

## April 2020 Critical Care Case of the Month: Another Emerging Cause for Infiltrative Lung Abnormalities

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Editor's Note: the following case presentation represents a compilation of several patients.

### ***History of Present Illness***

The 27-year-old man presented to the Emergency Department in late February 2020 with fever, cough, and green sputum production. He was recently in Hawaii where he meant his Asian girlfriend and was "partying hard". He was intoxicated and had recent nausea and vomiting.

### ***PMH, SH and FH***

No significant PMH or FH. He does admit to smoking, marijuana use, THC use, and vaping.

### ***Physical Examination***

- Vital Signs: BP 111/54 (BP Location: Right arm) | Pulse 74 | Temp 98.7 °F (37.1 °C) (Oral) | Resp 18 | Ht 5' 11" (1.803 m) | Wt 72.6 kg (160 lb) | SpO2 99% | BMI 22.32 kg/m<sup>2</sup>
- General: Awake, alert, interactive, no acute distress
- HEENT: Anicteric, moist mucosa, trachea midline
- CV: RRR
- Lungs: bilateral lower lobe rhonchi, no wheezing, symmetric expansion
- Abdomen: Soft, non-tender, non-distended, positive bowel sounds
- Extremities: no Lower extremity edema, no clubbing, no cyanosis
- Neuro: No focal deficits, moves all extremities.
- Psych: Appropriate

Which of the following are **appropriate at this time?**

1. CBC
2. Chest X-ray
3. Electrolytes
4. 1 and 3
5. All of the above

**Correct!**  
**5. All of the above**

All are indicated. A CBC is indicated because of the history of fever and respiratory symptoms suggesting pneumonia. The electrolytes are indicated because of recent nausea and vomiting. The chest x-ray is indicated because of the possibility of pneumonia.

Below are his laboratory values and chest x-ray interpretation. (Table 1).

Table 1. Initial laboratory values and chest x-ray interpretation

CBC		Chemistry	
WBC	13.5*	GLU	111
RBC	4.26	BUN	12
HGB	11.2*	NA	143
HCT	33.7*	K	3.8
PLTC	191	CL	110
		CO2	25
		CREATININE	1.1

\*Portable Chest X-Ray: Mild asymmetric opacity at the left lung base could reflect a mild pneumonia in the appropriate clinical setting. Follow-up to evaluate for clearing with therapy or establish baseline recommended.

\*Abnormal.

What is the ***least likely diagnosis?***

1. Aspiration pneumonia
2. Community-acquired pneumonia
3. COVID-19 pneumonia
4. E-cigarette or vaping product use associated lung injury (EVALI)
5. Pulmonary embolism

**Correct!**

### **5. Pulmonary embolism**

Aspiration pneumonia, community-acquired pneumonia, and e-cigarette or vaping product use associated lung injury (EVALI) all seem possible. COVID-19 had just arrived in the US in late February 2020 and seems unlikely and pulmonary embolism seems very unlikely. He was admitted for observation and shortly afterwards developed a low-grade fever to 38.1°C. He denied any shortness of breath although there was an occasional cough of greenish sputum.

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

1. Obtain a thoracic CT scan
2. Obtain a nasal swab for COVID-19
3. Respiratory isolation
4. 1 and 3
5. All of the above

**Correct!**  
**5. All of the above**

A thoracic CT scan was obtained to better define the abnormalities reported on the portable chest x-ray (Figure 1).

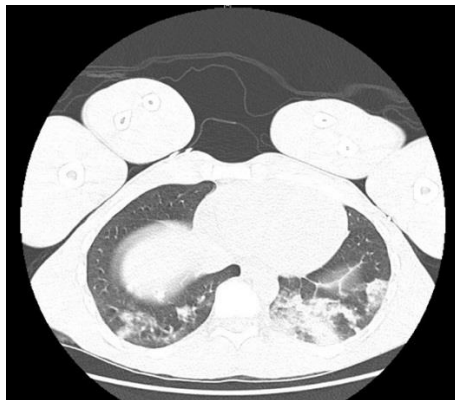


Figure 1. Representative image in lung windows from the thoracic CT scan showing bilateral consolidation left greater than right.

A nasal swab for COVID-19 was obtained along with sputum and blood cultures. Because of the possibility of COVID-19 he should be placed in respiratory isolation.

He also received word that his girlfriend who he had met in Hawaii had returned home to South Korea and was ill with similar complaints of fever and cough. She had been diagnosed with pneumonia and was being evaluated for the new, novel coronavirus COVID-19.

His girlfriend's history raises the possibility that he might have COVID-19 (also known as SRAS-CoV-2). Results returned the two days later and were positive (His girlfriend was also positive). At about this time he became increasingly short of breath and was begun on supplemental oxygen therapy. Hydroxychloroquine has been touted in some preliminary studies as possibly being beneficial for COVID-19 (1). However, in our opinion the results are preliminary and the data is weak at this time.

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

1. Repeat chest x-ray
2. Bronchoscopy
3. Transfer to the ICU
4. 1 and 3
5. All of the above

**Correct!**  
**4. 1 and 3**

His tempo of disease at this juncture is one of worsening and for this reason, along with the reason that it was easier to observe while maintaining respiratory isolation, he was moved to the ICU. He was placed in strict respiratory isolation with personnel entering the room using air-purifying respirators (PAPR) using P100 HEPA filters (filter >99.97% of 0.3 um particles). Preliminary studies suggest a high positive rate for respiratory samples obtained by bronchoscopy. However, with a positive nasal swab for COVID-19 bronchoscopy would seem to add little at this time other than excluding other pathogens. A repeat chest X-ray showed progression of the consolidation. His oxygen requirements gradually increased until he was on a 60% oxygen by mask and he was dyspneic at rest.

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

1. Begin favipiravir (Avigan®)
2. Begin non-invasive ventilation
3. Begin remdesivir
4. Begin umifenovir (Arbidol®)
5. Consider early intubation

**Correct!**

### **5. Consider early intubation**

All the drugs listed are experimental and undergoing trials (2). In our view, early intubation should be considered and non-invasive ventilation and high-flow nasal oxygen should be used sparingly (3). This is because non-invasive ventilation and high-flow nasal oxygen likely increase the infectivity of COVID-19 by aerosolizing the patient's respiratory secretions. The patient was intubated with a limited number of people in the room in PAPR. He spent only two days receiving mechanical ventilation with a HEPA filter on the exhalational limb of the ventilator. He was extubated and rapidly improved.

### ***References***

1. Lecrubier A. COVID-19: could hydroxychloroquine really be the answer? Medscape. March 18, 2019. Available at: <https://www.medscape.com/viewarticle/927033> (accessed 3/19/20).
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3. Raschke RA, Till SL, Luedy HW. COVID-19 prevention and control recommendations for the ICU. *Southwest J Pulm Crit Care.* 2020;20(3):95-7. [\[CrossRef\]](#)