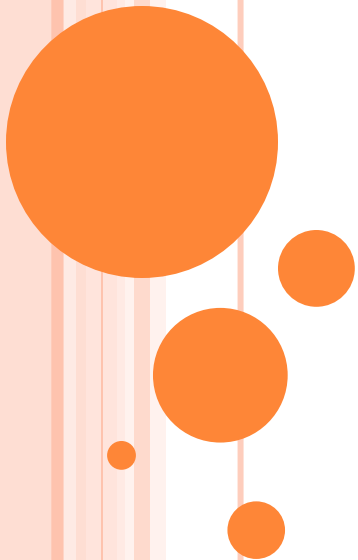


# PERICARDITIS

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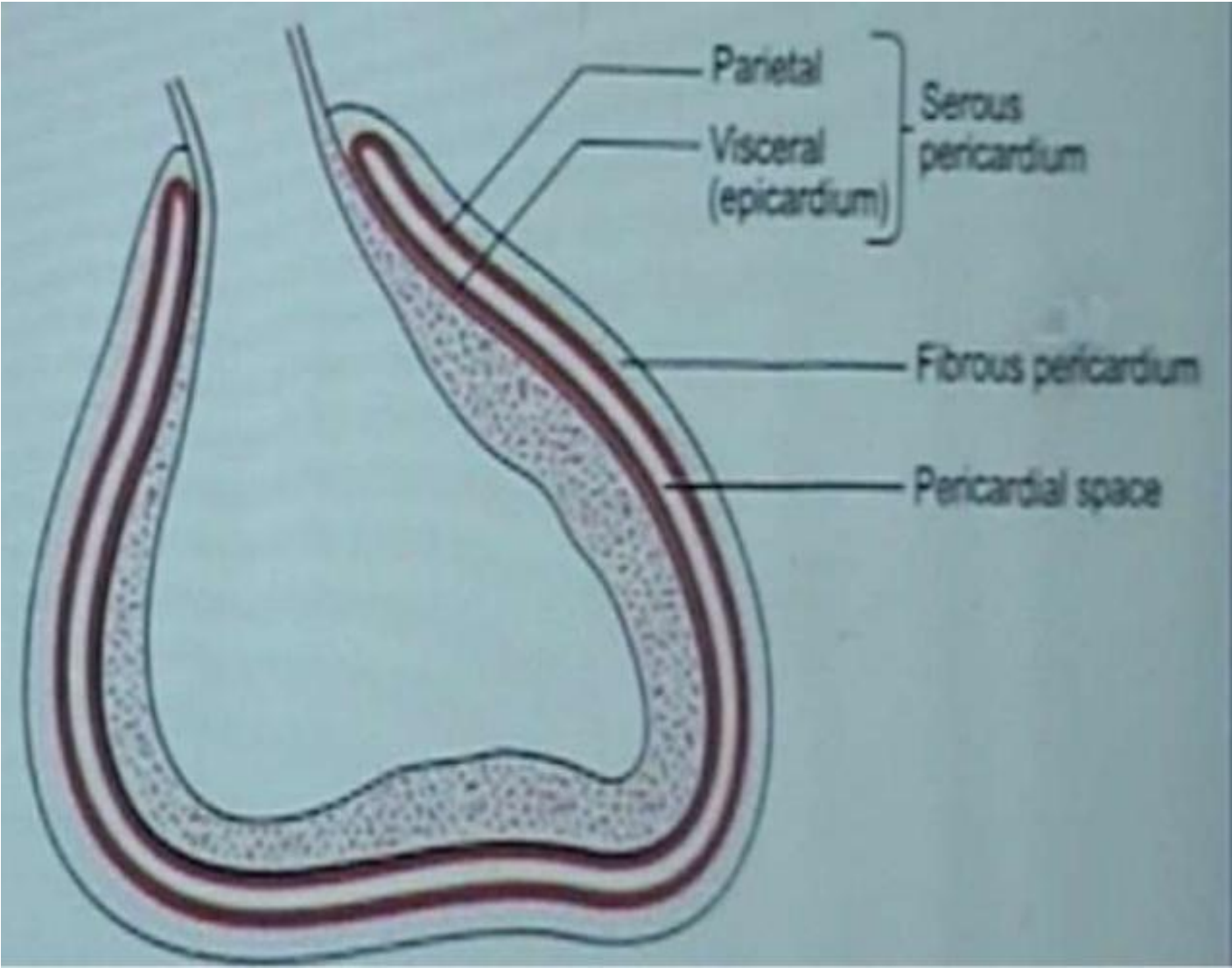
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# INTRODUCTION

