

Lecture ~ 02

Myocarditis & Pericarditis



Microbiology Team - 430

Done By:

Ghadeer Al-Wuhyad

Hanan Al-Rabiah

Khawla Al-Othman

Ibrahim Al-Faris

Hatim Al-Ansari

Hussam Al-Razqan

Mohammed Al-Kurbi

Special Thanks To Al **Hanoof AL Khalaf**

Myocardium:

It is the middle layer of the walls of the heart, made of cardiac muscle that contracts to push out blood

Pericardium:

Double walled sac (serous and fibrous) that contains the heart and the roots of the great vessels

Myocarditis:

Def: Inflammatory disease of the heart muscle

Causes:**Differential diagnosis:**

- Acute Myocarditis.
- Vasculitis.
- Cardiomyopathy.

Can be due to a variety of infectious and non infectious causes.

Infectious	Non infectious
Viruses <ul style="list-style-type: none"> - Coxsackie B - HIV 	Systemic Diseases <ul style="list-style-type: none"> - SLE (Giant cell myocarditis) - Sarcoidosis - Vasculitis(Wegener's disease) - Celiac disease
Bacterial <i>Corynebacterium diphtheriae</i> (diphtheria). <i>Tuberculosis</i> . Rickettsia Chlamydia	<ul style="list-style-type: none"> - Neoplastic infiltration
Protozoan <i>Trypanosoma cruzi</i> (Chagas disease)	Drugs & Toxins <ul style="list-style-type: none"> - Ethanol - Cocaine - Radiation
Spirochete <ul style="list-style-type: none"> - <i>Borrelia burgdorferi</i> (Lyme disease) 	
Parasitic : Taxoplasma	

- **Viral infection is the most common cause (Coxsackie B virus).**
- Giant cell myocarditis due to Thymoma , SLE or thyrotoxicosis

Clinical presentation:

- **Mild:** Fever, headache, muscle aches, diarrhea, sore throat and rashes → self limiting
- **Severe:** Chest pain, arrhythmias, sweating and fatigue → Presented with congestive heart failure

Diagnosis: routine work

- **Lab work:** (which result elevation of WBCs, ESR, Troponin, CK-MB).
- **Radiology:** X-rays (shows cardiomegaly – enlargement of the heart-), MRI and Echocardiogram.
- **ECG:** (shows non-specific T wave and ST changes).
- **Micro lab:** blood cultures, viral serology.
- **Heart muscle biopsy (rare).**

Histopathological findings:

- “Dallas” criteria (specific)
- “Giant cells” may be seen (non-specific).

Treatment:

- Mild cases management is **supportive**
- Bacterial infection : antimicrobial
- Steroid with sever case
- Heart failure patients may need heart transplant.

Prognosis:

- Most cases of viral myocarditis are self limiting.
- In some cases patients may be left with lifelong complications (heart failure).

Pericarditis:

Def: Inflammation of pericardium usually of infectious etiology,
Provokes fibrinous exudates

Differential diagnosis:

- Acute myocardial infarction.
- Pulmonary embolism.
- Pneumonia.
- Aortic dissection.

Pathophysiology:

Origin of Pericarditis:

- Contiguous spread.(lung , myocardium aorta)
- Hematogenous spread. (septicemia , neoplasm or metabolic)
- Lymphatic spread.
- Traumatic or irradiation.

What happen?

- Inflammation provokes fibrinous exudates with or without serous effusion.
- The normal pericardium is transparent and glistening “shiny”, in infection is turned into a dull, opaque “unclear” and “sandy” sac.
- Can cause pericardial scarring by fibrosis facilitate adhesion of organisms

Types of Pericarditis:

Caseous Pericarditis	Serous Pericarditis	Fibrous Pericarditis (chronic Pericarditis)
Happen in TB infection .	<ul style="list-style-type: none"> - Happen in Autoimmune diseases (rheumatoid arthritis, SLE). - Pericardium turns into Transudative Effusive Fluid. 	Caused by Suppurative, caseous or thick layer of scar tissue.

