hamad Medical Corporation, HGH, Doha, Qatar, Assistant Professor in Clinical Radiology, Weil Cornell Medical College, Qatar (WCMC-Q)

<sup>2</sup>Senior Consultant Radiologist, Clinical Imaging Department, Hamad Medical Corporation, HGH, Doha, Qatar, Assistant Professor in Clinical Radiology, Weil Cornell Medical College, Qatar (WCMC-Q)

**Submission:** September 23, 2017; **Published:** October 02, 2017

**\*Corresponding author:** Sushila Ladumor B, Consultant Radiologist, Clinical Imaging Department, Hamad Medical Corporation, HGH, Doha, Qatar, Assistant Professor in Clinical Radiology, Weil Cornell Medical College, Doha, Qatar (WCMC-Q), Email: drsbladumor@yahoo.com

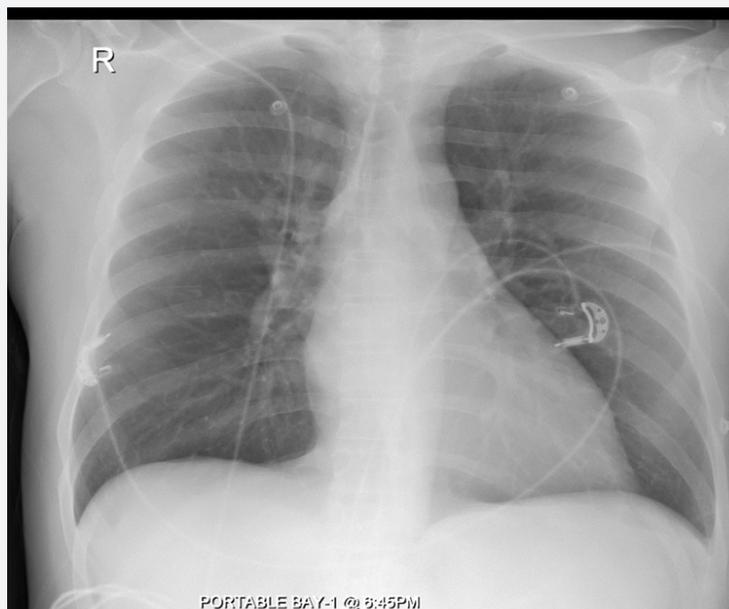
## Abstract

The “crazy-paving” pattern at thin-section computed tomography (CT) of the lungs is characterized by scattered or diffuse ground-glass attenuation with superimposed interlobular septal thickening and intralobular lines. Initially described in cases of alveolar proteinosis, this pattern has subsequently been reported in a number of conditions like infectious, neoplastic, idiopathic, inhalational, and many other disorders of the lung [1], so now considered to be nonspecific. The present report describes a case of a 42-year-old gentle man with known case of Diabetes mellitus, Coronary Artery disease, Hypertension, history of smoking and Congestive Heart Failure presented with a crazy-paving appearance of the lungs on a chest X-ray and Chest computed tomography scan. This unusual association highlights the importance of the correlation of clinical history and radiographic information.

**Keywords:** Computed tomography; Congestive heart failure; Crazy-paving appearance; Pulmonary alveolar proteinosis; Pneumocystis carini Pneumonia; Nonspecific interstitial pneumonia and fibrosis; Adult respiratory distress syndrome (ARDS).

## Clinical History

### First Presentation in Institute



**Figure 1:** X-ray chest portable sitting projection reveal upper lobe diversion and Karley B line, representing early pulmonary edema. Heart size does not appear enlarged. Patient treated and sent home with regular medicine.

42 year gentlemen admitted with severe shortness of breath dyspnea and cough. Patient admitted due to his known case of Diabetes mellitus, Coronary Artery disease, Hypertension and Congestive Heart Failure (Figure 1).

