Mycoplasma Pneumoniae Myocarditis In A Young Man

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Abbreviations: CMR = Cardiac Magnetic Resonance**; CMV =** Cytomegalovirus; **CT** = Computed Tomography; **EBV** = Epstein-Barr virus; **EKG** = Electrocardiogram; **ELISA** = Enzyme Linked Immunosorbent Assay; **HIV** = Human Immunodeficiency Virus; **HSV** = Herpes Simplex Virus**; ICU** = Intensive Care Unit**; IgM** = Immunoglobulin M; **IVIG** = Intravenous Immunoglobulin; **LHC** = Left Heart Catheterization; **NSAID** = Non-Steroidal Anti-Inflammatory Drug; **PCR** = Polymerase Chain Reaction; **STEMI** = ST-Segment Elevation Myocardial Infarction; **TTE** = Transthoracic Echocardiogram; **URI** = Upper Respiratory Infection

Abstract

A 23-year-old man presented with acute diarrhea and chest pain that improved when sitting forward. Electrocardiogram showed diffuse inferolateral ST-segment elevations, and a left heart catheterization which demonstrated no coronary disease. Cardiac magnetic resonance imaging was suggestive of myocarditis, and infectious work-up was notable for positive *Mycoplasma pneumoniae* immunoglobulin M. The patient's symptoms and cardiac biomarkers improved with azithromycin.

1. Introduction

Mycoplasma pneumoniae is the smallest free-living organism and is largely a respiratory pathogen. Extrapulmonary manifestations are not common, and cardiac ones even more rare with an incidence of 1-5% [1,2]. There is currently a paucity of literature describing practice guidelines for *Mycoplasma* myocarditis, with the landscape largely dominated by case reports [3-7].

2. Case Report

A previously healthy 23-year-old man presented with acute diarrhea accompanied by fever, rhinorrhea, productive cough, intermittent chest pain, and abdominal discomfort. Notably, his chest pain was described as burning and improved with forward sitting. While he denied symptoms like palpitations, shortness of breath, or edema, he did report exposure to a sick family member. Presenting vitals were notable for heart rate of 111 beats/minute, blood pressure 104/67 mmHg, normal temperature, and normal peripheral oxygen saturation on room air. On physical exam, he was in no acute distress, his heart had regular S1/S2 without pericardial friction rub, his lungs were clear to auscultation, his abdomen was mildly tender to palpation in the right upper quadrant without rebound or guarding, and he had no remarkable skin findings.

The patient had no past medical history. He denied toxic habits. His occupation was a student. He had no recent travel history or clear *Mycoplasma* exposure.

Electrocardiogram demonstrated diffuse ST-segment elevations in an inferolateral distribution. The patient was taken emergently for Left Heart Catheterization (LHC) with demonstrated no coronary disease. Endomyocardial biopsy was deferred. He was admitted to the cardiac intensive care unit post-procedurally for monitoring, further work-up, and management.

Labs were notable for normal white blood cell count, normal basic metabolic panel, and initial high-sensitivity troponin I of 7,112 ng/L (normal ≤ 58 ng/L) which peaked at 7,140 ng/L. BNP was 179 pg/mL (normal ≤ 100 pg/mL), CRP was 15.4 mg/dL (normal ≤ 0.9 mg/dL), and ESR was 85 mm/hr (normal ≤ 20 mm/hr). Transthoracic Echocardiogram (TTE) demonstrated normal left ventricular function and size, normal right ventricular function and size, normal valves, no regional wall motion abnormalities, and no pericardial effusion. Cardiac Magnetic Resonance Imaging (CMR) was performed including steady-state free precession cine imaging, parametric T2 mapping, and Late Gadolinium Enhancement (LGE) imaging. CMR demonstrated subepicardial and mid-myocardial LGE in the mid-distal posterolateral/lateral and basal posterolateral walls of the left ventricle, a non-ischemic pattern suggestive of myocarditis (Figure 1). There was no pericardial thickening, effusion, or enhancement. T2 mapping was normal, and there were no regional wall motion abnormalities.

