

## A OVERVIEW ON MYOCARDITIS

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**ABSTRACT:** The aim of this Article is to bring awareness about myocarditis. Myocarditis is an uncommon but potentially life-threatening disease it causes inflammation in the middle layer of heart wall and leads to sudden death.

Myocarditis is an intersection between genetic and acquired causes of human cardiomyopathy. This Article mainly focuses on classification, Pathophysiology, clinical features, mechanism, signs and symptoms, diagnosis.

This narrative review aims to summarize the current knowledge about myocarditis, with a particular attention to predictors of short and long term Prognosis, in order to provide a rational and practical approach to the diagnosis, evaluation and treatment of suspected myocarditis.

**KEYWORD:** Non-ischemic heart disease; myocardial inflammation; heart failure; life-threatening cardiac disease; predictors of outcome.

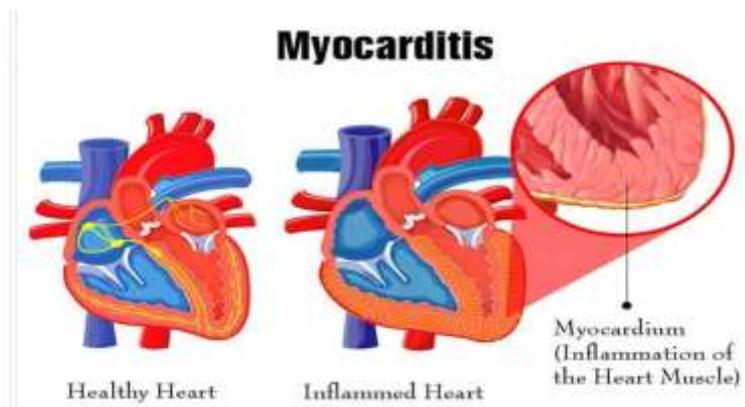
### 1. INTRODUCTION

**DEFINITION:** Inflammation of the middle layer of the heart wall. myocarditis is usually caused by a viral infection. A severe case can weaken the heart, which can lead to heart failure, abnormal heartbeat, and sudden death.

Myocarditis refers to the clinical and histological manifestations of a broad range of pathological immune processes in the heart. Myocarditis that looks like a heart attack. Because the blood arteries supplying the heart are inflamed, myocarditis can cause chest pain. While the heart's function is mostly retained, the inflow of inflammatory cells might cause reversible coronary closure due to spasm. Inflammation of the pericardium, also known as pericarditis, can cause chest pain that is worse while reclining backward and better when leaning forward. Myocarditis of the outer layers of the heart muscle is frequently accompanied by pericarditis.[1]

A cute or persistent heart failure-like myocarditis. Shortness of breath, weariness, and an inability to endure activity are all symptoms of myocarditis. Patients with enlarged hearts usually develop symptoms 2 weeks to a few months following gastrointestinal or upper respiratory infections (acute).

In the absence of infection, the immune system of the body may continue to attack the heart, resulting in a more chronic form. Chronic myocarditis can also be caused by a previous acute infection or heart muscle injury.[1]



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### 2. CLASSIFICATION OF MYOCARDITIS

The causal, histological, and clinicopathological criteria can all be used to classify myocarditis.[2][3][4][5][6][7][8][9][10]

**Myocarditis can be divided into three categories based on the causes:**

- Infectious myocarditis is a type of myocarditis that is caused by bacteria
- (Infectious myocarditis)
- Myocarditis caused by the immune system (Immune mediated myocarditis)
- Myocarditis caused by toxins (Toxic myocarditis)

**Myocarditis can be divided into five groups based on histological criteria:[11][12] [3]**

- Lymphatic myocarditis is a kind of myocarditis that affects the lymph
- Myocarditis with eosinophilia
- Polymorphic myocarditis is a type of polymorphic myocarditis.
- Myocarditis with giant cells
- Sarcoidosis of the heart

**Myocarditis can be divided into three groups based on clinicopathological four criteria: [13][14][15]**

- Myocarditis with fulminant symptoms.
- Acute myocarditis is a condition in which the heart muscle becomes inflamed.
- Chronic active myocarditis is a condition in which the heart muscle becomes inflamed.
- Chronic persistent myocarditis (CPM) is a kind of myocarditis.

