

SOUTHWEST JOURNAL of PULMONARY & CRITICAL CARE

Journal of the Arizona, New Mexico, Colorado and California Thoracic Societies www.swjpcc.com

December 2020 Pulmonary Case of the Month: Resurrection or Medical Last Rites?

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History of Present Illness

An 88-year-old man who has been short of breath and febrile up to 101.5° F for the past day presented on October 20, 2020. He has no known sick contacts or exposure to COVID-19.

PMH, SH, and FH

- No reported pulmonary history although he had a Xopenex MDI which he rarely used.
- Coronary artery disease with prior coronary artery bypass grafting (1978); multiple subsequent stents; chronic atrial fibrillation; pacemaker (Micra)
- Stage 3-4 CKD (creatinine 1.95)
- Chronically on warfarin

Physical Examination

- Temp 37.3, Sat 92% on RA, 95% on 2 lpm,
- Lungs: Few crackles in right upper chest
- CV: regular, no murmur
- Ext: 1 to 2+ edema (chronic, uses TED hose)

Which of the following is/are the most likely diagnosis?

1. Community-acquired pneumonia
2. Congestive heart failure
3. COVID-19
4. 1 and 3
5. Any of the above

Correct!
4. 1 and 3

Community-acquired pneumonia (CAP) is common (1). The common symptoms of bacterial pneumonia include fever, cough, and sputum production (may or may not be present). The color and quality of sputum provide the clue to microbiological etiology. However, in the elderly presentation can be more subtle. There may be no fever or respiratory complaints and the elderly can present only with confusion. Of course, at this time in the middle of a pandemic, COVID-19 remains high on the differential.

Bacteria which cause CAP pneumonia include are *Streptococcus pneumoniae*, *Staphylococcus aureus*, Group A *Streptococcus*, *Klebsiella pneumoniae*, *Hemophilus*

influenzae, *Moraxella catarrhalis*, anaerobes, and gram-negative organisms (1). *Streptococcus pneumoniae* (also called *Pneumococcus* by some older physicians) was by far and away the most common cause of pneumonia 30-40 years ago and remains the most common cause. However, the other organisms appear to be increasing in incidence (1).

What should be done at this time?

1. Blood cultures
2. Chest X-ray
3. Sputum Gram stain and culture
4. 1 and 3
5. All of the above

- Correct!
2. Chest X-ray
or
5. All of the above

The latest IDSA/ATS guidelines emphasize that location is important in determining the appropriate work up of the patient (2). Most patients should have a chest x-ray. In the outpatient arena a compatible history and physical with a chest x-ray may be sufficient but as an inpatient sputum Gram stain and culture and blood cultures may be obtained in an inpatient only if they do not delay treatment. They also do not recommend routinely checking a serum procalcitonin which is increased in infections.

The patient had the following initial laboratory evaluation:

- CBC: H/H 12.4/36.8, WBC 9.1
- Chemistry: Na 132, Cl 96, Cr 2.5, BUN 39
- Procalcitonin: 0.23 ng/ml (normal < 2, indeterminate 0.15-2.0)
- NT-proBNP: 3153 pg/ml (normal <450 pg/mL for patients aged 75-99 years)
- Cocci Serology: Negative
- COVID swab PCR: Negative
- Legionella antigen: Negative

A Chest x-ray was obtained (Figure 1).

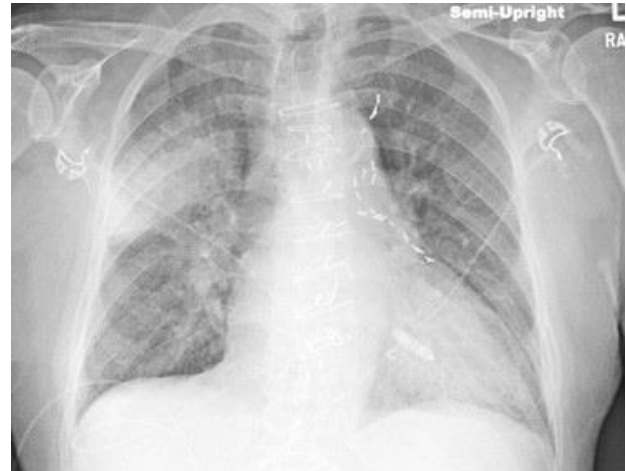


Figure 1. Initial portable chest x-ray.

What should be *done next*?

1. Admit and treat with piperacillin/tazobactam and doxycycline
2. Treat an outpatient with amoxicillin
3. Treat as an outpatient with amoxicillin and doxycycline
4. 1 and 3
5. All of the above

Correct!

