April 2018 Pulmonary Case of the Month

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History of Present Illness

A 74-year-old woman with known chronic obstructive pulmonary disease (COPD) presented to emergency department on 2/4/18 with dyspnea. She had been hospitalized at another hospital from 12/29/17 - 1/30/18 for a COPD exacerbation and health care associated pneumonia described as a cavitary pneumonia. She was treated with various doses of systemic steroids and antibiotics. Her course was complicated by atrial fibrillation with a rapid ventricular response. She eventually was discharged to a skilled nursing facility.

Past Medical History, Social History and Family History

She has a known history of COPD with an FEV1 of 22% of predicted and is on 2L/min of O2 by nasal cannula. There is also a history of:

- Hypertension.
- Hypercholesterolemia.
- Paroxysmal atrial fibrillation, not on anticoagulation.
- Right 4 mm PICA aneurysm.

She lives in rural Kingman, AZ with some dust and outdoor bird exposure.
Family history is noncontributory.

Medications

- Alprazolam 0.25 mg p.o. b.i.d.
- Symbicort two puffs inhaled b.i.d.
- Diltiazem 120 mg p.o. q.12h
- Disopyramide 150 mg p.o. q.6h
- Furosemide 20 mg p.o. daily
- Levalbuterol 0.31 mg q.6 days p.r.n.
- Meperidine 50 mg p.r.n. pain
- Metoprolol succinate 12.5 mg p.o. b.i.d
- Prednisone 10 mg p.o. daily

Physical Examination

- Vitals: BP 110/65 mm Hg, P 130 irregular beats/min, T 37° C, Respirations 20 breaths/min
- General: Appears in mild respiratory distress
- Lungs: Distant breath sounds
- Heart: Irregular rhythm with distant tones
- Abdomen: no organomegaly, masses or tendernesses
- Extremities: No edema

Which of the following ***should be done*** at this time?

1. Arterial blood gases (ABGs)
2. Chest x-ray
3. Electrocardiogram
4. 1 and 3
5. All of the above

Correct!
5. All of the above

She has a rapid, irregular pulse with a history of atrial fibrillation. An electrocardiogram showed she was in again in atrial fibrillation with a rapid ventricular response. Her ABGs showed a PaO2 of 68 mm Hg, PaCO2 of 36 mm Hg, and a pH of 7.46. Chest x-ray is shown in Figure 1.

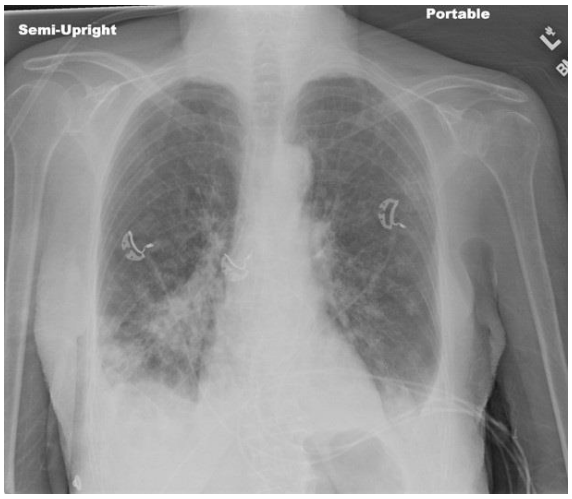

Figure 1. Admission portable chest x-ray.

Additional laboratory obtained showed a hemoglobin of 4.1 g/dL, hematocrit 13%, white blood cell count 10,500 cells/mcL with a left shift, platelets. 200,000 cells/mcL.

Which of the following should be ***done at this time***?

1. Anticoagulation for atrial fibrillation
2. Bronchoscopy
3. Thoracic CT scan
4. 1 and 3
5. All of the above

Correct!
3. Thoracic CT scan

Clinically she seemed to ill at this time to undergo bronchoscopy although this was anticipated in the near future. For this reason and because gastrointestinal bleeding was suspected she was not anticoagulated. She was transfused with 2 units of packed red blood cells; placed on diltiazem drip with reduction in her heart rate to less than 100 and treated with broad spectrum antibiotics (vancomycin, piperacillin/tazobactam, voriconazole). A thoracic CT scan was performed (Figure 2).