**Echocardiography**

Patient had Echocardiography with Conclusion:

Technically difficult study

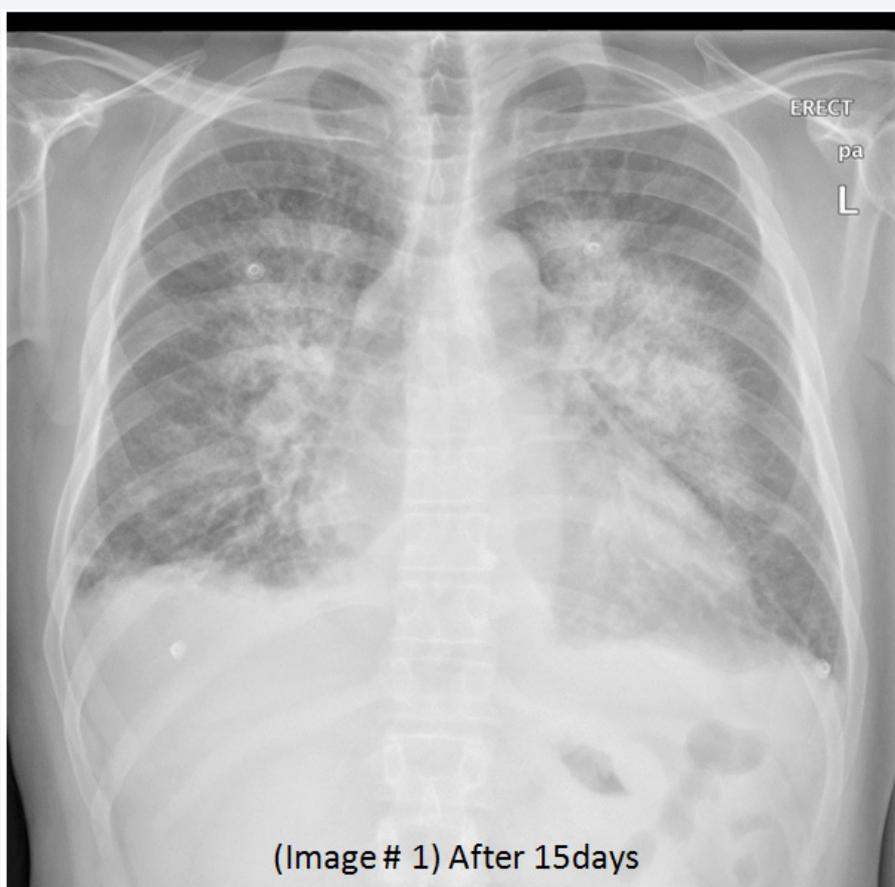
- a) Mildly dilated left ventricle.
- b) Moderately reduced systolic Left Ventricular function (EF 39 %).

- c) Moderate global Hypokinesis of Left Ventricular.
- d) Moderate mitral valve regurgitation is present.

Patient again came back again and admitted with severe shortness of breath dyspnea and cough with high inflammatory markers, given 80 mg IV Lasix stat & IV antibiotics, nebulized salbutamol and ipratropium nebs, Dyspnea improved and patient discharged on fourth day with regular medication and

antibiotics. Patient has a 30 year 1-2 pack per day smoking history but he didn't smoke for the last 20 days but exposed to cigarettes smoke with his friends for last 3 days before his condition worsened.

**X-Rays and CT during his Hospital stay: (Figure 2A-2E)**



**Figure 2A:** X-ray chest frontal projection: Bilateral perihilar airspace disease, upper lobe diversion, Karley B line, minimal right pleural effusion and bilateral basal atelectasis. Findings are in favor of pulmonary edema. Superimposed infection cannot be excluded.