- The pericardium is a fibroelastic sac made up of visceral and parietal layers separated by a (potential) space, the pericardial cavity. In healthy individuals, the pericardial cavity contains 15 to 50 mL of an ultrafiltrate of plasma.
- **Functions :**
- 1. Stabilization of the heart within the thoracic cavity.
- 2. Protection of the heart from mechanical trauma and infection from adjoining structures.
- 3. The pericardial fluid functions as a lubricant and decreases friction of cardiac surface during systole and diastole.
- 4. Prevention of excessive dilation of heart especially during sudden rise in intra-cardiac volume (e.g. acute aortic or mitral regurgitation).





- Pericarditis is a condition caused by inflammation of the pericardial sac.
- Pericarditis is acute or chronic inflammatory process of the visceral or parietal pericardium.



# ETIOLOGY

- **Idiopathic Infectious**
- Virus- Coxsackievirus B group
- Bacteria-pneumococci
- Fungus- histoplasma
- **Noninfectious**
- • Uremia • MI • Neoplasm • Trauma
- **Autoimmune / Hypersensitivity:**
- Dresslers syndrome
- Rheumatoid arthritis
- Systemic lupus Erythematosus



# Causes of pericardial disease: infection

## Infection

- A. Viral - Coxsackievirus, echovirus, adenovirus, EBV, CMV, influenza, varicella, rubella, HIV, hepatitis B, mumps, parvovirus B19,
- B. Bacterial - Staphylococcus, Streptococcus, pneumococcus, Haemophilus, Neisseria (gonorrhoeae or meningitidis), Chlamydia (psittaci or trachomatis), Legionella, tuberculosis, Salmonella, Lyme disease
- C. Mycoplasma
- D. Fungal - Histoplasmosis, aspergillosis, blastomycosis, coccidioidomycosis, actinomycosis, nocardia, candida
- E. Parasitic - Echinococcus, amebiasis, toxoplasmosis
- F. Infective endocarditis with valve ring abscess



# Major causes of pericardial disease

Idiopathic	
Infections	Viral , tubercular
Neoplasm	A. Metastatic - Lung or breast cancer, Hodgkin's disease, leukemia, melanoma B. Primary - Rhabdomyosarcoma, teratoma, fibroma, lipoma, leiomyoma, angioma C. Paraneoplastic
Cardiac	A. Early infarction pericarditis B. Late postcardiac injury syndrome (Dressler's syndrome) C. Myocarditis D. Dissecting aortic aneurysm
Autoimmune	A. Rheumatic diseases - Including lupus, rheumatoid arthritis, vasculitis, scleroderma, mixed connective disease B. Other - Granulomatosis with polyangiitis (Wegener's), polyarteritis nodosa, sarcoidosis, IBD (Crohn's, ulcerative colitis), Whipple's, giant cell arteritis, Behcet's disease, rheumatic fever
Drugs	Procainamide, isoniazid, hydralazine, phenytoin, penicillin, phenylbutazone, doxorubicin
Metabolic	A. Hypothyroidism - Primarily pericardial effusion B. Uremia C. Ovarian hyperstimulation syndrome
Trauma	A. Blunt, Penetrating C. Iatrogenic - Catheter and pacemaker perforations, cardiopulmonary resuscitation
Radiation	



**Table 10–19.** Definitions and diagnostic criteria for pericarditis.

Pericarditis	Definition and Diagnosis
<b>Acute</b>	At least two of the following four listed findings: <ol style="list-style-type: none"><li>1. Pericardial chest pain</li><li>2. Pericardial rub</li><li>3. New widespread ST-elevation or PR depression</li><li>4. Pericardial effusion (new or worsening)</li></ol> <p>Additional supportive findings:</p> <ol style="list-style-type: none"><li>1. Elevated inflammatory markers (CRP, ESR, WBC)</li><li>2. Evidence for pericardial inflammation (CT or MRI)</li></ol>
<b>Incessant</b>	Pericarditis lasting longer than 4–6 weeks but less than 3 months without remission
<b>Recurrent</b>	Recurrence after a documented first episode and a symptom-free interval of 4–6 weeks or longer
<b>Chronic</b>	Pericarditis lasting longer than 3 months

CRP, C-reactive protein; CT, computed tomography; ESR, erythrocyte sedimentation rate; MRI, magnetic resonance imaging; WBC





# CLINICAL MANIFESTATION

- **Chest pain:-**
- • Sudden in onset • Retrosternal in location
  - Pleuritic and sharp in nature
- • Exacerbated by inspiration and coughing
  - Worsens when supine and improves upon sitting upright or leaning forward.
- • Can often radiate to the neck, arms, or left shoulder, trapezius muscle. It is relieved by sitting, the pain may radiate to the neck, arms or left shoulder.
- It often is not relived by nitroglycerin or morphine. Pain usually 4 to 48 hours before a rub is heard.