#### **Pathophysiology of Myocarditis**

Myocarditis is a condition in which the myocardium is inflamed, and cardiac myocyte cells die. Lymphocytes, neutrophils, eosinophils, giant cells, granulomas, or a combination of these cells invade the myocardium in biopsy-proven myocarditis.

The pathogenesis of myocarditis is still being studied. Myocardial damage can be caused by a variety of methods.

A viral or other cardiotoxic substance causes direct cardiomyocyte damage.

An autoimmune reaction to an infectious or other cardiotoxic substance causes myocardial damage.

Inflammation of the myocardium can be widespread or localised. Myopericarditis occurs when inflammation spreads into the pericardium. The nature of symptoms depends on the level of cardiac involvement and extension into the neighboring pericardium. Heart failure, arrhythmias, and even sudden cardiac death can result from diffuse involvement. Focal involvement causes heart failure less frequently, but it can produce arrhythmias and sudden cardiac death. When the pericardium is involved, it causes chest pain and other pericarditis symptoms.[16]

### 3. CLINICAL FEATURES

- Heart Failure is a common symptom of Acute Viral Myocarditis, which is typically accompanied by fever and myalgias.
- Pain in the Chest (due to Pericarditis or myocardial injury & destruction) Palpitations (as a result of arrhythmias).
- Cardiogenic Shock develops quickly after a febrile respiratory condition (discharged from Urgent care settings for Viral illness)
- Unexpected death (in young adults, myocarditis causes up to 20 percent of all cases of sudden death)[1]

### 4. SEVERAL MECHANISMS OF MYOCARDIAL DAMAGE

**MYOCARDIAL DAMAGE HAS SEVERAL CAUSES:**

- Myocytes are directly injured by the infectious pathogen.
- A toxin, such as that produced by *Corynebacterium diphtheriae*, causes myocyte damage.
- Infection-induced immune response or autoimmunity causes myocyte damage.

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### Major mechanisms that contribute to myocarditis:

#### 5. INFECTION

- Virus
- Bacteria
- Parasites

#### IMMUNE ACTIVATION AGAINST INFECTIOUS PATHOGENS

- Innate immunity
- Adaptive immunity

#### PRIMARY IMMUNE MECHANISMS

- Myocyte injury
- Antigen mimicry
- Hypersensitivity reactions[17]

#### 6. SIGNS AND SYMPTOMS

You may experience modest symptoms such as chest pain, rapid or irregular heartbeats, or shortness of breath if you have myocarditis in its early stages. Some persons with myocarditis in its early stages have no symptoms.

Myocarditis symptoms and indicators vary depending on the source of the disease. The following are some of the most common myocarditis indications and symptoms:

- Pain in the chest
- Heartbeats that are fast or irregular (arrhythmias)
- At rest or during exertion, you may experience shortness of breath.
- Swelling of the legs, ankles, and feet due to fluid buildup Fatigue
- Headache, body aches, joint discomfort, fever, sore throat, and diarrhea are some of the other indications and symptoms of a viral infection.

Symptoms of myocarditis can be identical to those of a heart attack. Seek emergency medical attention if you are experiencing inexplicable chest discomfort and shortness of breath.[18]

- CHF (leading to edema, breathlessness and hepatic congestion). Palpitations are a type of heart palpitation that (due to arrhythmias).
- Unexpected death (in young adults, myocarditis causes up to 20 percent of all cases of sudden death).
- Fever is a symptom of a fever (especially when infectious) [1]

