PERICARDITI E MIOCARDITI: FRATELLI O CUGINI?

Versamento pericardico cronico

Diagnosi e Gestione clinica

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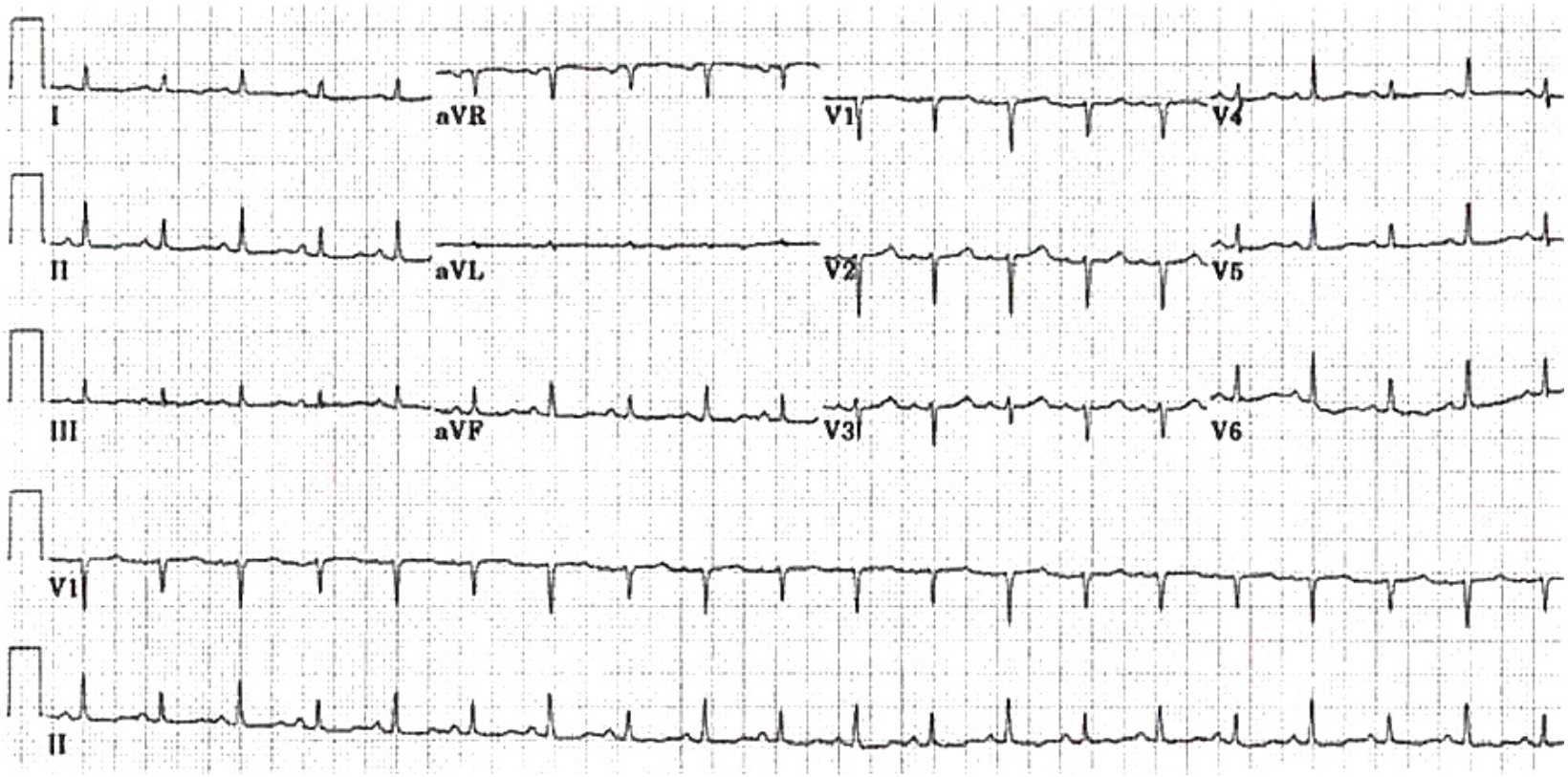
REGIONE PIEMONTE

