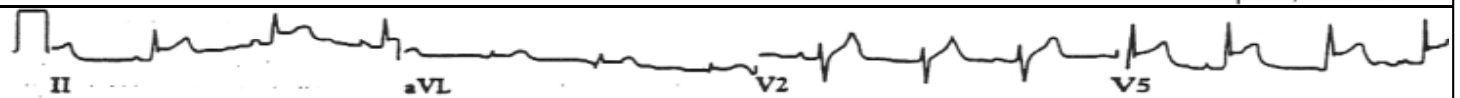


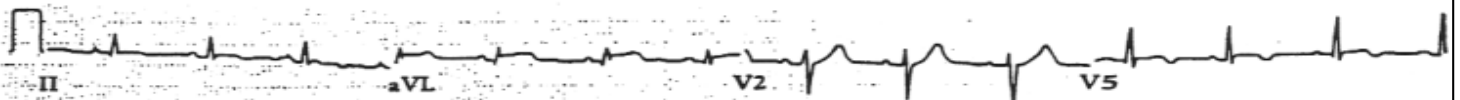
## PERICARDIAL DISEASE

**Table 1.** Tests and Treatments for Various Causes of Acute Pericarditis.\*

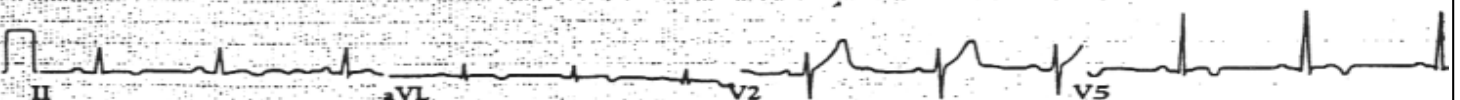
Condition	Estimated Incidence†	Clinical Indications and Tests	Usual Treatment
Idiopathic	85–90%		Aspirin, NSAIDs
Infectious			
Viral	1–2%	Acute and convalescent viral titers, viral cultures, serologic test for HIV	Aspirin, NSAIDs
Bacterial	1–2%	Fever, elevated white-cell count; examination of pericardial fluid	Antibiotics, drainage of pericardial fluid
Tuberculous	4%	Chest radiography, tuberculin skin test, histologic examination, cultures, and measurement of adenosine deaminase level in pericardial fluid and tissue	Multidrug antituberculous therapy and prednisone
Acute myocardial infarction	NA (occurs in 5–10% of patients with myocardial infarction)	Electrocardiography, serum troponin or creatine kinase, echocardiogram	Aspirin (avoid NSAIDs)
Aortic dissection	Rare (<1%)	Magnetic resonance imaging, computed tomography, transesophageal echocardiography	Urgent surgery
Trauma	NA	Clinical history	NSAIDs (avoid aspirin)
Neoplasm	7%	Constitutional symptoms, lymphadenopathy; chest radiography, examination of pericardial fluid	NSAIDs, glucocorticoids (by intrapericardial instillation)
Chest-wall irradiation	Rare (<1%)	Clinical history	NSAIDs
Uremia	NA (occurs in approximately 5% of patients with chronic renal disease before initiation of dialysis and 13% after initiation of dialysis)	Serum blood urea nitrogen and creatinine levels	Initiate or intensify dialysis
Cardiotomy or thoracic surgery	Rare (<1%)	Clinical history, evidence of polyserositis; chest radiography, erythrocyte sedimentation rate	Aspirin, NSAIDs
Autoimmune or inflammatory disease	3–5%	Rheumatoid factor, complement levels, antinuclear antibodies	Aspirin, NSAIDs, glucocorticoids
Adverse drug reaction‡	Rare (<1%)	Clinical history; eosinophil count	Discontinue drug; aspirin, NSAIDs



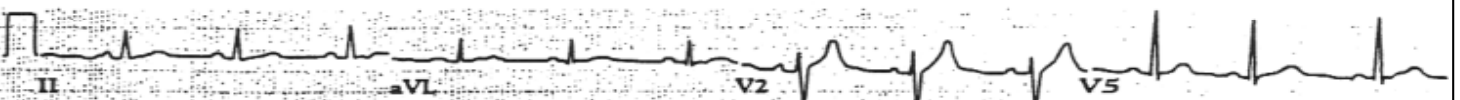
**Stage 1** begins with the onset of chest pain, and lasts several days. Note the concave upward ST elevations seen in the precordial and limb leads. The T waves remain upright in those leads with ST-segment elevation.