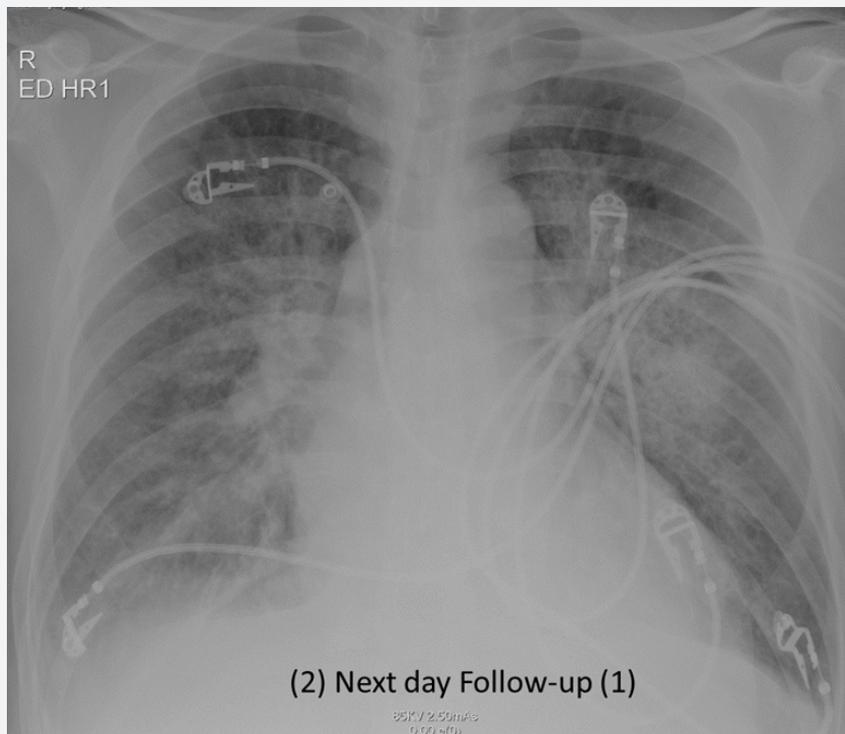
Pleural effusion (RT>LT) multiple small mediastinal lymph nodes (arrow in image a & b), likely reactive. Bilateral perihilar airspace diffuse air space opacity and ground-glass attenuation with superimposed interlobular septal thickening and intralobular lines (LT> RT). Common differential of Crazy paving given as well as diagnosis of pulmonary edema (uncommon cause of crazy paving) given in view of history of CHF and improvement by treatment. Superimposed infection is likely in view of high inflammatory markers (Figures 3A & 3B).

**Discussion**

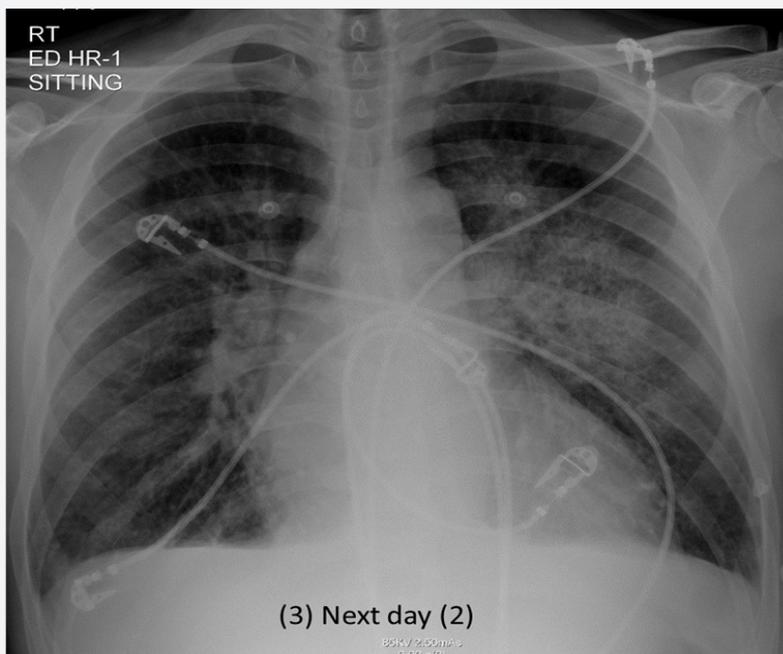
A 'crazy-paving' appearance of the lungs on a high-resolution computed tomography (CT) scan of the chest, defined as scattered or diffuse ground-glass attenuation superimposed on a network of interlobular septal thickening and intralobular lines, was first described in association with pulmonary alveolar proteinosis nearly 20 years ago [2,3]. Initially, this radiographic pattern was thought to be specific for alveolar proteinosis, but has subsequently been reported in a variety of interstitial