Caso Clinico

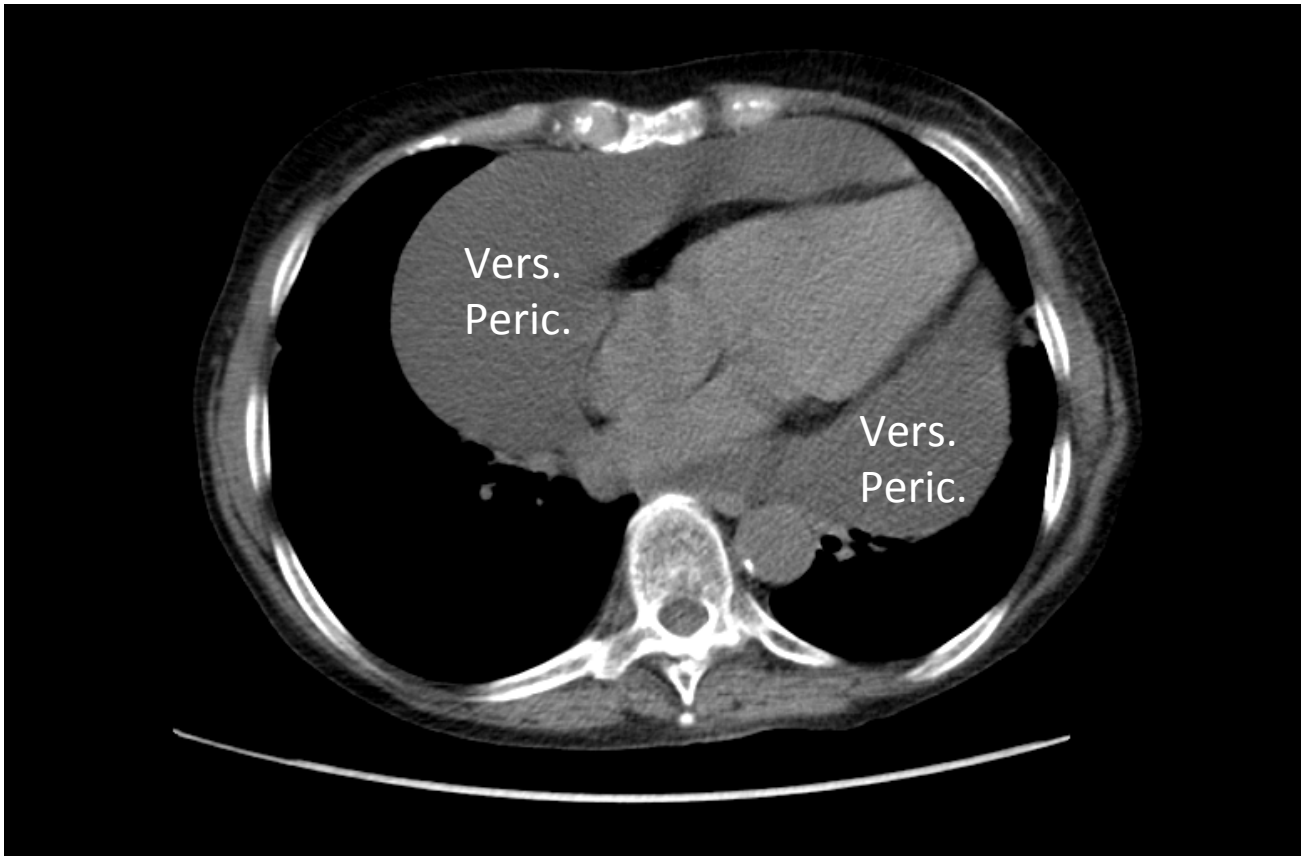
- Paziente di 69aa affetta da artrite reumatoide e sindrome di Sjogren da molti anni.
- Versamento pericardico “cronico” noto dal 2010.
- Eseguite 2 pericardiocentesi diagnostico-terapeutiche (03/2011 e 09/2011 con drenaggio pericardico).
- Esame liquido pericardico indicativo di trasudato.
- Test Quantiferon TB: positivo.
- TAC torace ed addome mdc: versamento pericardico grave.
- Mai segni o sintomi di tamponamento. Astenia e lieve dispnea da sforzo.
- Eseguiti cicli di terapia con ibuprofene e colchicina.

