Pericarditis as a Secondary Complication of COVID-19 in a Renal Transplant Patient

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ABSTRACT

Introduction: A wide range of complications from COVID-19 are being reported, including cardiac complications.

Case Presentation: A 71-year-old woman with systemic lupus erythematosus complicated by focal segmental glomerular sclerosis status post kidney transplant presented with worsening left-sided chest pain after receiving treatment for COVID-19 pneumonia at an outside hospital. She was subsequently diagnosed with acute pericarditis, likely secondary to viral infection with COVID-19, and was successfully treated with aspirin and colchicine for 90 days without complications.

Discussion: NSAIDs and colchicine are mainstays in acute pericarditis treatment. Though treatment presented a potential challenge given this patient's prior kidney transplant, aspirin and colchicine proved to be effective in treating her case of COVID-19-associated pericarditis.

Conclusion: This report has implications for future treatment of renal transplant patients with COVID-19-related pericarditis and emphasizes the need for research into the pathophysiology of pericarditis in the context of COVID-19, including risk factors and treatment.

INTRODUCTION

Since the first described cases in December 2019 in Wuhan, China, SARS-CoV-2—the virus responsible for the COVID-19 pandemic—has infected over 175 million people worldwide, with the death toll exceeding 3.8 million at the time of this publication.[1,2] It is now well-known that common clinical characteristics of COVID-19 include fever, cough, dyspnea, and fatigue. It is also well understood that individuals with comorbid medical conditions, such as hypertension, diabetes, and other cardiovascular conditions, are more likely to have a severe progression of and worse prognosis from the disease.[3]

As the novel coronavirus continues to affect the global population, other presentations and complications are emerging. Neurologic, dermatologic, and cardiac complications all have been reported. Cardiac presentations have included acute myocardial injury, myocarditis, acute heart failure, and acute myocardial infarction.[4,5]

This case report describes a case of COVID-19-associated pericarditis in an elderly woman with a complex medical history and discusses potential treatment options for future cases of COVID-19-related pericarditis, specifically in patients with systemic lupus erythematosus status-post renal transplant.

CASE REPORT

A 71-year-old woman with a history of systemic lupus erythematosus complicated by focal segmental glomerular sclerosis status post living related donor kidney transplant in 2005, Hepatitis C, type 2 diabetes mellitus, asthma, and obstructive sleep apnea presented to the hospital with chest pain and shortness of breath. Her home medications included allopurinol, amlodipine, insulin, metformin, metoprolol, mycophenolate mofetil, spironolactone, tacrolimus, and trazodone. Notably, she was discharged 1 day prior from a different hospital after a week-long stay where she was treated for COVID pneumonia with remdesivir for 5 days and dexamethasone 6mg daily for 7 days. She did not receive convalescent plasma, and intubation was not necessary. She also was noted to have acute metabolic encephalopathy, likely secondary to her COVID infection, which resolved by the time of discharge.

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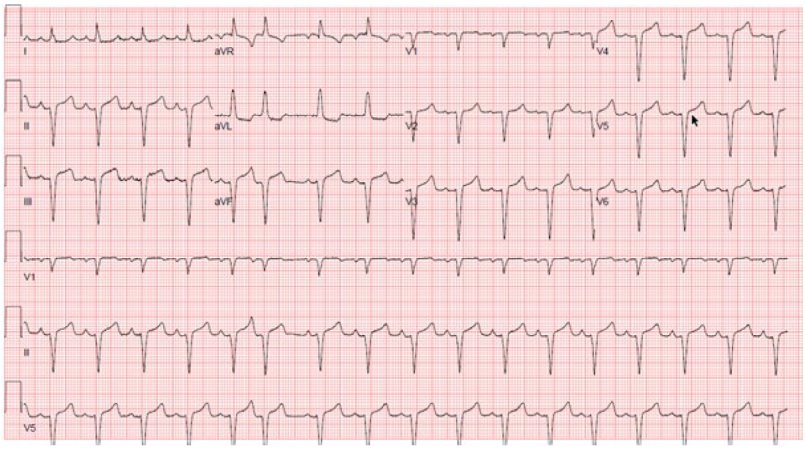
Figure. Electrocardiogram Revealing Sinus Tachycardia and ST-Elevations in Leads II, III, aVF, and V1-V6



Upon arrival to the hospital, the patient endorsed a week-and-a-half long history of intermittent left-sided burning/sharp chest pain that radiated to her neck and left shoulder. The pain was exacerbated while supine and with deep inspiration and improved on sitting upright and leaning forward. On examination, she appeared anxious and uncomfortable. She was afebrile, hypertensive to 173/88 mm of Hg, had a regular heart rhythm but was tachycardic with pulse of 105/minute, and tachypneic to 22/minute. Palpation over her sternum revealed reproducible pain. On cardiac exam, she was noted to have a friction rub that was more noticeable when learning forward. The remainder of the exam was largely unremarkable.