**Stage 2.** The ST segments return to the baseline, T waves become flat, and the PR segment may become depressed.



**Stage 3.** T-wave inversion may be seen. This may persist for weeks, or even indefinitely.



**Stage 4.** Normalization.

**FIGURE 1.** The electrocardiographic stages of acute pericarditis

## ACUTE PERICARDITIS

### Physical findings and w/u:

- PE:** friction rub w/ 3 components: A&V-syst,V-diast
- EKG:** Diffuse concave ST ↑ (except V1 & aVR)
- CXR:** CM if sig. per. eff. present
- Lab:** ↑WBC & ESR; +/- ↑Trop & CKMB
  - Consider: Viral serology/HIV testing; B/C;
  - ASO titer; BUN/Cr; ANA; RF; heterophile Ab
- Echo:** 60% have per. eff. To R/O WMA

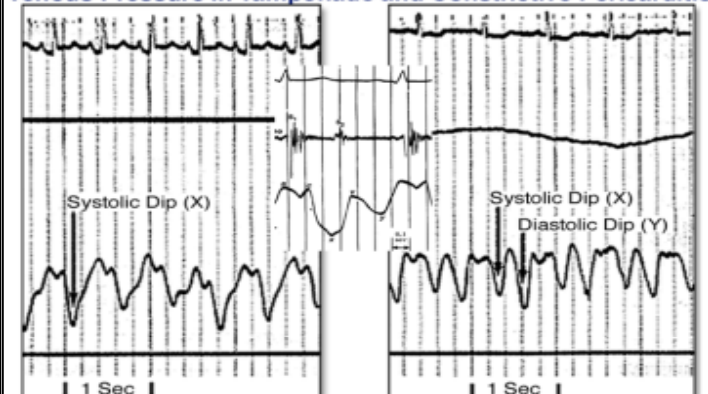
### Management:

- Hospitalize based on etiology
- Outpt. if uncomplicated
- NSAIDs; w/ 5-7 d taper
- If CP persists after 2-3 days: 7-10 d steroid taper
- Avoid anticoagulants
- If relapsing: Colchicine PRN & to prevent recurrence
- Pericardiectomy not recommended

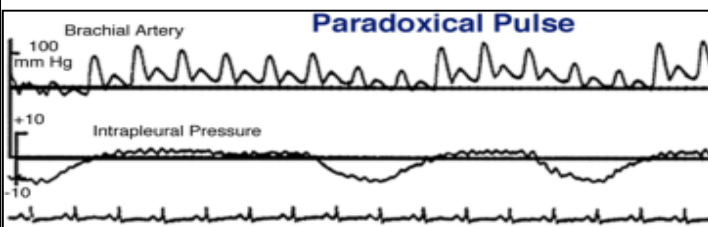
## CONSTRICTIVE PERICARDITIS

- Anat.:** Thickened, fibrotic & adherent pericardium.
- Phys.:** Restrains diastolic expansion.
- S/Sx:** SOB, fatigue, JVD/edema, hepatomegaly/ascites.
  - No pulm congestion. Pericardial knock
  - Kussmaul sign (↑ systemic venous pressure w/ insp)
- Etiol:** Surgery/viral/XRT/RA in US. TB in Africa
- Dx:** Rapid increase in early diastolic pressure (filling):
  - Dip/plateau; √ sign). CXR- pericardial calcification
  - MRI/CT: pericardial thickening/calcification

### Venous Pressure in Tamponade and Constrictive Pericarditis



In cardiac tamponade (left), systolic (X) descent is prominent, and the diastolic (Y) descent is small or absent. The reduction in the Y descent reflects impairment of filling from the beginning of diastole in cardiac tamponade, contrasting with constrictive pericarditis, where impairment is when the ventricle reaches a critical volume at some point in diastole. In constriction (right), X & Y are both prominent, creating a waveform with two dips per cycle.



