

# Myocarditis

By : assist. Prof. Nader Alaridah MD,PhD

# Background

- Myocarditis is an inflammatory disease of the cardiac muscle.
- Histologically, It is described as an inflammatory infiltrate of the myocardium with necrosis and/or degeneration of adjacent myocytes.
- There are multiple aetiologies including viral, bacterial, parasitic, fungal, allergic, eosinophilic, granulomatous, toxic, and post-viral immune-mediated response, infiltrative etc..
- Myocarditis usually manifests in an otherwise healthy person and can result in rapidly progressive (and often fatal) heart failure and arrhythmia.

# Epidemiology

- No racial predilection exists.
- No sex predilection exists in humans, but there is some indication in laboratory animals that the disease may be more aggressive in males than in females.
- Patients are usually fairly young. The median age of patients affected with lymphocytic myocarditis is 42 years.
- Younger patients, especially newborns and infants, immunocompromised patients may be more susceptible to myocarditis.

# Etiology

- Myocarditis is probably caused by a wide variety of infectious organisms, autoimmune disorders, and exogenous agents, with genetic and environmental predisposition.
- Coxsackie B virus is most often associated with myocarditis. It is a member of the picornavirus family and the enterovirus genus, and is closely related to other enteroviruses such as echovirus, poliovirus, and rhinovirus. Most adults have at some time been infected with this cardiotropic virus.

# Viral Causes

- Coxsackievirus types A and B, especially type B, are the most common viral causes of myocarditis.
- Adenovirus (types 2 and 5 most common)
- Cytomegalovirus
- Echovirus
- Epstein-Barr virus
- Hepatitis C virus
- Herpes Simplex virus
- Human immunodeficiency virus
- Influenza and parainfluenza viruses
- Measles virus
- Mumps, associated with endocardial fibroelastosis (EFE)
- Parvovirus B19
- Poliomyelitis virus
- Rubella virus
- Varicella -Zoster virus

# Enteroviruses

- Enteroviruses are picornaviruses that are extremely small RNA viruses, naked capsid virions with icosahedral symmetry.
- The coxsackieviruses, echoviruses, and other enteroviruses are widespread throughout the world.
- Coxsackieviruses type A (4,16), type B (1, 2,3,4,5) cause myocarditis.
- Their name is derived from their ability to infect intestinal tract epithelial and lymphoid tissues and shed into the feces, but do not commonly cause gastrointestinal diseases.

# Coxsackieviruses

- Coxsackie B viruses are estimated to be responsible for at least 50% of the cases of infection-caused heart diseases.
- For reasons yet unknown, the cardiac disease caused by this virus mainly occurs in middle-aged men, with onset occurring, on average, around age 42 years.
- The cardiac disease becomes apparent about two weeks after exposure to the virus.

# Transmission

- Humans are the major natural host for coxsackieviruses.
- Person-to-person.
- fecal–oral transmission.



# PATHOGENESIS

- Both direct viral-induced myocyte damage and post-viral immune inflammatory reactions contribute to myocyte damage and necrosis
- Inflammatory lesions and the necrotic process may persist for months, although the viruses only replicate in the heart for at most two or three weeks after infection
- Evidence from experimental models has incriminated cytokines such as interleukin-1 and TNF, oxygen free radicals and microvascular changes as contributory pathogenic factors

# Clinical presentation

- Clinical presentation varies considerably.
- In mild forms, there are few or no symptoms.
- In severe cases, patients may present with acute cardiac decompensation and progress to death.

# Prognosis

- Most patients with acute myocarditis and mild cardiac involvement recover without long-term sequelae.
- Patient with advance cardiac dysfunction, varied outlook.
- Patients with severe hemodynamic collapse at presentation actually have a good prognosis.
  - 93% transplant-free survival in 11 years.
- 30% of those with chronic myocarditis may recover

The End

# Other Rare Causes of Heart Infection

- Bacterial Causes
  - - Diphtheria - Myocarditis
  - - Psittacosis (*Chlamydia psittaci*) - Endocarditis
  - - Q fever (*Coxiella burnetii*) - Pericarditis, myocarditis, and endocarditis. Endocarditis is frequently associated with purpuric rash, renal insufficiency, stroke, and heart failure.
  - - Typhus (*Rickettsia* spp) - Myocarditis
- Parasitic Causes
  - - Chagas' Disease (*Trypanosoma cruzi*) - Myocarditis
  - - Trichinosis (*Trichinella spiralis*) - Myocarditis
  - - Amebiasis (*Entamoeba histolytica*) - Pericarditis
  - - Trypanosomiasis (*Trypanosoma brucei rhodesiense* or *T b gambiense*) - Myocarditis