1. Admit and treat with amoxicillin and doxycycline

The chest x-ray shows a right upper lobe consolidation which is compatible with CAP. A variety of protocols have been devised for determining admission for CAP. These include CURB-65 criteria (2). CURB-65 stands for **C**onfusion; **B**lood **U**rea nitrogen greater than 7 mmol/L (19 mg/dL); **R**espiratory rate of 30 breaths per minute or greater; **B**lood pressure less than 90 mmHg systolic or diastolic blood pressure 60 mmHg or less; and age **65** or older. Each is given a point and those with 2 or more points should be admitted to the hospital.

The patient was admitted and treated with piperacillin /tazobactam and doxycycline but did not improve over the next several days with increased requirement for supplemental oxygen. A repeat chest x-ray showed worsening RUL consolidation (Figure 2).



Figure 2. Repeat chest x-ray 3 days after admission.

What should be done at this time?

1. Bronchoscopy with bronchoalveolar lavage
2. Broaden the antibiotic coverage
3. Empirically begin fluconazole
4. 1 and 3
5. All of the above

Correct!
4. 1 and 3

He has not responded well to therapy and consideration should be given to an etiology of a pneumonia caused by an organism other than *Streptococcus pneumoniae*. In Arizona Valley fever or coccidioidomycosis (cocci) causes an estimated 15% to nearly 30% of community-acquired pneumonias (3). After 1 week (10/27) a bronchoscopy with bronchoalveolar lavage (BAL) was performed. The results of the BAL are given below:

- BAL: 39% alveolar macrophages, 34% lymphocytes, 25%

polymorphonuclear leukocytes, 2% eosinophils

- Gram stain, fungal smear and acid-fast bacteria smears negative

What treatment should he receive at this time?

1. Fluconazole
2. Itraconazole
3. Ketoconazole
4. Posaconazole
5. Voriconazole

Correct!
1. Fluconazole

Any of these medications can be used to treat coccidioidomycosis. However, fluconazole is usually considered the drug of choice although there are no controlled trials supporting its preferred use. He had actually been started on oral fluconazole several days earlier and was switched from oral to IV therapy. Unfortunately, he continued to do poorly. Over the next 3 days his respiratory status deteriorated, requiring hi-flow 40 lpm and 80% FIO₂.

Liposomal amphotericin B was initiated but he continued to do poorly. Chest x-ray and subsequent CT confirmed worsening of multifocal infiltrates with small effusions (Figure 3).

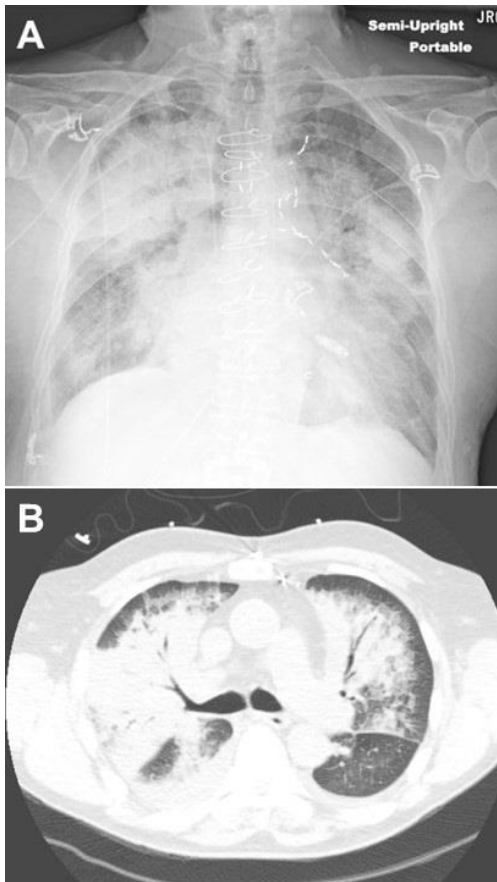


Figure 3. A: Repeat portable chest x-ray and B: CT scan in lung windows done on 10/30.

He required intubation on 10/31. Liposomal amphotericin B was continued and fluconazole switched to posaconazole. He slowly improved and was able to be extubated after on 11/9. A chest x-ray showed improvement (Figure 4).

