

Does COVID-19 Make Your Heart Race? -Atrial Fibrillation in Novel Coronavirus

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Abstract

The novel coronavirus COVID-19 has caused the first pandemic of this decade. As we continue to learn more about COVID-19, little is known about cardiovascular manifestations of COVID-19. We present a case of a patient that developed new onset atrial fibrillation as an unusual manifestation of COVID-19 infection.

Case Presentation

A 99-year-old female presented to the emergency department with fever at home, cough, shortness of breath, and diarrhea for 1 week. She reported that with the exception of going to church, she had remained at home, following executive orders, due to concerns of the novel coronavirus. She denied any recent travel or sick contacts at home or when she visited church. She stated that she was fully independent at home prior to getting sick. Vitals showed temperature of 37.9°C (100.0°F), blood pressure of 152/79 mm Hg, heart rate of 90 beats per minute, respiratory rate of 18 breaths per minute, and oxygen saturation of 95% on room air. She was alert and oriented. Cardiac exam revealed regular rhythm on presentation, S1 and S2 were heard and were unremarkable. The rest of the physical examination was noncontributory.

Past Medical History

This included a history of hypertension, intermittent asthma, and colon cancer (in remission) status post right hemicolectomy 3 years before presentation. She denied history of atrial fibrillation.

Differential Diagnoses

COVID-19 pneumonia, bacterial pneumonia, viral exanthem

Investigations

A chest X-ray on presentation showed minimal left lower lobe atelectasis with suggestion of mild bilateral infiltrates (Figure 1). Initial ECG showed sinus rhythm at approximately 75 beats per minute (Figure 2). Labs were significant for leukopenia 3.0×10^9 cells per microliter with lymphopenia of 0.4×10^9 cells per microliter, thrombocytopenia 101,000 cells per microliter, and a negative influenza and respiratory viral panel. Electrolytes were within normal limits throughout the patient's hospitalization (Tables 1&2). She was placed in isolation with contact and droplet precautions, and the state department of health was contacted for COVID-19 testing. Twenty-four hours after admission, the test returned positive for COVID-19. Her hospital course was complicated by progressive hypoxemia, requiring oxygen supplementation. Approximately 44 hours after admission, the patient developed a rapid heart rate of 126 beats per minute. An ECG at the time showed atrial fibrillation with rapid ventricular response (RVR) (Figure 3). A transthoracic echocardiogram was not performed in order to mitigate risk of transmission of COVID-19 to hospital staff.



Figure 1: Chest X-ray showing mild left sided atelectasis and mild bilateral infiltrates.

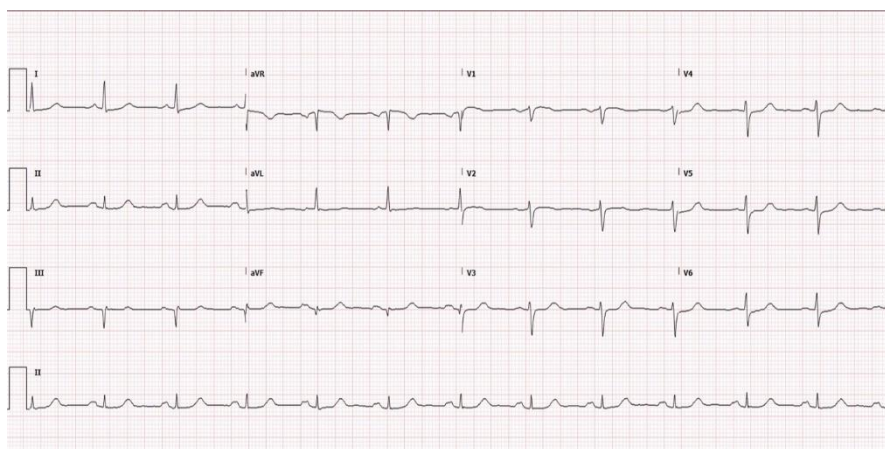


Figure 2: Electrocardiogram on presentation to the emergency department

Laboratory Test	Value
WBC Count	3.0 x 10 ⁹ cells / μL
Absolute lymphocyte count	0.4 x 10 ⁹ cells / μL
Sodium	138 mEq/L
Potassium	4.1 mEq/L
Magnesium	2.1 mEq/L
Troponin	< 0.03
COVID-19 RT-PCR	Positive

Table 1: Pertinent Laboratory Findings on Admission.

Laboratory Test	Value
WBC Count	3.9 x 10 ⁹ cells / μL
Absolute lymphocyte count	0.6 x 10 ⁹ cells / μL
Sodium	139 mEq/L
Potassium	3.9 mEq/L
Magnesium	2.0 mEq/L
Troponin	< 0.03

Table 2: Pertinent Laboratory Findings when Patient Developed Atrial Fibrillation.