ECG



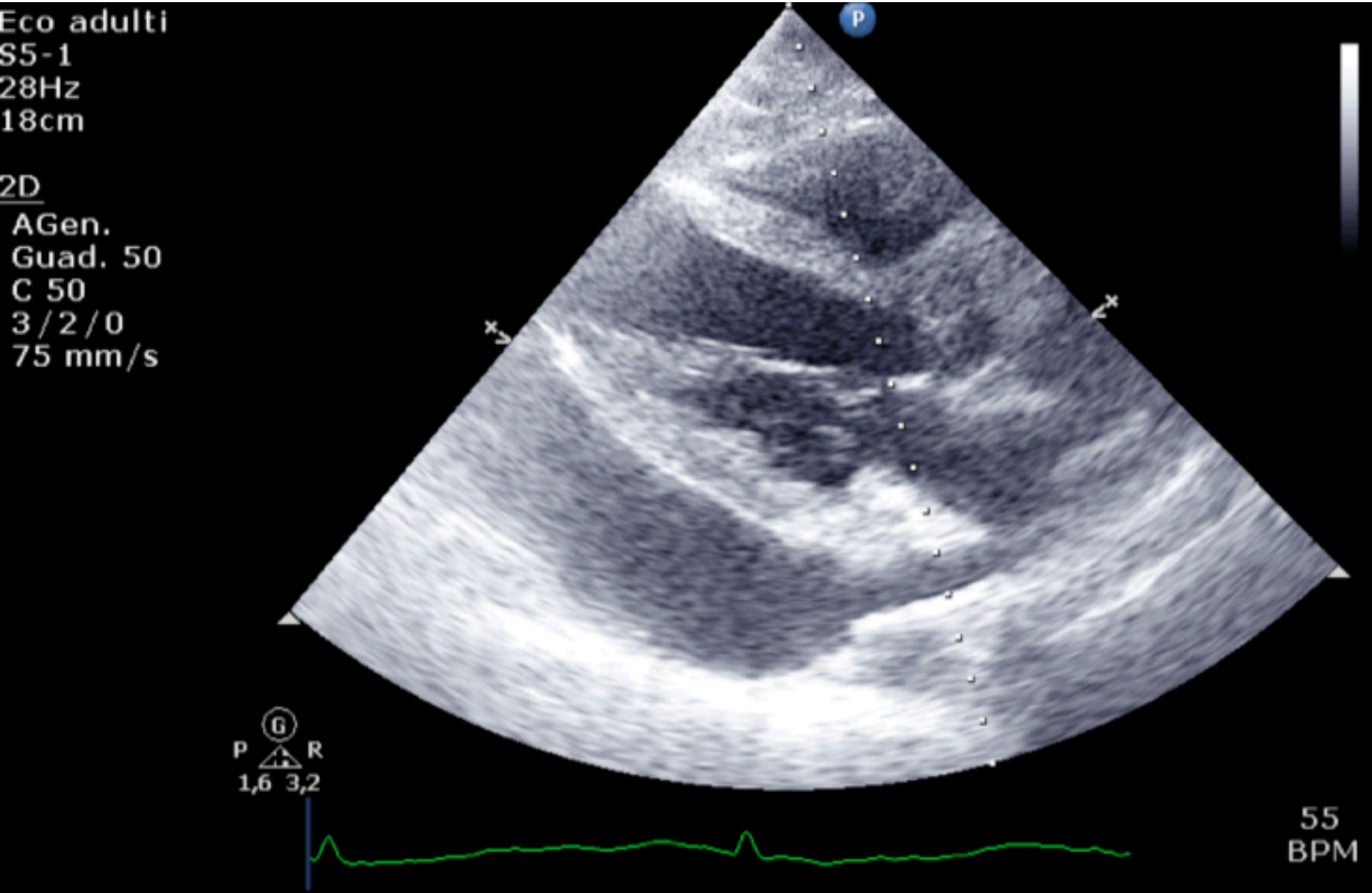
ECG: RS, bassi voltaggi QRS, atipie aspecifiche ST/T

