

# Myocarditis

## Myocardial and Valvular Diseases Handout IV

### Bacteria

- abscesses

### Viruses

- interstitial mononuclear infiltrate with necrosis of individual myocytes

### Parasites

- organisms in interstitium or myocytes with necrosis and inflammation

### Sarcoidosis and fungi

- granulomas

### Hypersensitivity

- perivascular eosinophils with or without vasculitis

	PERICARDITIS	MYOCARDITIS
CLINICAL	Sharp or pleuritic chest pain, worse when supine Pain radiating to left trapezius ridge Dyspnea	Flu-Like (myalgias, fatigue, fever) Dyspnea, new CHF Pediatrics - grunting, retractions
ETIOLOGY	Viruses & Idiopathic Most Common Lupus/Sarcoid Radiation Drugs (procainamide, hydralazine)	Infectious (influenza, lyme, chagas, etc)
DIAGNOSIS	Clinical EKG Stages: (1) PR depression with ST elevation (III>II and no ST depression in aVL suggests pericarditis) (2) Normalization (3) T wave inversion Pericardial effusion on ultrasound Troponin may be elevated	Difficult EKG - Sinus tachy, dysrhythmia, Troponin may be elevated ECHO may show hypokinesis Gold std: biopsy
TREATMENT	Ibuprofen 400-800 mg q6-8 hrs x 2 weeks Colchicine 0.5 mg BID (prevents recurrence) *Note: In US formulation is 0.6mg tablets Admit for high risk: large effusion, T >38 C, signs of myopericarditis	Admit to monitored setting Supportive (may need LVAD, ECMO)

## ***CONDITIONS THAT CAN PRODUCE THE ACUTE PERICARDITIS***

- *By Bacteria*
- *Usually Due To Viruses*
- *Parasites*
- *Fungi*
- *After A Heart Attack.*
- *Aneurysm*
- *Cancer*
- *Certain Drugs.*
- *Heart Surgery.*
- *Injury*
- *Kidney Failure*
- *Lupus*
- *Radiation Therapy*
- *Rheumatic Fever*
- *Rheumatoid Arthritis*
- *AIDS, (Wicked Immune System)*





# *Clinical features*

## *Pericarditis*

- The most common symptom of acute pericarditis is ***precordial or retrosternal chest pain***, usually described as ***sharp or stabbing***.
- o Pain may be of ***sudden or gradual onset*** and may ***radiate to the back*** (left trapezial ridge), neck, left shoulder, or arm.
- o ***Movement or inspiration may aggravate the pain.***
- o Pain may be most ***severe when the patient is supine*** and can be ***relieved when the patient leans forward while sitting.***

# CAUSES OF MYOCARDITIS

## Primary myocarditis

- Myocarditis caused by acute viral infection is called primary myocarditis.
- Viruses: Coxsackie A and B, adenovirus, influenza virus, HIV virus, Epstein-Barr\_virus, herpes virus, cytomegalovirus, mumps virus, respiratory syncytial virus and rubella virus.

