

*Self study material



MICROBIOLOGY

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Myocarditis

- 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, & post-viral immunemediated response, infiltrative etc..
- Myocarditis usually manifests in an otherwise healthy person and can **result in rapidly progressive** (& often fatal) **heart failure & arrhythmia**.

- Epidemiology:

- No racial predilection میل 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 & infants, immunocompromised patients may be more susceptible to myocarditis.

- Etiology:

- Myocarditis is probably caused by a wide variety of infectious organisms, autoimmune disorders, & exogenous agents, with genetic & environmental predisposition.
- **Coxsackie B virus** is most often associated with myocarditis. It is a member of the **picornavirus** family & the **enterovirus** genus, and is closely related to other enteroviruses such as **echovirus, poliovirus, & 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 & 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, & 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 & lymphoid tissues** & 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 2 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 & post-viral immune inflammatory reactions contribute to myocyte damage & necrosis.
- Inflammatory lesions & 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 & TNF, oxygen free radicals & 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** & progress to death.

- Prognosis:

- Most patients with acute myocarditis & 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.

- Other Rare Causes of Heart Infection:

• Bacterial Causes:

• - Diphtheria - Myocarditis.

• - **Psittacosis (Chlamydia psittaci) - Endocarditis.**

• - **Q fever (Coxiella burnetii) - Pericarditis**, myocarditis, & **endocarditis** (endocarditis is frequently associated with **purpuric rash, renal insufficiency, stroke, & 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.

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