January 2016 Pulmonary Case of the Month

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History of Present Illness

A 64-year-old man was seen in June 2015 with a nonproductive cough.

Past Medical History, Social History and Family History

He has no significant past medical history. He is a former smoker. Family history is positive for coronary artery disease

Physical Examination

Decreased breath sounds over the right hemithorax with dullness to percussion. Otherwise, the physical exam is unremarkable.

Radiography

A chest radiograph was performed (Figure 1).

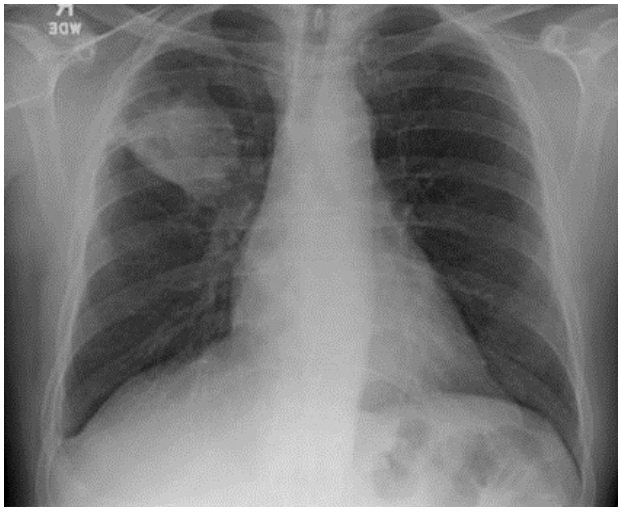

Figure 1. Initial PA chest radiograph.

The chest radiograph ***shows*** which of the following?

1. There is a large mass in the right upper lobe
2. There is a loculated pleural effusion
3. There is volume loss in the right upper lobe
4. 1 and 3
5. All of the above

Correct!
4. 1 and 3

There is a large mass in the right upper lobe abutting the minor fissure. The minor fissure is displaced superiorly indicating volume loss in the right upper lobe. Although a loculated pleural effusion could present as a mass in the minor fissure, there is no meniscus along the fissure making a loculated pleural effusion unlikely. There is a small right pleural effusion indicated by the meniscus in the right lung sulcus.

Which of the following ***should be done next***?

1. Bronchoscopy
2. Mediastinoscopy
3. PET/CT scan of the chest
4. 1 and 3
5. 2 and 3

Correct!
4. 1 and 3

The patient almost certainly has lung cancer. The volume loss in the right upper lobe suggests endobronchial obstruction. A needle biopsy would likely yield a diagnosis and is not wrong, but most would prefer bronchoscopy with a suspected endobronchial obstruction (1). Needle biopsy has a higher complication rate, and enlarged mediastinal lymph nodes can be sampled during bronchoscopy (1).

The patient underwent a chest PET/CT scan which the mass along with enlarged mediastinal lymph nodes with accumulation of radioactive glucose indicating probable metastatic disease. Bronchoscopy showed a right upper lobe endobronchial mass which on biopsy was a non-small cell cancer of the lung TTP-1 positive. He was begun on etoposide and cisplatin with radiation.

He subsequently developed a large right pleural effusion. An attempt was made to insert an indwelling PleurX catheter for drainage but this was unsuccessful. In November, 2015 pemetrexed and carboplatin was recommended with a plan for 2 cycles and a restaging evaluation. He took dexamethasone in preparation but developed night sweats, cough, increasing shortness of breath, upper respiratory symptoms and a productive cough.

A chest radiograph was performed (Figure 2).

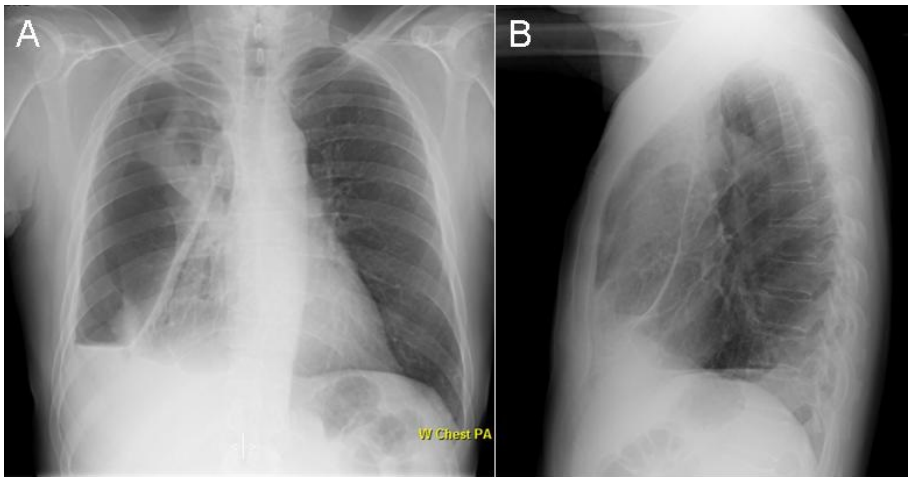

Figure 2. Chest radiograph.

