

PEDIATRIC MYOCARDITIS



MYOCARDITIS
FOUNDATION



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DEFINITION:

Pediatric Myocarditis is a rare, sometimes fatal disease characterized by inflammation of the heart muscle in children under the age of 18 years. The disease can affect the muscle cells of the heart (myocytes), the heart valves and blood vessels, and the specialized electrical conduction pathways within the heart.

Most patients recover completely from acute or sudden myocarditis. In newborns, myocarditis can be severe due to an immature immune system. When the muscle cells of the heart weaken from myocarditis, the heart chambers may enlarge. This form of heart disease is called dilated cardiomyopathy. Children with dilated cardiomyopathy may develop symptoms of heart failure, sometimes necessitating a heart transplant. Heart failure resulting from myocarditis-induced dilated cardiomyopathy is a significant cause of disability and death in children.

ETIOLOGY:

Myocarditis may be caused by infections in the heart, autoimmune disorders, hypersensitivity reactions to drugs and toxin exposure. Viruses are the most common cause of myocarditis in children. Coxsackie B was the first virus associated with myocarditis. Many other viruses have also been implicated in children including Adenovirus, Parvovirus B19, Hepatitis B & C viruses and HIV. The heart can be damaged by the virus itself or by the body's immune defense against the virus. Drugs including some antibiotics, antipsychotics and anticonvulsants may rarely cause hypersensitivity reactions resulting in inflammation of the heart. Scorpion bites have been associated with myocarditis primarily in India. Autoimmune disorders associated with myocarditis include systemic lupus erythematosus, celiac disease, and sarcoidosis. Finally, Giant Cell Myocarditis is a rare but serious cause of acute dilated cardiomyopathy and heart failure carrying a high risk of death unless heart transplantation is performed.

SIGNS AND SYMPTOMS:

(When to suspect Pediatric Myocarditis)

Clinical manifestations of acute viral myocarditis are usually nonspecific and highly variable. They range from mild flu-like symptoms to sudden death. Many infants and children with myocarditis present with fulminant features such as rapid and labored breathing, wheezing, grunting, low blood pressure, cool extremities and decreased urine output. Older children may complain of fatigue, fever, vomiting and muscle aches a few days before developing more severe symptoms such as shortness of breath and exercise intolerance. More advanced symptoms include rapid heart rate, erratic and weakened pulse, pale color, sweating, and dizziness.

DIAGNOSIS:

(How is Pediatric Myocarditis Detected)

A physical examination may reveal signs of respiratory distress or decreased cardiac function. Clinical findings may include rapid respiratory or heart rate, retracting chest wall respiratory muscles, nasal flaring, distended neck veins, weakened pulse, irregular heart rhythm, cool extremities, enlarged liver, and low blood pressure. Some patients may develop a change in their mental status, becoming confused, disoriented or non-interactive.

Blood tests for cardiac injury may include:

- Troponin I may or may not be elevated in children with myocarditis.
- BNP will be elevated in myocarditis but cannot distinguish myocarditis from other causes of heart failure.
- Myoglobin is released during cardiac injury and increases with the severity of myocarditis.

The Electrocardiogram (ECG) is abnormal in about half of the cases and may show decreased electrical voltages or an irregular heart rhythm.

The Echocardiogram (ECHO) is usually non-specific but may reveal decreased left and or right ventricular pump function.

Magnetic resonance imaging (MRI) may detect inflammation of the heart muscle and can reveal myocardial edema and ischemia that often occur in myocarditis, though specificity is lacking. An area of “scar” is often noted where the myocarditis affected the heart.

THERAPY:

(What are the Treatment Options for Myocarditis?)

The primary treatment of myocarditis is supportive care based on guidelines and recommendations published by major cardiovascular organizations in North America and Europe. There are specific guidelines for the management of heart failure in children and standards of care for heart transplantation and pediatric cardiomyopathies. Children with a new diagnosis of myocarditis usually require hospitalization for treatment of heart failure and arrhythmias. In severe cases, extracorporeal membrane oxygenation (ECMO) or a ventricular assist device (VAD) may be necessary in the acute phase to allow the heart to recover or to serve as a bridge to transplantation. Immunoglobulin (IVIG) or corticosteroids have been used in some acute cases to inhibit the immune response. Following the acute phase, surviving patients may recover completely or have long-term deficits in cardiac function. In severe cases cardiac transplantation may offer the best chance for long-term survival.

EXPECTED OUTCOMES:

(What is the Prognosis for Myocarditis Patients?)

Although many children recover from myocarditis with no serious consequences, severe forms of myocarditis are associated with significant morbidity and mortality worldwide. Transplant-free survival rates are highly variable, ranging from 40%-80% over 5 years.

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