

Lecture ~ 02

# Myocarditis & Pericarditis



Microbiology Team - 430

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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:**

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

**Differential diagnosis:**

- Acute Myocarditis.
- Vasculitis.
- Cardiomyopathy.

Infectious	Non infectious
<b>Viruses</b> <ul style="list-style-type: none"> <li>- <b>Coxsackie B</b></li> <li>- HIV</li> </ul>	<b>Systemic Diseases</b> <ul style="list-style-type: none"> <li>- SLE (<b>Giant cell myocarditis</b>)</li> <li>- Sarcoidosis</li> <li>- Vasculitis(Wegener's disease)</li> <li>- Celiac disease</li> </ul>
<b>Bacterial</b> <i>Corynebacterium diphtheriae</i> (diphtheria). <i>Tuberculosis</i> . Rickettsia Chlamydia	<ul style="list-style-type: none"> <li>- Neoplastic infiltration</li> </ul>
<b>Protozoan</b> <i>Trypanosoma cruzi</i> (Chagas disease)	<b>Drugs &amp; Toxins</b> <ul style="list-style-type: none"> <li>- Ethanol</li> <li>- Cocaine</li> <li>- Radiation</li> </ul>
<b>Spirochete</b> <ul style="list-style-type: none"> <li>- <i>Borrelia burgdorferi</i> (Lyme disease)</li> </ul>	
<b>Parasitic :</b> 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 <b>TB infection</b> .	<ul style="list-style-type: none"> <li>- Happen in Autoimmune diseases (rheumatoid arthritis, SLE).</li> <li>- Pericardium turns into Transudative Effusive Fluid.</li> </ul>	Caused by Suppurative, caseous or thick layer of scar tissue.

## Type of effusive fluid

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

### Causes: (mostly are infectious)

- Viral infection: **Coxsackievirus A and B, Echovirus** (most common causes).
- Bacterial infection: ***M. tuberculosis*, S. pneumoniae, 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

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

## Pericarditis Pathophysiology