Which of the following are ***true*** regarding the chest radiograph?

1. A bronchopleural fistula should be suspected
2. A pleural catheter has been inserted
3. There is a large right hydropneumothorax
4. 1 and 3
5. All of the above

Correct!
4. 1 and 3

The chest x-ray shows a large right pneumothorax with a horizontal air-fluid interface indicating a hydropneumothorax. The density seen that could be confused with a catheter is actually fluid in the fissure. Note how it ends at the air-fluid interface and does not extend outside the chest. The large hydropneumothorax combined with the clinical symptoms of fever and productive cough suggest a bronchopleural fistula, a communication between a main stem, lobar, or segmental bronchus and the pleural space.

A chest tube was inserted which made little difference in the patient's symptoms or radiographic appearance.

Which of the following are ***true*** regarding bronchopleural fistulas?

1. Bronchoscopy with a Fogarty catheter can be used to isolate the bronchopleural fistula
2. Can occur with necrosis of lung cancer during chemo or radiation therapy
3. Endobronchial valves may help reduce the pneumothorax
4. 1 and 3
5. All of the above

Correct!
5. All of the above

Bronchopleural fistulas can occur with trauma, pulmonary resection or from necrotic lung tissue during treatment for lung cancer or infection. A balloon-tipped Fogarty catheter can be inserted into the bronchus and when the balloon is inflated can result in a reduction in the pneumothorax identifying the bronchus where the fistula originates. That was done in this case the identified the right upper lobe as the source of the fistula. Endobronchial valves for compassionate use may be considered. These are valves that allow air to escape from the pleural space into the bronchi during exhalation but are closed during inspiration. A valve was placed in this patient and resulted in a dramatic reduction in the size of the pneumothorax (Figure 3).

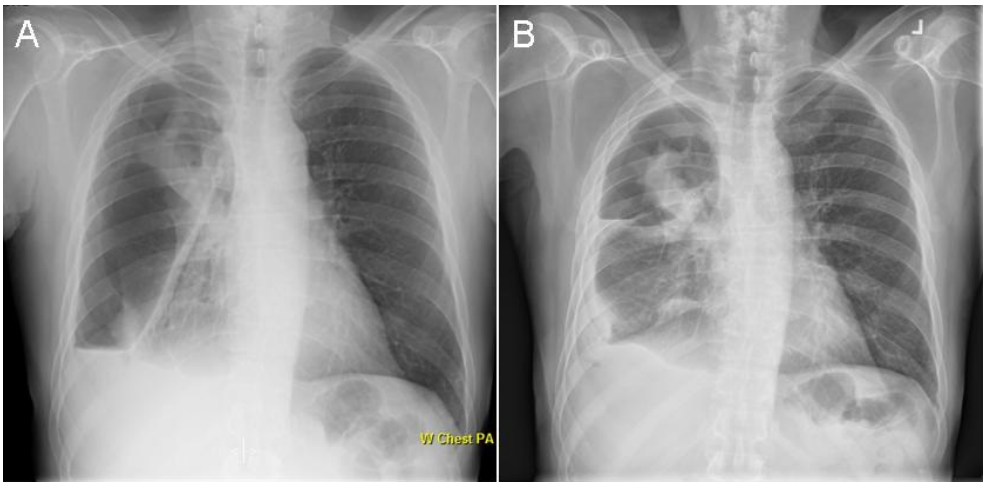

Figure 3. Panel A: original chest radiograph. Panel B: repeat chest radiograph about 1 week after endobronchial valve insertion.

In a recent series of 40 patients with persistent air leaks, 93% experienced improvement and 48% complete resolution with endobronchial valves (1). In another series of 14 patients, resolution occurred in 56% (2). Our patient was eventually able to be discharged from the hospital.

References

1. Rivera MP, Mehta AC, Wahidi MM. Establishing the diagnosis of lung cancer: Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest. 2013;143(5 Suppl):e142S-65S. [CrossRef] [PubMed]
2. Travaline JM, McKenna RJ Jr, De Giacomo T, Venuta F, Hazelrigg SR, Boomer M, Criner GJ; Endobronchial Valve for Persistent Air Leak Group. Treatment of persistent pulmonary air leaks using endobronchial valves. Chest. 2009;136(2):355-60. [CrossRef] [PubMed]
3. Hance JM, Martin JT, Mullett TW. Endobronchial valves in the treatment of persistent air leaks. Ann Thorac Surg. 2015;100(5):1780-6. [CrossRef] [PubMed]