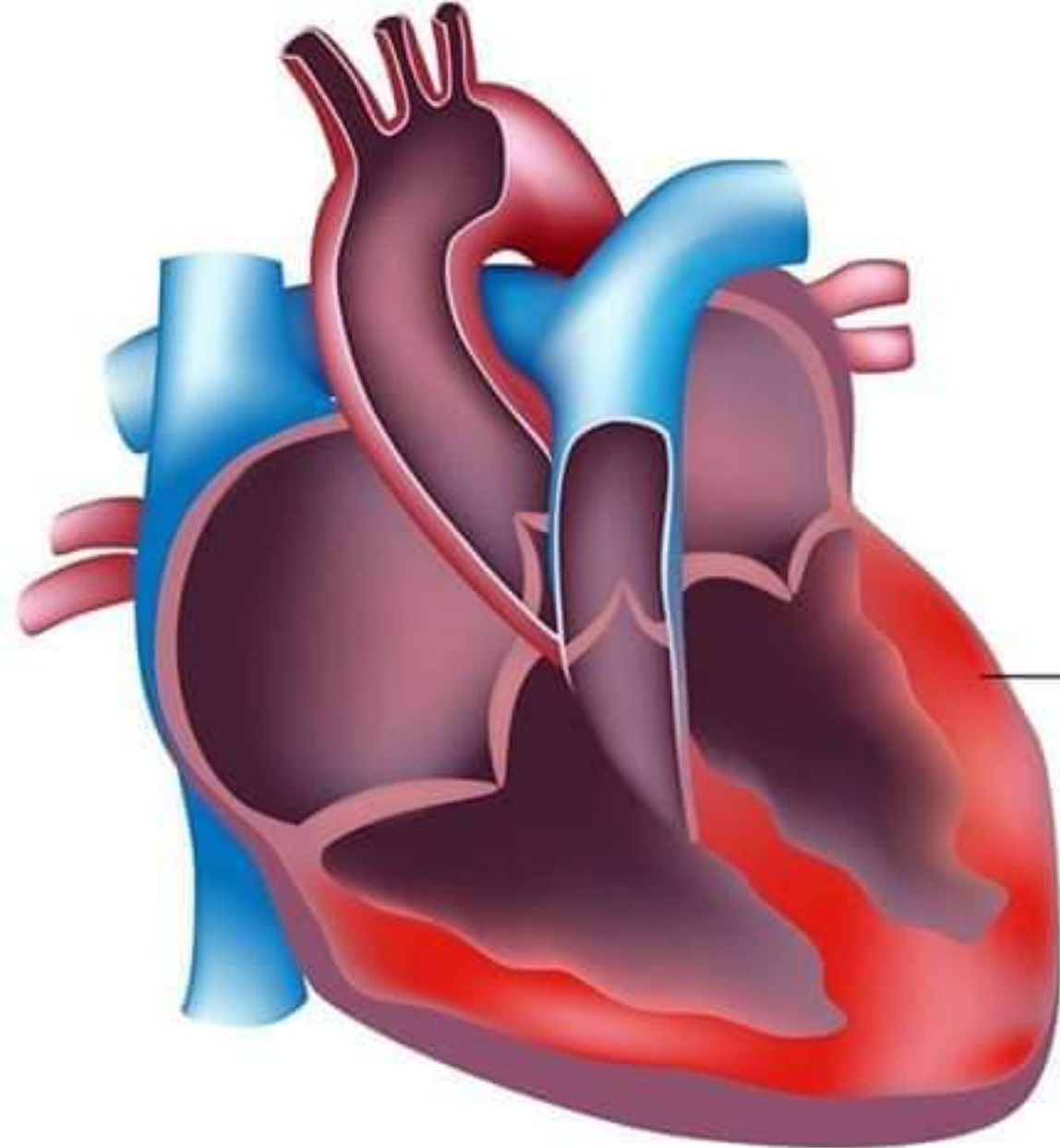
## Secondary myocarditis

- Myocarditis caused by non-viral cause is called secondary myocarditis

## Infections

- Bacterial: Diphtheria, brucellosis, H.influenza, mycoplasma, pneumococci, salmonella, streptococcus, staphylococcus.
- Protozoal: Entamoeba, trypanosomiasis .
- Fungal: Candida, actinomyces, aspergillus

# Myocarditis



Inflammation of  
heart muscle

# Myocarditis:

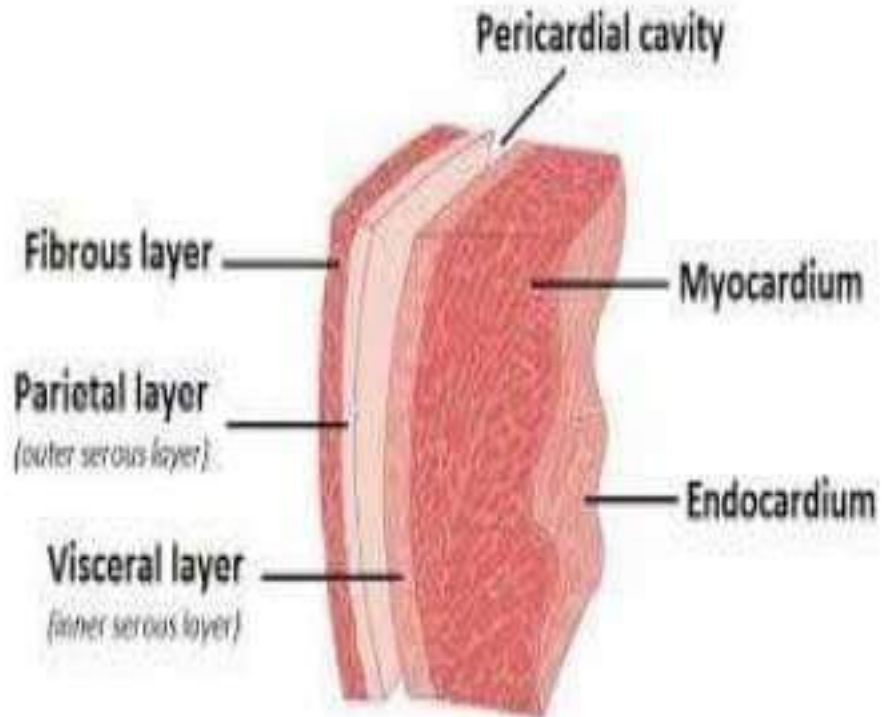
## Definition:

Inflammation of the cardiac muscle, with an immune cellular infiltrate that results in myocardium destruction and/or valvular disease , *without blockage of coronary artery* that define heart attack (myocardial infarction).

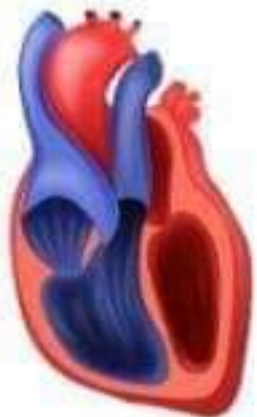
Myocarditis may or may not include death (*necrosis*) of heart tissue.

# Inflammatory Disorders of the Heart

- Endocarditis
- Pericarditis
- Myocarditis







healthy heart



myocarditis

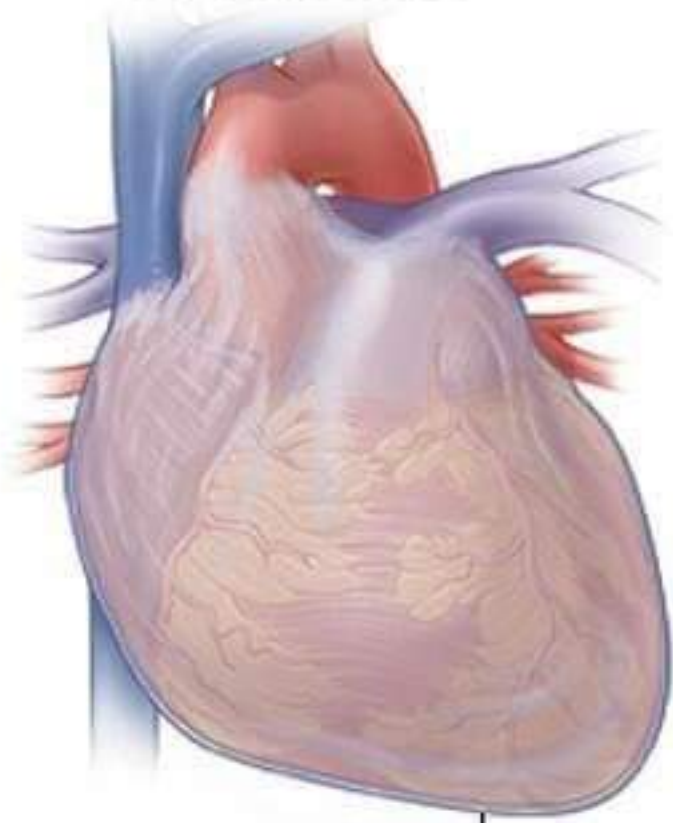
# PERICARDITIS

- Definition: inflammation of the pericardium

## Clinical manifestations

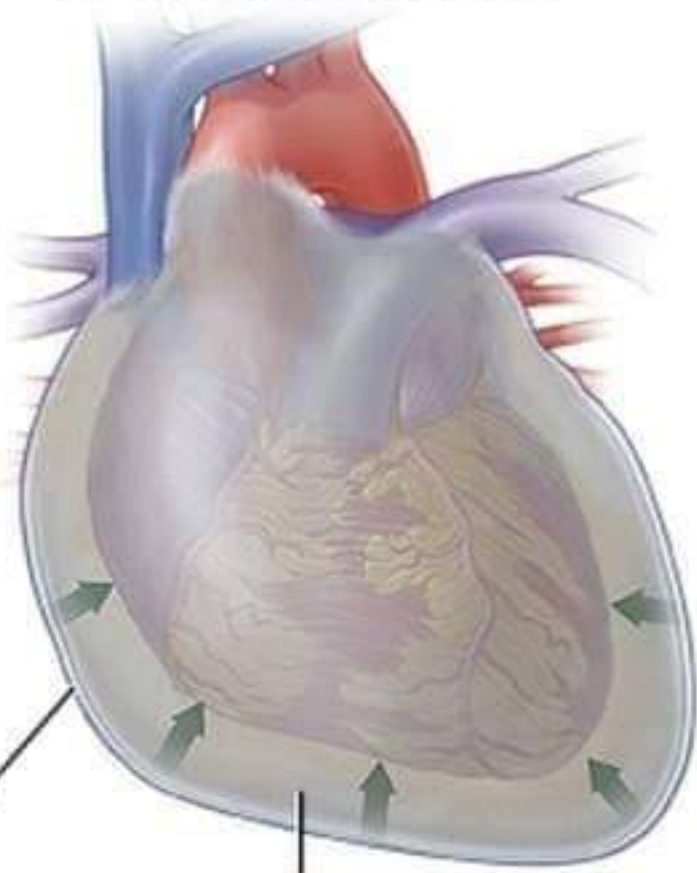
- Pain over pericardium, clavicle, neck & scapula
- friction rub, aggravated by breathing & turning in bed, relieved by sitting up
- dyspnea, low cardiac output, increase WBC, pt appears extremely ill

Normal heart



Pericardium

Pericardial effusion



Buildup of fluid

# PERICARDITIS

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## □ Causes:

### (b) Diseases in lungs, pleura and mediastinum:

- (i) tuberculosis
- (ii) carcinoma
- (iii) pneumonia complicated by empyema

### (c) Generalized disorders (mechanism not known)

- (i) uremia
  - (ii) connective tissue diseases
  - (iii) hypothyroidism
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# Differentiating Chest Pain

## Pericarditis

- Pain is often sharp, piercing
- Located between the neck and shoulder
- Dyspnea unrelated to exertion
- Pericardial friction rub

## Acute MI

- Pain is described as pressure
- Dyspnea related to exertion
- Pain is in the chest and may sometimes radiate

# Causes of Pericardial Effusion

## Neoplastic

- Hemangiosarcoma
- Aortic body tumor (chemodectoma)
- Heart-base tumor
- Mesothelioma
- Thyroid carcinoma
- Lymphosarcoma
- Connective tissue tumor
- Other metastatic tumors

## Congenital

- Peritoneopericardial diaphragmatic hernia
