

## Introduction:

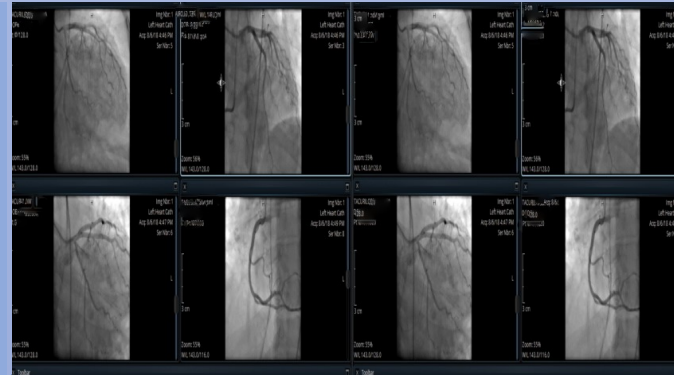
Myocarditis is clinically and pathologically defined as inflammation of the myocardium. The disease can present as a wide array of symptoms ranging from non-specific self-limiting symptoms to fulminant arrhythmias, hemodynamic collapse and death.

## Case:

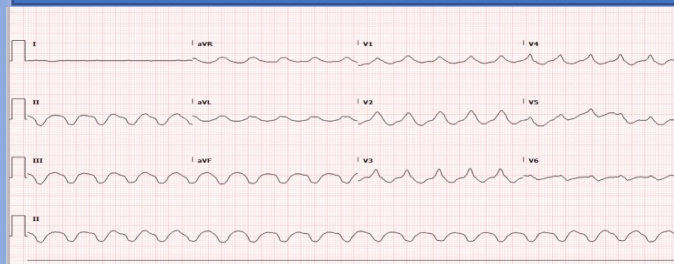
56 y/o woman with no significant past medical history presented to ED with two days of body ache, fever, and nausea. Her symptoms progressed to lower chest pain, dyspnea and vomiting. On evaluation, patient was found to be in cardiogenic shock requiring vasopressor support, later developed incessant VT requiring defibrillation and anti-arrhythmic support. Cardiac testing revealed elevated troponin, echo showed EF of 15-20% with RWMA. Ischemia was suspected but LHC showed non-obstructive coronary disease. Mechanical support with Impella was placed promptly and endomyocardial biopsy was obtained. She did receive systemic steroids. Despite being on four vasopressors and circulatory support, her condition deteriorated, and VA ECMO was initiated. Unfortunately, her condition continued to deteriorate and, she eventually went into multi-organ failure and died.

## Discussion:

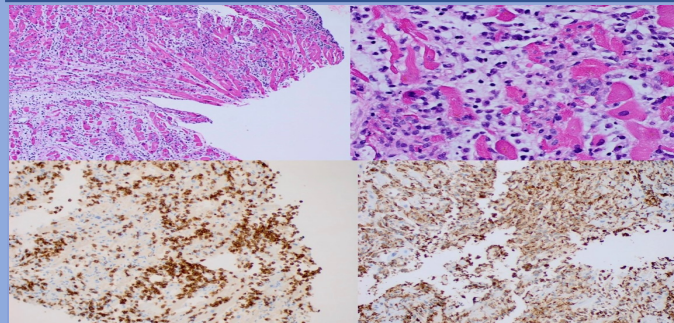
Myocarditis is diagnosed using an established histological and immune-histochemical criteria.  
-The standard Dallas pathological criteria requires inflammatory cellular infiltrate with or without associated myocyte necrosis on conventionally stained heart-tissue section.



A. Cardiac Catheterization showing clean coronaries



B. Ventricular tachycardia in this patient with Myocarditis



C. Inflammatory cellular Infiltrate on histology

- Histologic criteria includes inflammatory infiltrates associated with myocyte degeneration and necrosis of non-ischemic origin .
- Immuno-histochemical criteria includes abnormal inflammatory infiltrates defined as  $>14$  leukocytes/mm<sup>2</sup> including up to 4 monocytes/mm<sup>2</sup> with the presence of  $>7$  CD3-positive T lymphocytes/mm<sup>2</sup> .
- Cardiac biopsy remains the gold standard for diagnosis
- Echocardiography can be used in myocarditis diagnosis. Findings suggestive of myocarditis include left ventricular dilation, systolic and diastolic dysfunction and regional wall motion abnormalities
- Contrast Induced Cardiac MRI has high specificity: Findings of Myocardial hyperemia, edema and necrosis or scar
- Acute dilated cardiomyopathy and heart failure due to myocarditis should be managed according to AHA/ACC guidelines and the Heart Failure Society of America recommendations
- Despite advancements in the field of cardiology, diagnosing myocarditis still remains a challenge

## Conclusion:

The diagnosis of fulminant myocarditis to be considered in patients with unexplained ventricular arrhythmias. Endomyocardial biopsy is the gold standard to diagnose myocarditis and immunosuppressive therapy which could be lifesaving in patients with giant cell myocarditis. Mechanical support should be considered in patients with cardiogenic shock either as bridge to recovery or to transplant.