May 2014 Critical Care Case of the Month: Second Wind

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History of Present Illness

A 65 year old woman was admitted for gastrointestinal bleeding as evidence by hematochezia. At the time of admission she denied any respiratory symptoms other than mild dyspnea. However, she rapidly developed respiratory failure, was transferred to the ICU and required emergent intubation.

PMH, FH, SH

She has a history of rheumatoid arthritis with a cervical spine fusion. There is also a history of sarcoidosis and she was receiving prednisone 30 daily up until the time of admission. There is no significant family history. She does not smoke or drink.

Physical Examination

Afebrile. Pulse 78. BP 105/65 mm Hg. Respirations: 28. SpO₂ 96% while receiving an FiO₂ of 60% at the time of transfer to the ICU.

Neck: No jugular venous distention.

Lungs: Scattered rales and rhonchi.

Cardiovascular: Regular rhythm.

Abdomen: no hepatosplenomegaly.

Radiography

A portable chest x-ray taken after intubation is shown in figure 1.

Figure 1. Portable chest x-ray taken shortly after intubation.

Which of the following **best describe the chest x-ray?**

1. Chronic interstitial disease
2. Diffuse consolidation
3. Endotracheal tube in the right mainstem bronchus
4. Small right pneumothorax
5. All of the above

Correct!

2. Diffuse consolidation

There is consolidation in both lungs. Consolidation means that alveoli are filled with liquid rather than air. Because the alveoli surround the bronchi which contain air, an air-water interface is formed producing an air bronchogram on imaging studies. Chronic interstitial disease is a possibility in this patient who has rheumatoid arthritis but without older x-rays for comparison this would be difficult to diagnose. The tip of the endotracheal tube is about at the level of the top of the aortic arch which means it is a satisfactory position. She has a venous catheter inserted into her right subclavian vein and pneumothorax can result from the procedure. However, there is no evidence of a pneumothorax on the portable chest x-ray.

In a patient who develops rapid respiratory failure the overwhelming concern is pneumonia? Endotracheal suction specimens were sent to the laboratory.

Which of the following **tests and/or cultures should be ordered?**

1. Fungal smear and cultures
2. Gram stain and bacterial cultures
3. Rapid influenza test
4. Serologic testing for coccidioidomycosis
5. All of the above

Correct!
5. All of the above

All of these causes of pneumonia are possible, especially in Arizona in an immunocompromised host receiving corticosteroids. Her coccidiomycosis serology was negative. Her other results are shown in Table 1.

Table 1. Summary of rapid viral testing and sputum culture.

Virology		
Influenza A PCR	Positive (A)	
Influenza B PCR	Negative	
RSV PCR	Negative	
Sputum cultures		
Source: sputum induced		
Organism	PSEUDOMONAS sp	
Antibiotic	MIC (ug/mL)	Interpretation
Pip/Taz	4/4	S
Cefepime	8	S
Meropenem	<=1	S
Ciprofloxacin	>2	R
Gentamicin	<=2	S
Tobramycin		
S=SUSCEPTIBLE		R=RESISTANT
ASPERGILLUS FUMIGATUS 2+		

Which of the following **should not be administered?**

1. Cefepime
2. Ciprofloxacin
3. Meropenem
4. Oseltamivir
5. Voriconazole

Correct!
2. Ciprofloxacin

Treatment is indicated for influenza A which is probably responsible for her acute respiratory failure. Oseltamivir was given. However, whether to treat the *Pseudomonas* and *Aspergillus* is not entirely clear. Both are common airway colonizers in the ICU. However, since the patient was acutely ill she was begun on both cefepime and voriconazole. If ciprofloxacin was used it is unclear what would be treated since the *Pseudomonas* is resistant and it is not a treatment for either influenza or *Aspergillus*.

The patient was improving and had been extubated but several days later developed hemoptysis. A repeat chest x-ray is shown in figure 2.

Figure 2. Repeat portable chest x-ray.

What should be **done next**?

1. Bronchoscopy
2. Needle biopsy
3. Thoracic CT scan
4. 1 & 3
5. All of the above

Correct!
4. 1 & 3

The repeat chest x-ray shows that much of the consolidation has cleared except in the right upper lung where increased density persists (Figure 3).

Figure 3. Repeat portable chest x-ray showing a rounded density in the right upper lung (red circle) with a question of cavitation.

Bronchoscopy revealed blood coming from the right upper lobe. A thoracic CT was performed with the most relevant image shown in Figure 4.

Figure 4. Representative image from the thoracic CT scan.

What is the most likely **cause of her hemoptysis?**

1. Aspergilloma
2. Drug-resistant influenza A
3. Lung cancer
4. Necrotizing Pseudomonas pneumonia
5. Staphylococcal pneumonia after influenza

Correct!
1. Aspergilloma

A secondary infection is common during recovery from influenza (1). Staphylococcus is frequent but other infections do occur. However, the appearance of the CT scan showing a density inside a cavity is most characteristic of a fungus ball or aspergilloma (2). Consideration was given to resecting the lesion but her hemoptysis was minimal, she was being appropriately treated and she was still recovering from her influenza. Unfortunately, the patient developed massive hemoptysis 5 days later and died.

References

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2. Kousha M, Tadi R, Soubani AO. Pulmonary aspergillosis: a clinical review. Eur Respir Rev. 2011;20(121):156-74. [\[CrossRef\]](#) [\[PubMed\]](#)