and airspace pulmonary disorders [3]. In the present report, we describe a man who presented with progressive exertional dyspnea in association with a high-resolution chest CT scan that demonstrated a typical crazy-paving appearance. Subsequent

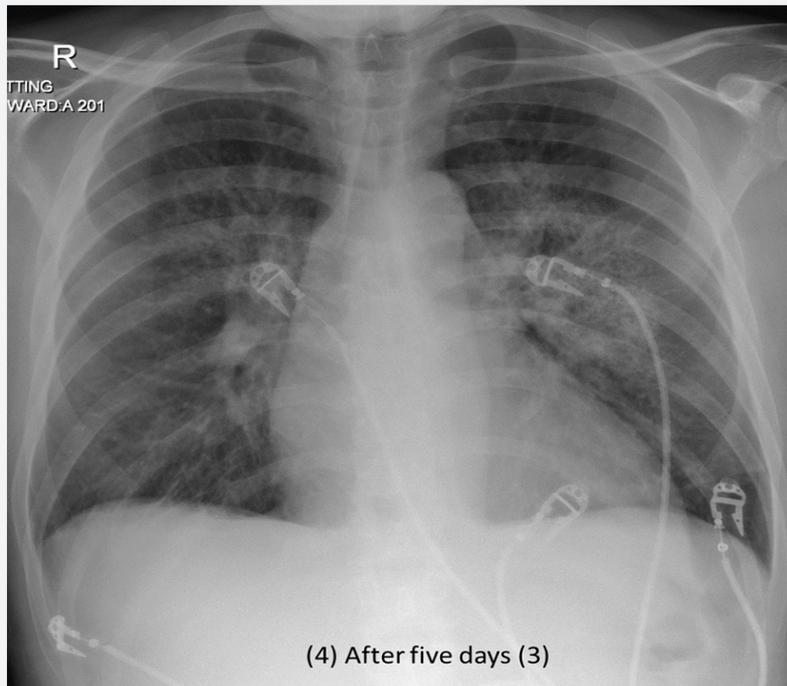
investigations and his clinical course demonstrated the cause for the abnormal radiographic changes to be pulmonary edema secondary to congestive heart failure [4].