- Pericardial cyst

## Other

- Right-sided heart failure
- Left atrial rupture
- Traumatic atrial rupture
- Anticoagulant rodenticide toxicosis
- Uremic pericarditis
- Bacterial or fungal infection
- Constrictive pericarditis

## Idiopathic

# Causes:

**I. Infection:** is the most important cause:

A. Viral infection: this is the most important cause in infection coxsackie A virus.

And B commonest one. B<sub>3</sub> , B<sub>5</sub>.

ECHO virus, influenza V. hepatitis V.

B. Bacterial infection – Tubercle bacilli

Staphylo coccus

Strepto coccus

Pneumo coccus

# Myocarditis & Pericarditis

endocardium



myocardium = heart

serous  
epicardium / pericardium

pericardial space

fibrous pericardium



# **Sign And Symptoms**

Manifestations of myocarditis range from asymptomatic or nonspecific generalized illness to acute cardiogenic shock and sudden death.

Infants and young children more often have a fulminant presentation with:

- Fever.
- Respiratory distress.
- Tachycardia, hypotension, gallop rhythm, and cardiac murmur.
- Associated findings may include a rash or evidence of end organ involvement such as hepatitis or aseptic meningitis.

# Viral Myocarditis

Signs and symptoms:

- Chest pain (often described as "stabbing" in character)
- Congestive heart failure (leading to edema, breathlessness and hepatic congestion)
- Palpitations (due to arrhythmias)
- Sudden death (in young adults, myocarditis causes up to 20% of all cases of sudden death)
- Fever (especially when infectious)

# Signs and Symptoms of Viral Myocarditis

- Symptoms

- Fatigue
- Dyspnea
- Palpitation
- Chest pain
- Syncope

- Signs

- Pericardial rub
- Sinus tachycardia
- Atrial or ventricular arrhythmias
- Conduction disturbances
- Cardiomegaly
- Right or left S<sub>3</sub> or S<sub>4</sub> gallop sounds
- Congestive heart failure