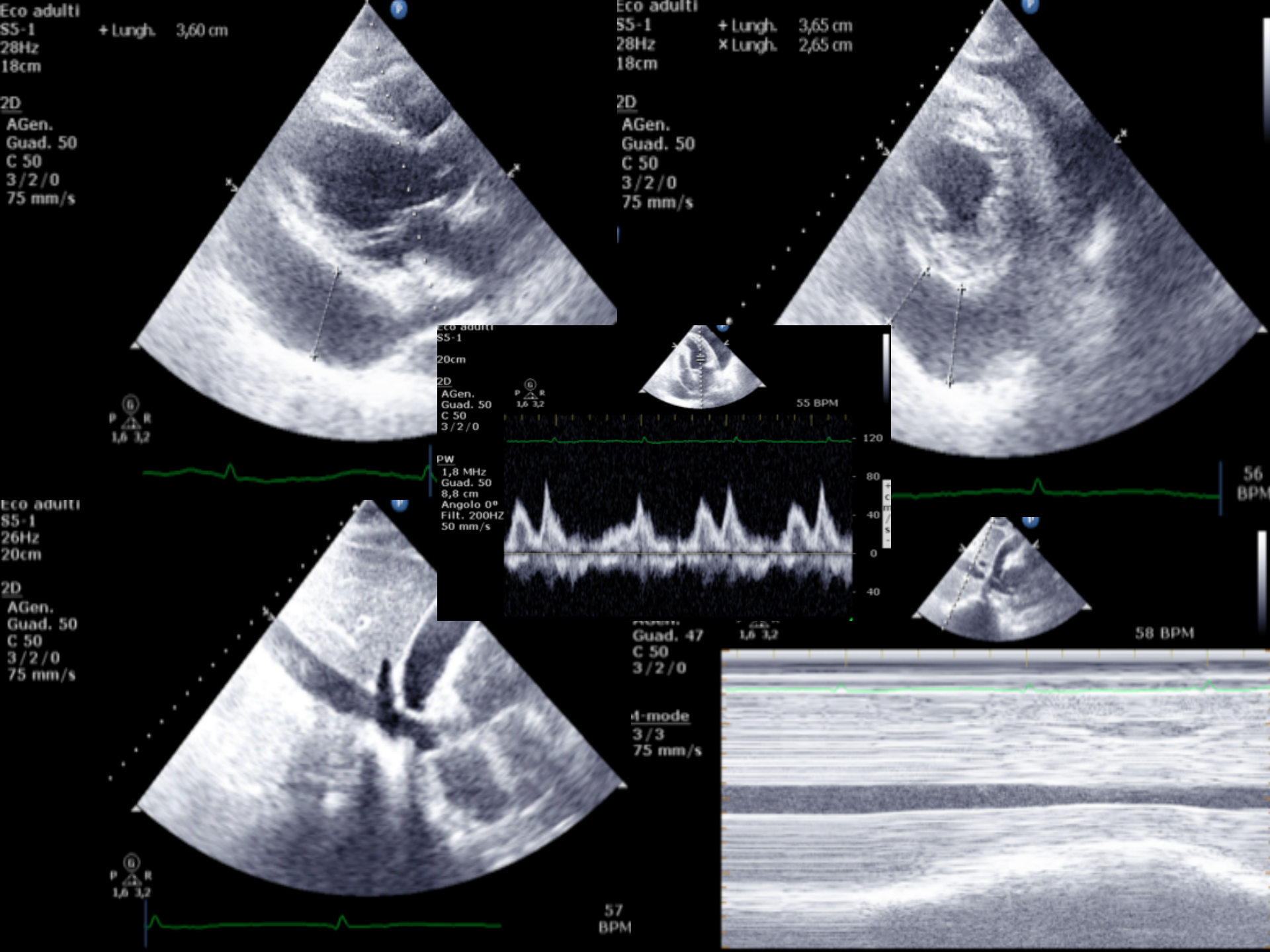
TAC torace con mdc



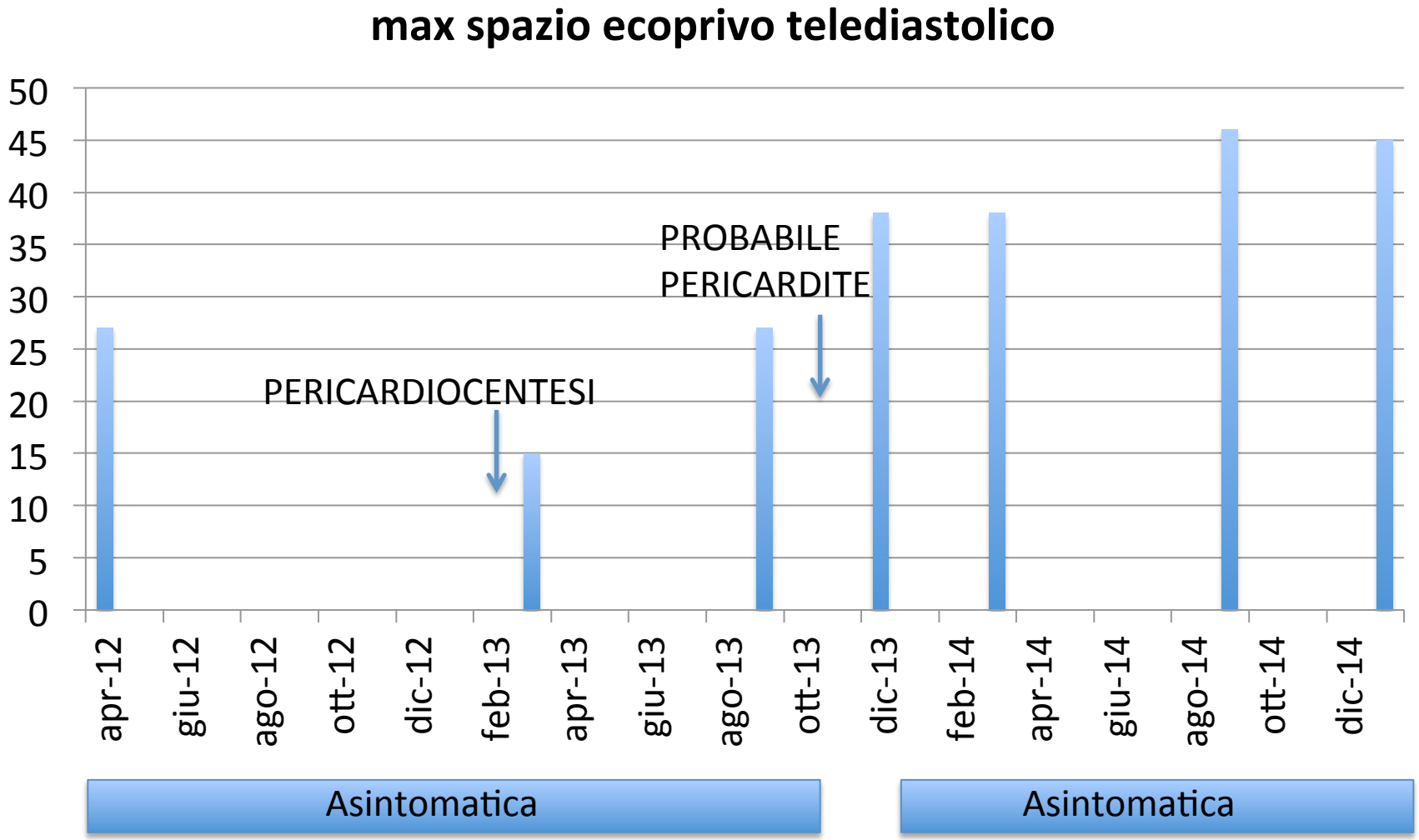
Versamento pericardico grave circonferenziale; no masse o linfoadenopatie.

Ecocardiogramma