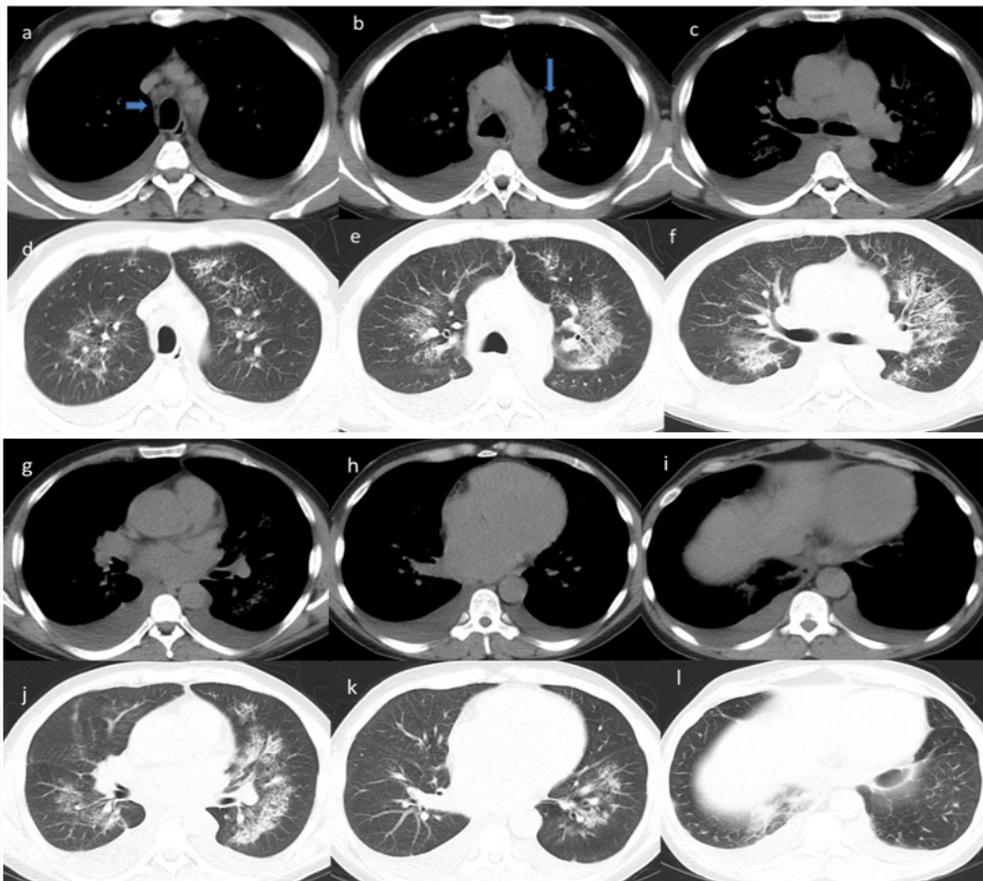
**Figure 2B:** X-ray chest portable semi sitting projection: Interval mild increase in previously seen bilateral perihilar airspace disease, as well as bilateral air space ground glass haziness noted. Minimal right pleural effusion and bilateral basal atelectasis. Findings are keeping with interval increase pulmonary edema.



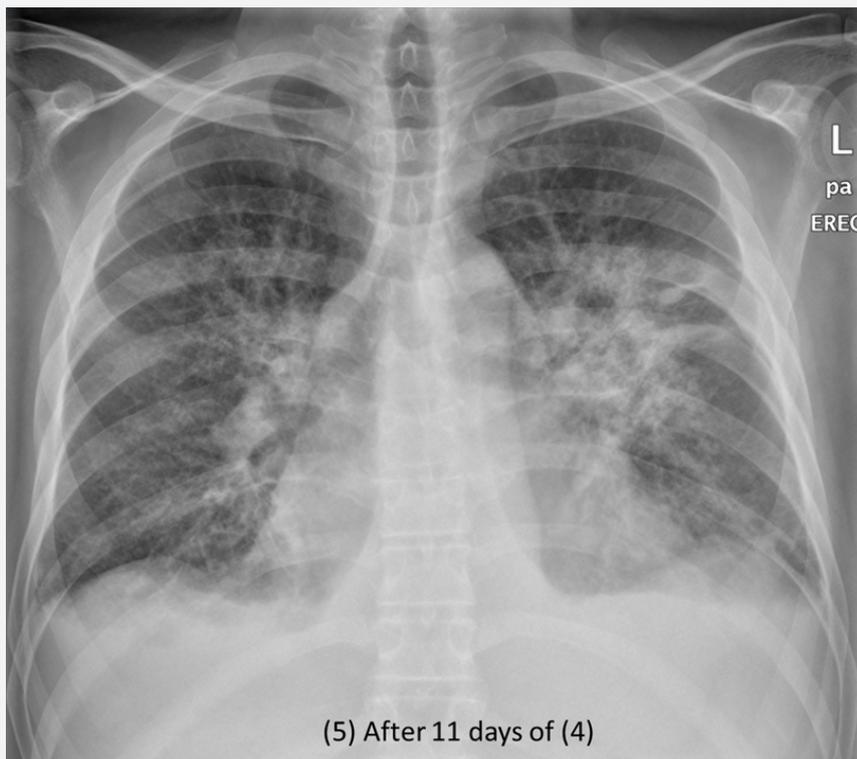
**Figure 2C:** X-ray chest portable semi sitting projection: Interval improvement in previously seen bilateral perihilar airspace disease, more improvement on right side as well as improvement in minimal right pleural effusion and bilateral basal atelectasis. Findings are keeping with interval improvement in changes of pulmonary edema.