Initial labs revealed elevated lactic acid to 2.3 mmol/L (reference range 0.5-2.0 mmol/L), a high-sensitivity troponin level of 283 ng/L (reference range < 10 ng/L), unremarkable complete blood cell count and basic metabolic panel, including a creatinine of 0.75 mg/dL (reference range 0.50-1.10 mg/dL). Labs also demonstrated elevated ferritin to 615.0 mg/dL (reference range 18.0-340.0 mg/dL), elevated C-reactive protein to 1.60 mg/dL (reference range 0.00-0.50 mg/dL), and elevated D-dimer to 2.59 mg/L (reference range < 0.69 mg/L), suggesting the presence of inflammation. Electrocardiogram (ECG) showed diffuse ST segment elevations in leads II, III, aVF, and V1-V6 concerning for acute coronary syndrome (Figure). The patient was subsequently started on clopidogrel and a heparin drip. Contrast transthoracic echocardiogram revealed severe left ventricular hypertrophy, no wall motion abnormalities, no pericardial effusion, and left ventricular ejection fraction (LVEF) of 64%. This study was largely unchanged from her most recent previous echocardiogram done in 2019, aside from a previously normal-sized left ventricle. LVEF in 2019 was 62%. Within 2 hours of admission to the transplant medicine team, troponin decreased to 142 ng/L. Based on presentation, physical examination findings, down-trending troponins, ECG and echocardiogram findings, it was determined that her symptoms were likely secondary to pericarditis rather than acute coronary syndrome. Clopidogrel and heparin were discontinued, and she was started on aspirin 650 mg 3 times daily and colchicine 1.2 mg twice daily for the first day of treatment, followed by 0.6 mg twice daily for 90 days. The primary team also discussed this plan with her outpatient transplant nephrologist prior to initiating, who agreed with the treatment regimen and recommended continuing home immunosuppression regimen.

The patient's chest pain improved over the course of her admission, and she remained hemodynamically stable. She was discharged on day 4 of hospitalization with close follow-up scheduled with her primary care physician for aspirin taper and monitoring for potential treatment side effects. On follow-up chart review, there were no reported complications from her treatment by her outpatient medical teams.

DISCUSSION

Acute pericarditis is defined as inflammation of the pericardium that may present with or without concomitant pericardial effusion. The diagnosis is made with 2 of the following criteria: (1) typical chest pain—usually pleuritic and positional in nature, (2) pericardial friction rub on physical exam, (3) ECG changes consistent with pericarditis—new PR depression or ST-segment deviations, and (4) pericardial effusion.[6] Most cases of acute pericarditis are triggered by viral infections, though it is well-known that acute pericarditis also can result secondary to systemic inflammatory or autoimmune conditions, such as systemic lupus erythematosus.

Our patient met criteria for acute pericarditis diagnosis as she had typical chest pain and ECG changes, as well as a friction rub on exam. Current Centers for Disease Control and Prevention guidelines recommend treating COVID-19 pneumonia with up to 10 days of dexamethasone in patients requiring supplemental oxygen.[7] Our patient received only 7 days of dexamethasone treatment prior to discharge from the outside hospital. We speculate this shorter course of corticosteroids, along with her predisposition as a patient with systemic lupus erythematosus, may have contributed to the development of her acute pericarditis. It is also possible that she had pericarditis earlier in her illness; the course of steroids received during her first hospitalization may have masked the original pleuritic chest pain.

Considering her complex medical history, including her previous kidney transplant, treatment presented a potential challenge. The mainstay of acute pericarditis treatment includes aspirin or NSAIDs, with colchicine as a potential add-on treatment to prevent recurrence.[8] Drug choice is dependent on contraindications or presence of other comorbid conditions.

It is well-known that NSAID use is contraindicated in patients with kidney disease. Though our patient had a history of living-donor kidney transplantation, her current kidney function was within normal limits. The evidence for or against the use of NSAIDs in COVID-19 patients is still being debated, though the World Health Organization has declared there is no evidence to support the role of NSAIDs in progression or severity of the disease.[9] There is also a paucity of evidence on use of colchicine in COVID-19 infection. Its use is limited by its toxicity, which ranges from mild gastrointestinal side effects to potentially fatal myotoxicity and rhabdomyolysis.[10] As colchicine undergoes both hepatic and renal metabolism, patients with hepatic or renal impairment are at increased risk of toxicity as are patients taking drugs that may inhibit these processes, including p-glycoprotein or CYP3A4 inhibitors. The calcineurin inhibitors cyclosporine and tacrolimus are inhibitors of p-glycoprotein and CYP3A4 and have been shown to potentially increase risk of colchicine toxicity when either is administered concomitantly with colchicine.[11–15] Our patient was taking tacrolimus as part of her immunosuppressant regimen at the time she presented with pericarditis, which presented a potential treatment challenge.

In other cases of COVID-19-associated pericarditis, colchicine, aspirin, and NSAIDs such as ibuprofen have been used and have shown success as treatment options.[16–20] Of particular importance to our case, there has been at least 1 other case of acute pericarditis secondary to COVID-19 infection in a kidney transplant recipient, who responded well and without complications to treatment with colchicine.[19] We were aware of the potential risks of using colchicine in this patient. However, given the previous case report demonstrating safe use of colchicine in a renal transplant patient on tacrolimus, we opted for treatment with both aspirin and colchicine due to our patient's higher risk for recurrence given her history of systemic lupus erythematosus, with close follow-up scheduled with her outpatient transplant team.

CONCLUSION

This case highlighted a unique complication of COVID-19 infection in a patient with systemic lupus erythematosus status post renal transplant, which was treated effectively with aspirin and colchicine without complications. To our knowledge, this is the first reported case of COVID-19-associated pericarditis in a kidney transplant patient successfully treated with aspirin and colchicine. Though more research is needed to fully understand the pathophysiology of pericarditis in the context of COVID-19, including risk factors and treatment options, this case report adds to a growing body of evidence on how to manage this complication in patients with more complex medical histories.

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