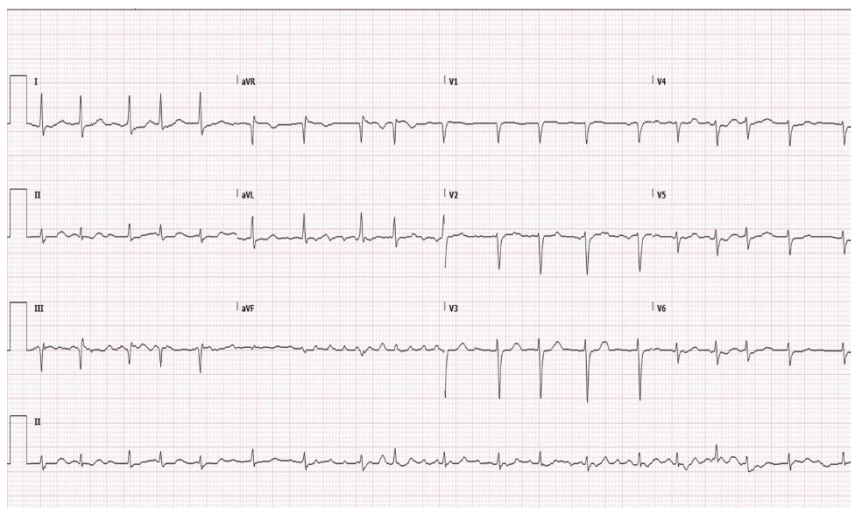


Figure 3: Electrocardiogram on development of atrial fibrillation with rapid ventricular response

Management

The patient received metoprolol 5 mg intravenously and supplementary oxygen. With this intervention, she converted to sinus rhythm. Subsequently, the patient developed recurrent atrial fibrillation with RVR on telemetry and was started on low-dose carvedilol 3.125 mg PO BID, which helped achieve rate control. The COVID-19 response team was contacted for further recommendations regarding potential treatment with hydroxychloroquine and/or azithromycin but considering her new onset arrhythmia, the patient was managed with supportive care alone. She remained in atrial fibrillation at discharge and was continued on carvedilol. Anticoagulation was offered given her CHA₂DS₂-VASc score of 4 and low HAS-BLED score of 1; however, the patient declined anticoagulation due to her concerns of bleeding. She was discharged 15 days later on 1 L oxygen with activity. She was seen in follow up as an outpatient 10 days later and remained in atrial fibrillation at that time. She had returned to her baseline functional status.

Discussion

The novel coronavirus COVID-19 has been a devastating global pandemic, with over 10 million reported cases and over 508,000 deaths worldwide [1]. One of the most frightening characteristics of this pandemic is the variability in clinical presentation and disease progression. Of note, a study involving 138 hospitalized patients indicated that one of the common complications of the COVID-19 infection is arrhythmia, occurring in approximately 16.7% of patients [2]. Unfortunately, the study did not clarify which types of arrhythmias are most common in patients with concurrent COVID-19 infection [3]. Additionally, the study noted the arrhythmias were more commonly found in the ICU setting vs. the non-ICU setting [2,3].

Atrial fibrillation is known to be the most common arrhythmia in the United States [4,5]. Risk factors of atrial fibrillation include advanced age, hypertension, and ischemic heart disease. Less common risk factors are prolonged alcohol use, recent cardiac surgery, and thyroid disorders. While atrial fibrillation is known to be associated

with the aforementioned risk factors, there is limited knowledge of association of atrial fibrillation and COVID-19. Notably, it is possible the profound hypoxemia seen in COVID-19, as was seen in our patient, may be a trigger for atrial arrhythmias like atrial fibrillation. Additional consideration should be made for anticoagulation in atrial fibrillation, considering the elevated risk of arterial and venous thromboembolism in sicker patients [6]. Further studies may be warranted in assessing thrombotic risk of atrial fibrillation in patients diagnosed with COVID-19.

Our case is unique for several reasons. First, the patient had no history of ischemic heart disease predisposing her to atrial fibrillation. In analysis of approximately 44,000 patients, while approximately 12% of patients diagnosed with COVID-19 had underlying hypertension, patients with cardiovascular disease (not including hypertension) were more inclined to experience significant morbidity and mortality [7,8]. Additionally, our patient was managed in the non-ICU setting, which in itself is another uncommon finding, since the Wang et al study found arrhythmias to be more common in the ICU setting [2].

One important step in clinical decision making was whether hydroxychloroquine and/or azithromycin should be used to treat COVID-19. Considering the development of new onset atrial fibrillation and the propensity for hydroxychloroquine and azithromycin to increase the potential arrhythmogenicity, a decision was made not to treat this patient with these medications. Fortunately, this patient responded well to supportive measures. Recent studies show benefit in utilizing these two agents to minimize time to resolution of COVID-19 shedding [9]. However, as our case highlights, each clinical scenario should be carefully considered and treatment tailored to the appropriate clinical context.

Conclusion

Outcomes of COVID-19 infection have been deeply concerning in the elderly due to high rates of morbidity and mortality. Existing evidence from prior clusters provide limited insight into the incidence of cardiac manifestations in COVID-19. This case report emphasizes the importance

of heightened vigilance for atrial fibrillation and other cardiac manifestations in high risk patients with COVID-19 as they may suggest a worse prognosis. A more comprehensive investigation of clinical manifestations of cardiovascular complications associated with COVID-19 is needed.

Learning Objectives

- To understand atrial fibrillation can be identified in patients diagnosed with COVID-19
- To understand how atrial fibrillation was managed in a hospitalized patient with COVID-19
- To consider avoiding hydroxychloroquine and azithromycin as treatment for COVID-19 in patients with diagnosed with new onset arrhythmia

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