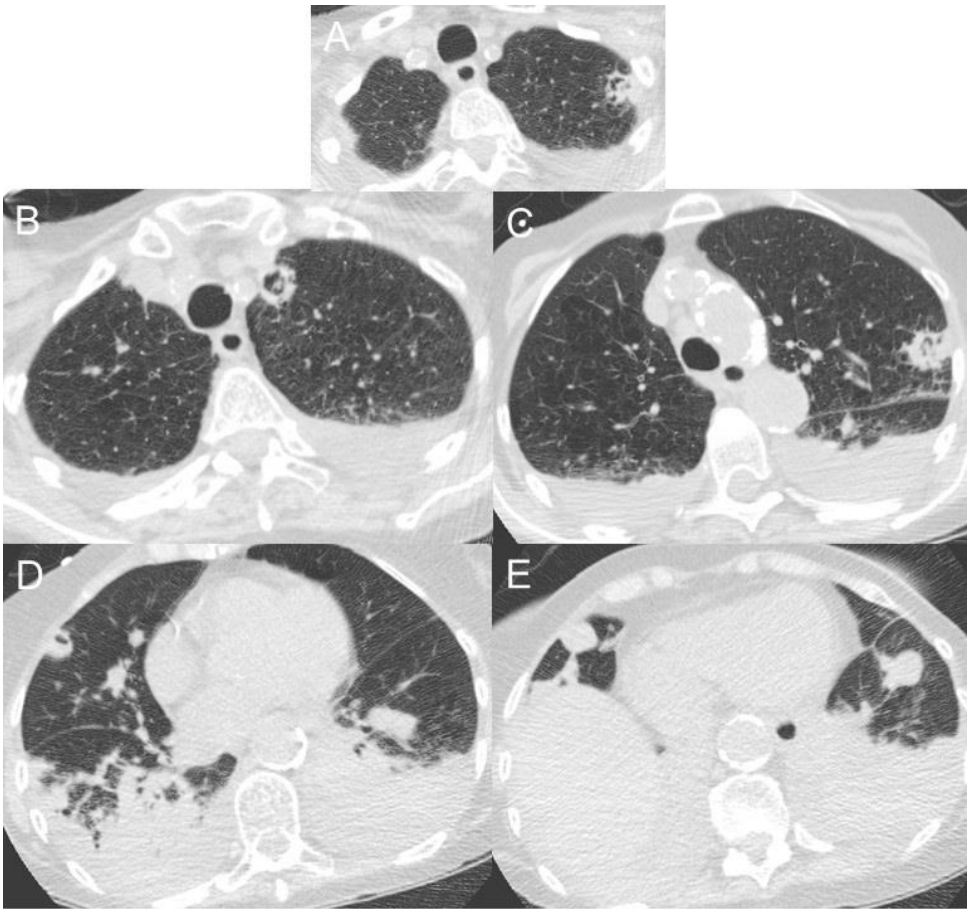

Figure 2. Representative images from the thoracic CT scan in lung windows.

The radiologist interpreted the CT scan as showing scatted cavities.

Which of the following ***<u>can cause lung cavities</u>***?

1. Abscess
2. Cancer
3. Immune diseases such as granulomatosis with polyangiitis (Wegner's)
4. Vascular diseases such as septic emboli
5. All of the above

Correct!
5. All of the above

The answer is obviously all of the above. There rather clever pneumonic CAVITY can be used to remember the differential diagnosis of cavitary lung diseases (1,2) (Figure 3).

Cancer

Abscess (TB/Fungal)

Vascular (septic emboli)

Immune (GPA, RA)

Trauma (pneumatocele)

Youth (sequestration, bronchogenic cysts)

Figure 3. Mnemonic for cavitary lung diseases.