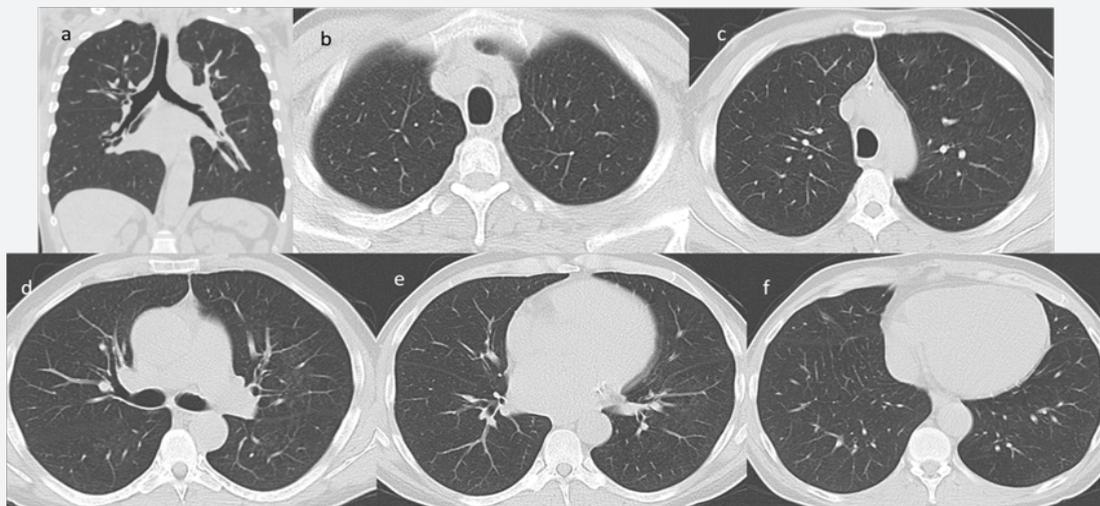
**Figure 2D:** X-ray chest portable semi sitting projection: No appreciable interval change compared to previous X-ray before five days. CT scan (HRCT high resolution CT) of chest recommended due to persistent left perihilar airspace disease.



**Figure 2E:** After three day of previous X-ray Chest (4) HRCT CHEST: Mediastinal window (a, b, c, g, h & i) with corresponding Lung window (d, e, f, j, k & l) demonstrates bilateral mild.



**Figure 3A:** X-ray chest frontal projection: After 11 days of last C-ray and 8 days of CT: Interval increase in previously seen bilateral perihilar airspace disease, more on right side as well as minimal bilateral pleural effusion and bilateral basal atelectasis. Patient advised CT for follow-up after five weeks to exclude underlying Interstitial lung disease or other differential pathology as patient had H/O smoking.



**Figure 3B:** After 5 weeks of last X-ray chest done for follow-up of interstitial lung disease. HRCT LUNG: Lung window reveal complete resolution of previously seen bilateral perihilar lung parenchymal disease as well as bilateral pleural effusion.

The association of cardiogenic pulmonary edema, a common condition, with a crazy-paving appearance on a CT scan of the lungs has been reported previously in only a few cases, but it is important for clinicians and radiologists to recognize. Based on available study and related other information in the reviews, it is possible to classify the main pulmonary insults that result in a crazy-paving appearance on an etiological basis into infectious, neoplastic, inhalational, toxic, sanguineous and idiopathic

disorders. Specific infectious disorders that are associated with a crazy-paving pattern include *Pneumocystis jiroveci* (carinii) pneumonia, *Mycobacterium tuberculosis* and *Mycoplasma pneumoniae* [5].