	MI	Pulmonary infarction	Pericarditis
<b>Chest pain</b>			
<b>location</b>	Retrosternal	Ant, post or lat	Retrosternal
<b>onset</b>	sudden	sudden	sudden
<b>character</b>	Pressure like heavy squeezing	Sharp, stabbing	Sharp, stabbing and sometimes dull
<b>Change with respiration</b>	no		<b>Worse with inspiration</b>
<b>Change with position</b>	no	no	<b>Worse in supine , improve c sitting up</b>
<b>Radiation</b>	Jaw, neck, shoulder or arms	shoulder	Jaw, neck, shoulder, arms, <b>trapezius</b>
<b>Duration</b>	Min to hours	Hours to days	Hours to days
<b>Response to NTG</b>	<b>improved</b>	No change	No change
<b>others</b>			
<b>Pericardial rub</b>	absent	rare	<b>present</b>
<b>S3, pul cong</b>	<b>present</b>	absent	absent



- **Pericardial friction rub:** • Present in 85% of cases of pericarditis • Highly specific with a variable sensitivity
- • A high-pitched scratchy or squeaky sound best heard with the diaphragm at the Left Sternal Border with the patient leaning forward.
- Pericardial friction rub is audible throughout the respiratory cycle, whereas the pleural rub disappears when respirations are on hold.
- **Fever**
- **Dyspnea and tachypnea:-** These respiratory changes can be secondary to anxiety or respiratory splitting to avoid the pain of deep breathing . Pulmonary tissue compression can cause dyspnea.
- **Restless, irritability & anxiety:-** Occur due to stimulation of Sympathetic Nerve.

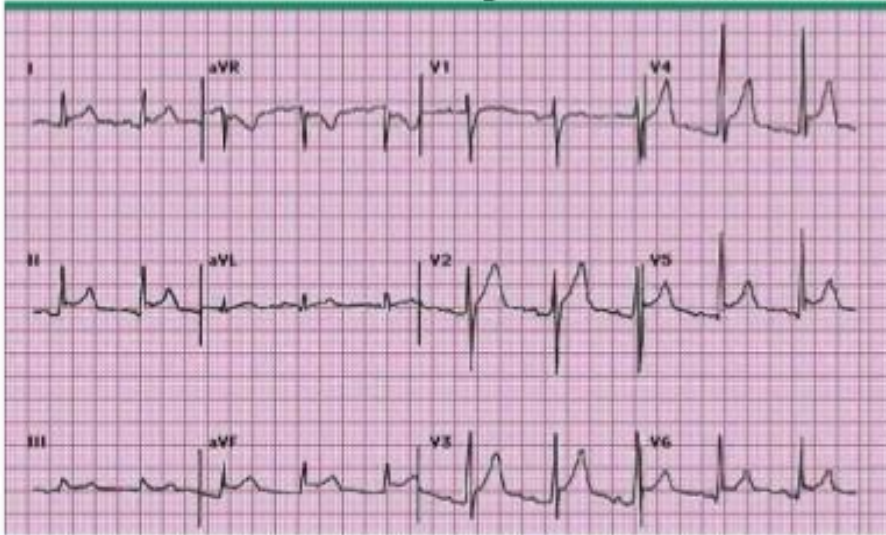


# ECG FINDINGS WITH PERICARDITIS

- Stage 1 (1st hrs-dys) :characterized by diffuse ST elevation (typically concave up).
- Stage 2(1st wk): characterized by normalization of the ST & PR segments.
- Stage 3: diffuse T wave inversions.
- Stage 4 :normalization of the ECG or indefinite persistence of T wave inversions.



# Electrocardiogram (ECG) in pericarditis



Electrocardiogram in acute pericarditis showing diffuse upsloping ST segment elevations seen best here in leads II, III, aVF, and V2 to V6. There is also subtle PR segment deviation (positive in aVR, negative in most other leads).