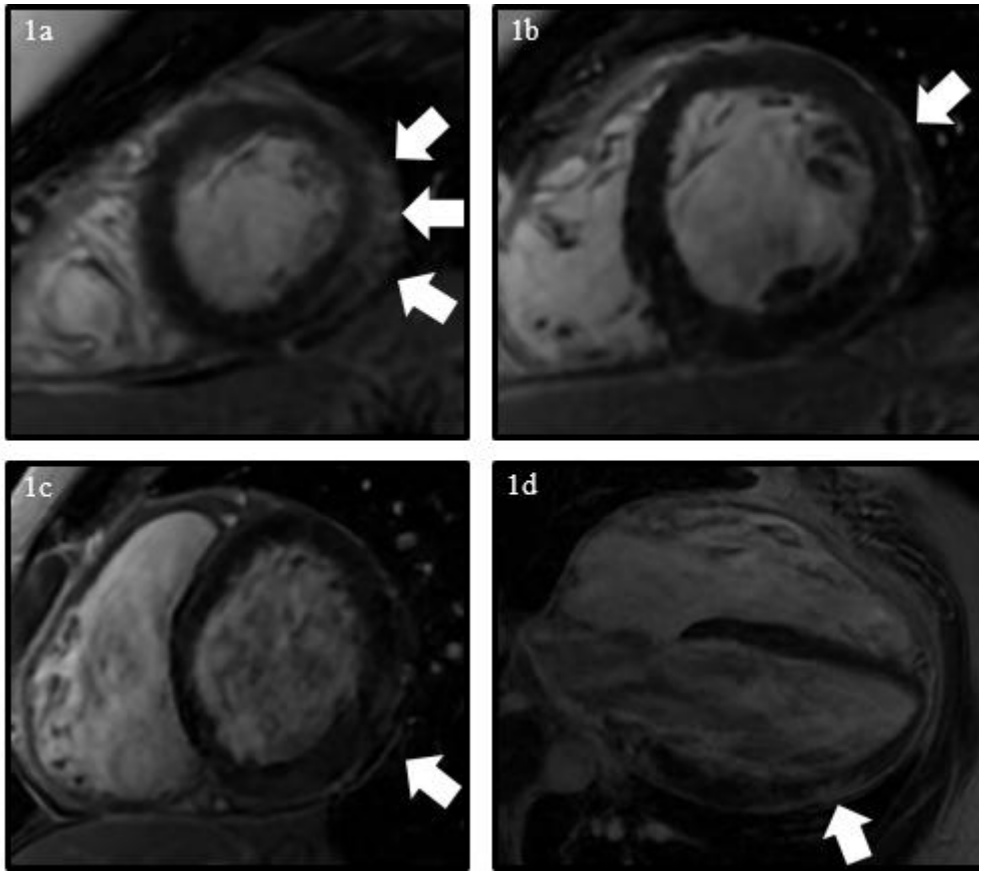

Figure 1: Cardiac magnetic resonance images of late gadolinium enhancement demonstrating subepicardial and mid-myocardial enhancement in the left ventricular mid-distal posterolateral/lateral wall on short-axis view (1a-1b), basal posterolateral walls on short-axis (1c), and mid-lateral wall in four-chamber (1d).

Infectious work-up was most notable for a positive *Mycoplasma pneumoniae* immunoglobulin M (IgM+) detected by ELISA (enzyme linked immunosorbent assay), and negative immunoglobulin G. The following work-up was negative: respiratory viral panel, Covid Polymerase Chain Reaction (PCR), Cytomegalovirus (CMV) IgM/PCR, Epstein-Barr virus (EBV) IgM, toxoplasma IgG/IgM, Human Immunodeficiency Virus (HIV) antibody/antigen, Herpes Simplex Virus (HSV) 1+2 PCR, coxsackie B(1-6) antibody, Legionella urinary antigen, peripheral blood cultures x2, gastrointestinal panel PCR, Clostridioides (formerly Clostridium) difficile PCR. Parvovirus B19 IgM was equivocal at 1.27 IV (upper limit of normal ≤ 0.90 IV). Computed tomography (CT) of his chest demonstrated multi-lobar peribronchovascular opacities compatible with pneumonia and no pulmonary embolism.

High-sensitivity troponin I rapidly self-improved without corticosteroids; no Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) were given due to a prior allergy, and no colchicine because of ongoing diarrhea. Infectious diseases was consulted and recommend azithromycin 500mg once a day for 3 weeks. The patient's diarrhea improved with azithromycin, high-sensitivity troponin I

downtrended to 985 ng/L on hospital day 3, and he was discharged on hospital day 4. The patient was lost to follow-up after discharge. Multiple attempts to reach him and his family were unsuccessful.

3. Discussion

Though there lacks an abundance of reports on *Mycoplasma pneumoniae* myocarditis, we present the existing literature. However, one review of 21 patients found 15 with pericarditis, 5 with myocarditis, and 1 with myopericarditis; 19 of 21 received antibiotics, 3 patients were "left with long-term sequelae," and 1 patient ultimately passed away [8]. Though the median age in this case series was 32 years, there are reports of *Mycoplasma* myocarditis patients as young as 6-years-old [1,8]. Though most patients present stably, there is one case report of a patient with *Mycoplasma* myocarditis leading to cardiogenic shock requiring intravenous immunoglobulin (IVIG) treatment [9].

EKG can be a helpful instrument in making the diagnosis of myopericarditis, such as the diffuse ST-segment elevations seen in our patient's EKG, and CMR can aid in diagnosing myocarditis. Macrolides such as azithromycin tend to be the treatment of choice as they inhibit *Mycoplasma* growth, though tetracyclines such as doxycycline have also been reported in the literature [9]. Infectious diseases consultation can be reasonable, especially for more acutely sick patients. The longer-term complication rate of *Mycoplasma* carditis is somewhere between 30-50% [2,8]. Our patient fits the typical demographic of younger men who usually incur *Mycoplasma* infection, presented with diagnostic clues on his EKG and suggestive features on CMR, and ultimately improved rapidly on macrolide therapy.

4. Conclusion

A 23-year-old man presented with acute diarrhea and chest pain that improved when sitting forward. EKG showed diffuse STE, and a LHC demonstrated no coronary disease. CMR was suggestive of myocarditis, and infectious work-up was notable for *Mycoplasma pneumoniae* IgM+. The patient's symptoms and cardiac biomarkers improved with azithromycin.

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