#### Common causes of Crazy-Paving

- a) Acute respiratory distress syndrome (ARDS)
- b) Bacterial pneumonia

- c) Acute interstitial pneumonia: essentially ARDS of unknown etiology
- d) Pulmonary alveolar proteinosis (PAP): rare, but the great majority of patients with PAP demonstrate crazy paving

#### Less common causes of Crazy-Paving

- i. Drug-induced pneumonitis
- ii. Radiation pneumonitis
- iii. Pulmonary hemorrhage / diffuse pulmonary hemorrhage
- iv. Good pasture syndrome
- v. Chronic eosinophilic pneumonia
- vi. Usual interstitial pneumonia (UIP) with superimposed diffuse alveolar damage
- vii. Pulmonary edema
- viii. Pulmonary infections
- ix. Mycoplasma pneumonia
- x. Obstructive pneumonia
- xi. Tuberculosis
- xii. Pneumocystis carinii pneumonia
- xiii. Cryptogenic organizing pneumonia (COP, formerly BOOP)
- xiv. Mucinous bronchioloalveolar carcinoma
- xv. Sarcoidosis, especially alveolar sarcoidosis
- xvi. Lipoid pneumonia
- xvii. Pulmonary veno-occlusive disease

#### More input about Crazy-Paving

- A. Crazy-Paving was originally described in patients with Pulmonary alveolar proteinosis and is very characteristic for this disease

- B. But Crazy-Paving is really a very nonspecific finding and can be seen in a variety of diffuse lung diseases

#### Conclusion

The crazy-paving appearance is a nonspecific finding seen in a variety of interstitial and airspace lung diseases. The crazy-paving pattern, characterized by scattered or diffuse ground-glass opacities or attenuation with superimposed interlobular septal thickening and intralobular lines, is a common radiologic manifestation. Often considered to have a limited differential diagnosis-pulmonary alveolar proteinosis, lipoid pneumonia, bronchioloalveolar cell malignancy- this pattern is now recognized as a CT manifestation of many diverse entities. Knowledge of the many causes of this pattern can be useful in preventing diagnostic errors.

In addition, although causes of this pattern are frequently indistinguishable at radiologic evaluation, differences in the location of the characteristic opacities or attenuation in the lungs as well as presence of additional radiologic findings, together with the history and clinical presentation, can often be useful in suggesting the appropriate diagnosis. The present case illustrates the importance of the correlation of radiographic appearance with clinical observations. It also emphasizes that a crazy-paving pattern on CT scan, once considered to be specific for pulmonary alveolar proteinosis, is now known to be nonspecific and may be seen in association with a wide spectrum of pulmonary diseases.

#### References

1. Rossi SE, Erasmus JJ, Volpacchio M (2003) "Crazy-paving" pattern at thin-section CT of the lungs: radiologic-pathologic overview. *Radiographics* 23 (6): 1509-1519.
2. Lee CH (2007) The crazy-paving sign. *Radiology* 243(3).
3. Walter De Wever, Joke Meersschaert, Johan Coolen, Eric Verbeken, Johnny A Verschakelen (2015) The crazy-paving pattern: a radiological-pathological correlation.
4. Johkoh T, Itoh H, Muller NL (2014) Crazy-paving appearance at thin-section CT: Spectrum of disease and pathologic findings. *Radiology*.
5. Nimrod Maimon, Narinder Paul, Gregory P Downey (2015) Progressive dyspnea associated with a crazy-paving appearance on a chest computed tomography scan.



This work is licensed under Creative Commons Attribution 4.0 License  
DOI: 10.19080/OAJS.2017.06.555683

#### Your next submission with Juniper Publishers will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats  
( Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission

<https://juniperpublishers.com/online-submission.php>