Type of effusive fluid

Serous	Suppurative	Hemorrhagic	Serosanguinous
<ul style="list-style-type: none"> • causing serous Pericarditis • happen in heart failure 	<ul style="list-style-type: none"> - Happen in Bacterial infection. - Pericardium turns into Cellular debris and large number of leukocytes Effusive Fluid 	<ul style="list-style-type: none"> - Happen in Malignancies and tumors. - Pericardium turns into Hemorrhagic Effusive Fluid.(consisting of blood) 	Consisting of serum and blood.

Causes: (mostly are infectious)

- Viral infection: **Coxsackievirus A and B, Echovirus** (most common causes).
- Bacterial infection: ***M. tuberculosis***, *S. pneumonia*, *S. aureus*
(Usually complication of pulmonary infections)

— HIV patients may develop pericardial effusions (*M.tuberculosis*, *M. avium* complex).

- Fungal infection: *Histoplasma*, *Coccidioides*.
- Parasitic infection: *contagious spread of Entamoeba histolytica*.(rare)

Clinical presentation:

- **Pleuritic chest pain “stabbing pain”** radiate to the back.
- **Pericardial rub (Friction rub).**
- Fever.
- Tachycardia and Paradoxus JVP (Jugular venous pressure).
- Pain relieved by sitting and leaning forward.
- Palpitations.
- Presyncope or syncope

Diagnosis:

- ECG (**shows concave upward ST segment**).
- Lab work: show leukocytosis and elevated ESR
- Blood cultures
- Chest x-rays (shows enlarged cardiac shadow or classified pericardium)
- CT scan (shows pericardial thickening).
- **Pericardial fluid or biopsy for fungi.**
- Antinuclear antibody tests and Histoplasmosis complement fixation in endemic area
- Urea and creatine test (routine test)

Treatment:

- **In case idiopathic & viral Pericarditis:** it is largely supportive treatment including bed rest, NASIDS and colchicine.
- **Antibiotics** against S.aureus & respiratory bacteria.
- **Viral infection: anti-viral drugs such as:** acyclovir for herpes simplex or Varicella , Ganciclovir for CMV
- **Tuberculosis infection:** anti-TB drugs
- **steroid**
- **Pericardiocentesis to relief tamponade** (procedure where fluid is aspirated from the pericardium)

Corticosteroid usually contraindicated

Constrictive Pericarditis (Pericarditis complication) : can result by other causes like Radiotherapy , Cardiac surgery or Dialysis

Tuberculous Pericarditis:

Def: It is and Pericarditis infection in patients with pulmonary TB.

Clinical presentation:

Fever, pericardial friction rub and hepatomegaly.

Diagnosis:

- Pericardial biopsy (more definitive).
- Tuberculin skin test (usually positive).
- Fluid smear for AFB (Acid Fast Bacilli) negative

Summary

	Myocarditis	Pericarditis
Epidemiology	Not known	Not accurate
Causes	Infectious (Coxsackie B) Non-infectious	Mostly infectious (TB)
Clinical presentation	<ul style="list-style-type: none"> - Chest pain (dull pain) - Arrhythmia - Heart failure 	<ul style="list-style-type: none"> - Chest "stabbing" pain - pericardial rub
Diagnosis	<ul style="list-style-type: none"> - ↑WBCs, ESR, Troponin, CK-MB - X-rays, MRI - ECG, Echocardiogram - blood cultures, viral serology - Heart muscle biopsy 	<ul style="list-style-type: none"> - ECG - leukocytosis and elevated ESR - Blood cultures - Pericardial fluid - Pericardial biopsy (TB)
treatment	Supportive	<ul style="list-style-type: none"> - anti-viral drugs - anti-TB drugs - steroid

Pericarditis Pathophysiology