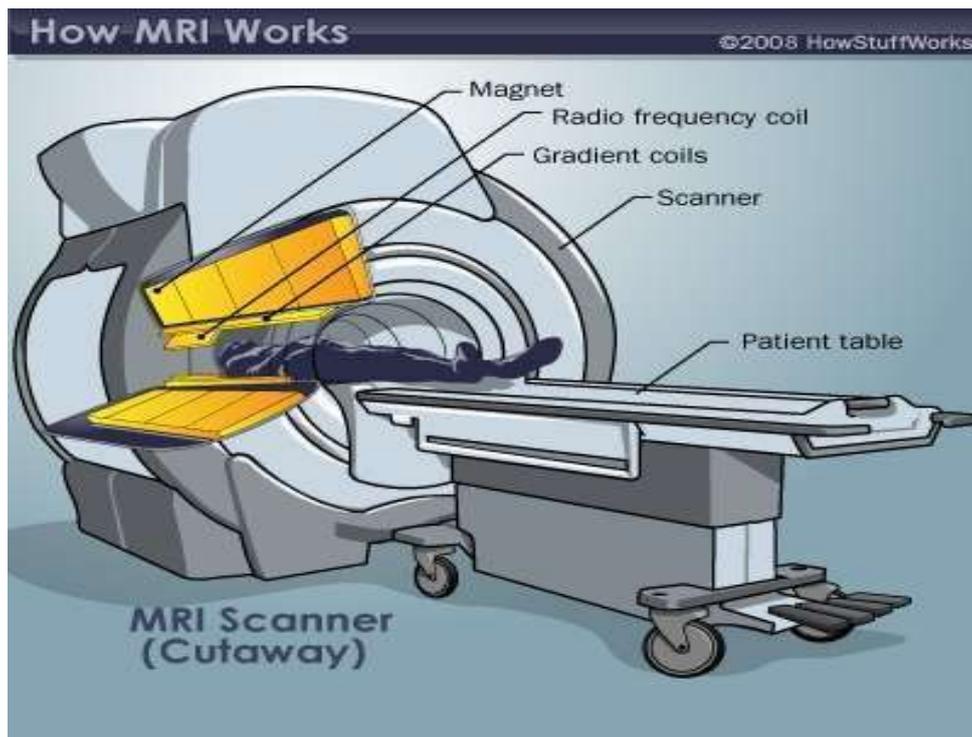
#### 7. DIAGNOSIS

Preventing long-term heart damage requires early detection of myocarditis. Your doctor may prescribe one or more tests after a physical examination to establish that you have myocarditis and to determine the severity of your condition. The following tests could be used to diagnose myocarditis:

- Electrocardiogram (ECG or EKG). This simple and painless test can detect irregular heartbeats by showing your heart's electrical patterns.
- Chest X-ray: An X-ray scan indicates the size and form of your heart, as well as whether or not you have fluid in or around it, which could indicate heart failure.
- Heart MRI: Magnetic resonance imaging of the heart (Cardiac MRI). Your heart's size, shape, and structure are revealed via a cardiac MRI. The results of this test may reveal evidence of cardiac muscle inflammation.
- Echocardiogram: The beating heart is represented by sound waves that move. An echocardiography can reveal the size of your heart and how well your heart is pumping
- Blood tests: Tests on the blood. A total blood count and a test to examine the levels of particular proteins (enzymes) that signify heart muscle injury are two blood tests used to diagnose or confirm myocarditis. Antibodies against viruses and other organisms that could cause a myocarditis-related illness can be determined using additional blood testing.
- Cardiac Catheterization: of the heart and biopsy of the heart muscle A catheter is a tiny tube that is placed into a vein in your leg or neck and then into your heart. Doctors may use a specific device to take a small sample of heart muscle tissue (biopsy) for laboratory analysis to screen for inflammation or infection. [19]

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MRI is emerging as an important tool for the diagnosis and follow-up of patients with acute myocarditis.



### 8. CONCLUSION

This review article concludes that myocarditis is a disorder that causes inflammation of the myocardium (HEART MUSCLE) and leads to fever, pain in the chest. In severe cases, it can weaken the heart, leading to heart abnormalities, heart failure, and sudden death.

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