ST segment elevation is due to a ventricular current of injury associated with epicardial inflammation; similarly, the PR segment changes are due to an atrial current of injury which, in pericarditis, typically displaces the PR segment upward in lead aVR and downward in most other leads.



# ECG ; AMI Vs Pericarditis

	AMI	Pericarditis
<b>Morphology</b>	Convex (dome-shaped) ST elevation May be > 5 mm in height	Concavity. Rarely >5 mm
<b>Distribution</b>	limited to anatomical groupings of leads	Generalized
<b>Reciprocal changes</b>	often A/w reciprocal ST seg changes	Not seen
<b>Conc ST &amp; T wave changes</b>	Common	Uncommon
<b>Hyperacute T waves</b>	May occur	Donot
<b>Q waves</b>	May occur	Donot
<b>PR segment depression</b>	Absent	Frequently seen



## OTHER TESTS

- **Echocardiogram** — Echocardiography is often normal unless there is pericardial effusion.
- **Chest x-ray** — typically normal.
- **Cardiac biomarkers** — may be increases in biomarkers of myocardial injury such as cardiac T I or T.
- **Signs of inflammation** — elevations in the WBC , ESR , and serum CRP concentration.
- An elevated troponin level is not associated with a worse prognosis, and troponin levels usually return to normal within 1 to 2 weeks.



# MYOPERICARDITIS

- When acute pericarditis is present, myopericarditis has been diagnosed by the detection of one or both of the following in the absence of evidence of another cause.
  1. Elevation in serum cardiac biomarkers, such as cardiac troponin I or T.
  2. New or presumed new focal or global left ventricular systolic dysfunction on imaging studies.





# DETERMINATION OF RISK AND NEED FOR HOSPITALIZATION

- Fever ( $>38^{\circ}\text{C}$  [ $100.4^{\circ}\text{F}$ ]) and leukocytosis.
- Evidence suggesting cardiac tamponade.
- A large pericardial effusion (ie, an echo-free space of more than 20 mm).
- Immunosuppressed state.
- A history of oral anticoagulant therapy.
- Acute trauma.
- Failure to respond within seven days to NSAID therapy.
- Elevated cardiac troponin, which suggests myopericarditis.



# TREATMENT

- The therapy of Acute Pericarditis should be targeted as much as possible to the underlying etiology.
- Most patients with Acute Pericarditis can be managed effectively with medical therapy alone.
- However, patients with a large pericardial effusion, a hemodynamically significant pericardial effusion, or evidence of Constrictive Pericarditis should be evaluated for invasive therapies, such as pericardial drainage and/or pericardiectomy.
- NSAIDs,
- Glucocorticoids



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# NSAIDs( NON STEROIDAL ANTI INFLAMMATORY DRUGS )

- In the treatment of Acute Pericarditis, the goals of therapy are the relief of pain and resolution of inflammation (and, if present, pericardial effusion).
- NSAIDs (ASPRIN, is recommended for all patients without a contraindication, with the duration of treatment based upon the persistence of symptoms, which is usually for 2 wks.
- Failure to respond to aspirin or NSAID therapy within 1 week (defined as persistence of fever, pericarditic chest pain, a new pericardial effusion, or worsening of general illness) suggests that a cause other than idiopathic or viral pericarditis is present.



# DRUGS

- ASPIRIN ( 750-1000 mg, TDS)
- IBUPROFEN (600 mg, TDS)
- INDOMETHACIN (25-50 mg, TDS, for recurrent pericarditis )
- COLCHICINE (0.5 mg- 0.6 mg, for recurrent pericarditis, Dressler Syndrome )
- PREDNISONE (0.25-0.50 mg/kg/day).
- ANTI TUBERCULOUS THERAPY
- ANTI BACTERIAL THERAPY



# CORTICOSTEROIDS

- systemic steroid therapy be restricted to patients with the following conditions :
  - • Patients with symptoms refractory to standard therapy
  - • Acute pericarditis due to connective tissue disease
  - • Autoreactive (immune-mediated) pericarditis
  - • Uremic pericarditis



# COMPLICATIONS

- Pericardial Effusion
- Cardiac Tamponade
- Arrhythmias :- it may be due to irritation of the sinus node, which is located close to the parietal pericardium. Atrial arrhythmias, especially Atrial flutter & atrioventricular conduction disturbance.