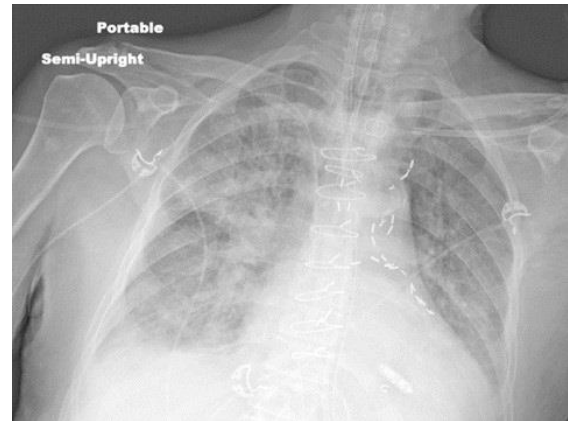


Figure 4. Repeat portable chest x-ray taken after 10 days of mechanical ventilation just prior to extubation.

Two days later on 11/11, he had worsening oxygenation, again requiring high flow oxygen with 80% FIO₂. Diuresis had been continued with creatinine now at 2.5 mg/dL and his serum Na⁺ was 151 mEq/L. Repeat echo indicated his ejection fraction was 62% with a normal inferior vena cava. A portable chest radiograph showed worsening consolidation (Figure 5).



Figure 5. Repeat portable chest x-ray done on 11/11.

At this juncture, the patient said he had enough and made himself do not intubate/do not resuscitate (DNI/DNR).

What *should be done* at this time?

1. Corticosteroids
2. Discussion with the patient regarding accepting mechanical ventilation
3. Switch the posaconazole to itraconazole
4. 1 and 3
5. Any of the above

Correct!
1. Corticosteroids

He was begun on methylprednisolone 60 mg IV daily. He had marked clinical improvement. A subsequent chest radiograph after 4 days demonstrated improvement (Figure 6)

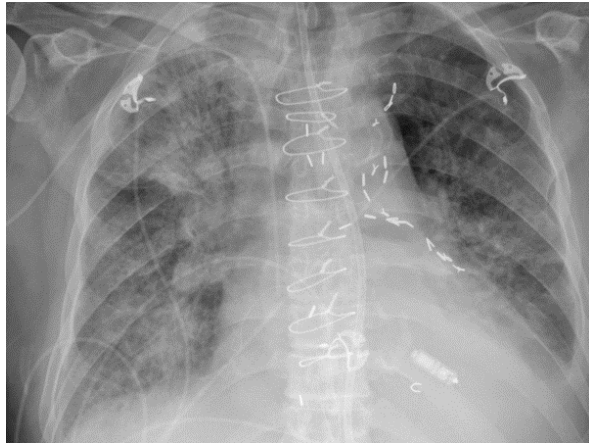


Figure 6. Chest x-ray done on 11/18.

After an additional 5 days of treatment, he was saturating well on room air and was able to be discharged to home. There are only a few case reports of corticosteroid therapy being clinically beneficial in severe pulmonary cocci (5,6). The proposed mechanism is similar to that proposed in some other infections (PJP, ?Covid-19) in which an excessive inflammatory response is suppressed.

The above should not be considered an endorsement of corticosteroid usage in Valley Fever. Anecdotal reports of benefits of corticosteroids have been seen with other diseases. However, when subjected to investigation corticosteroids did not prove to be beneficial. At this juncture with such limited data corticosteroids might be a consideration when a patient is doing poorly.

References

1. Pahal P, Rajasurya V, Sharma S. Typical Bacterial Pneumonia. 2020 Aug 15. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. [\[PubMed\]](#)
2. Metlay JP, Waterer GW, Long AC, Anzueto A, Brozek J, Crothers K, Cooley LA, Dean NC, Fine MJ, Flanders SA, Griffin MR, Metersky ML, Musher DM, Restrepo MI, Whitney CG. Diagnosis and Treatment of Adults with Community-acquired Pneumonia. An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America. *Am J Respir Crit Care Med.* 2019 Oct 1;200(7):e45-e67. [\[CrossRef\]](#) [\[PubMed\]](#)
3. CDC. Valley Fever (Coccidioidomycosis) Statistics. Available at: <https://www.cdc.gov/fungal/diseases/coccidioidomycosis/statistics.html> (accessed 11/28/20).
4. Shibli M, Ghassibi J, Hajal R, O'Sullivan M. Adjunctive corticosteroids therapy in acute respiratory distress syndrome owing to disseminated coccidioidomycosis. *Crit Care Med.* 2002 Aug;30(8):1896-8. [\[CrossRef\]](#) [\[PubMed\]](#)
5. Chang MR, Chopra N, Beenhouwer D, Goetz MB, Hoo GWS. Corticosteroids in the Management of Severe Coccidioidomycosis. *Am J Med.* 2019 Jan;132(1):110-113. [\[CrossRef\]](#) [\[PubMed\]](#)