Her sputum smears and cultures were unremarkable. Of course, in Arizona Valley Fever is included in the differential of nearly every lung disease and her coccidioidomycosis serology was negative. Her Aspergillus antigen, nasal MRSA, and vasculitis panel were all negative. A procalcitonin was slightly elevated at 0.21 ng/ml.

She slowly improved over one week. A thoracic CT scan was repeated (Figure 4).

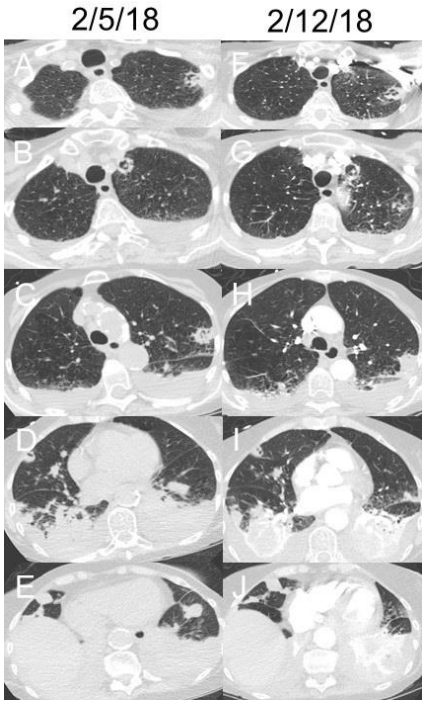

Figure 4. Thoracic CT images in lung windows from 2/5/18 and approximate corresponding images from 2/12/18.

What should be ***done at this time***?

1. Antibiotics for an additional week
2. Bronchoscopy with bronchoalveolar lavage and transbronchial biopsy
3. Hold the bronchoscopy she is doing well
4. 1 and 3
5. All of the above

Correct!

2. Bronchoscopy with bronchoalveolar lavage and transbronchial biopsy

The value of bronchoscopy was debated. It was argued that she was elderly and frail and might not tolerate the bronchoscopy well. On the other hand, she is an immunocompromised host on corticosteroids and not likely to be in a much better condition to proceed than she was at this time. The decision was made to proceed with the bronchoscopy and she tolerated the procedure well. All the studies of the bronchoalveolar lavage fluid were negative except the cytomegalovirus (CMV) PCR which was positive.

What should be ***done next***?

1. Begin foscarnet
2. Begin ganciclovir
3. Examine the bronchoalveolar lavage fluid cells and transbronchial biopsy
4. 1 and 3
5. All of the above

Correct!

3. Examine the bronchoalveolar lavage fluid cells and transbronchial biopsy

CMV is rather common and the presence of the virus does not necessarily indicate infection (3). The transbronchial biopsy was examined (Figure 5).

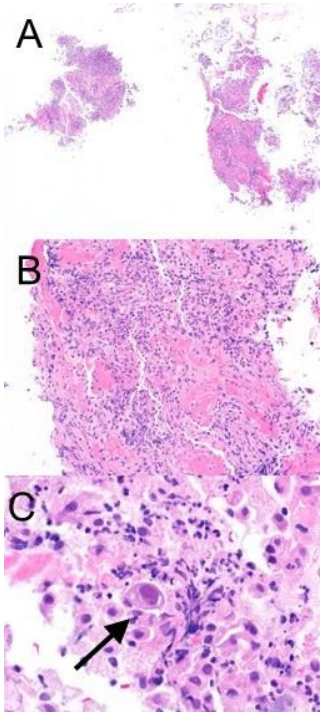

Figure 5. Panel A: low power view of transbronchial biopsy (H&E). Panel B: Higher power view. Panel C: High power view showing viral inclusion (arrow).

After viewing the biopsy our patient was begun on ganciclovir and eventually foscarnet. Her viral load was 18,600 copies/ml (>10,000 usually indicates infection). Unfortunately, she continued to do poorly and eventually died after being placed on comfort care only.

Cavitary lesions are unusual with CMV pneumonia although they have been reported (4,5). It seems more likely she developed pneumonia surrounding areas of emphysematous lung.

References

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