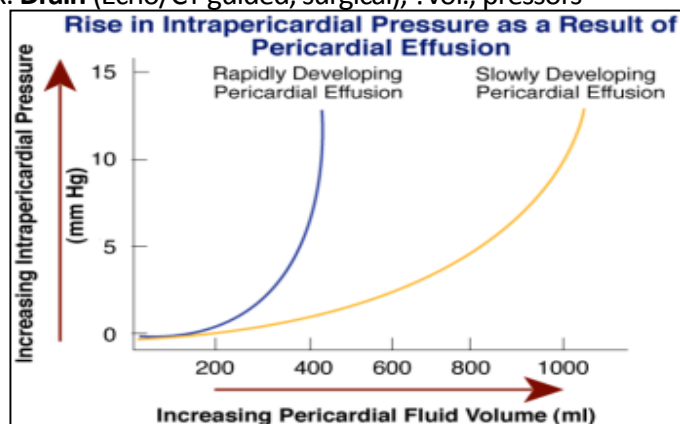
Paradoxical pulse is an exaggerated fall in arterial pressure with inspiration. Systolic pressure falls more than diastolic; the fall in pulse pressure reflects a fall in stroke volume. This occurs in the first beat after inspiration onset (indicated by intrapleural pressure fall)

## PERICARDIAL EFFUSION

- NI:** 50cc. CM on CXR: with ≥ 250cc
- Echo:** to dx, quantify & r/o tamponade
- CT/MR:** to assess pericardium, r/o masses
- EKG:** Low volt; elect. alternans
- Rx:** Pericardiocentesis w/ bx for dx.
- R/O hypothyroidism
- Idiopathic pericardial effusion > 3 mo → drain
- Avoid anticoagulants

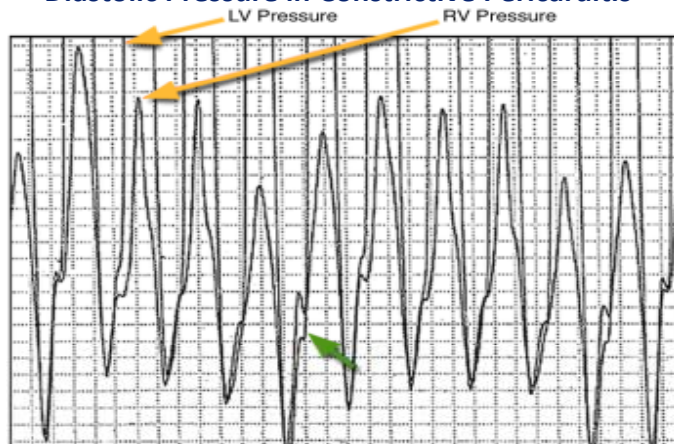
## CARDIAC TAMPONADE

- Rapidity of fluid accumulation, not absolute size.
- May be circumferential or loculated
- S/Sx:** Dyspnea, ↓BP, ↑HR, JVD, ↓ heart sounds
- Pulsus Paradoxus:**
  - > 10mmHg drop in SBP during normal inspiration.
  - May be blunted w/ sig AI, ASD, PH, LVH & RVH
- EKG:** Low volt./electrical alternans
- CXR:** +/- CM if Acute v.s. sub-acute
- Cath:** Diastolic pressure equalization (15-30mmHg)
- Rx:** Drain (Echo/CT guided, surgical), ?vol., pressors



Pericardial pressure rises more steeply in pericardial effusions that develop rapidly than in effusions that develop slowly

### Diastolic Pressure in Constrictive Pericarditis



RV & LV pressure waveforms are identical in diastole. During respiratory variation in diastolic pressure, pressures often separate by up to about 5 mm Hg (see top arrows)

### Electrical Alternans



Electrical alternans is caused by the heart swinging from one position to another within the pericardial sac on alternate beats. It disappears when the fluid is removed