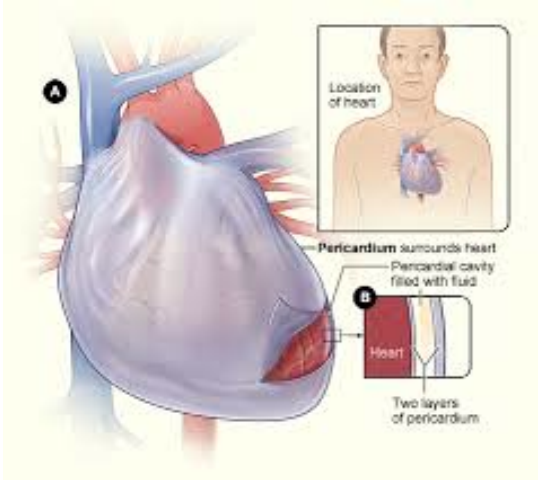



Eco adulti
S5-1
28Hz
18cm
+ Lungh. 3,60 cm
2D
AGen.
Guad. 50
C 50
3/2/0
75 mm/s
Eco adulti
S5-1
28Hz
18cm
+ Lungh. 3,65 cm
× Lungh. 2,65 cm
2D
AGen.
Guad. 50
C 50
3/2/0
75 mm/s
S5-1
20cm
2D
AGen.
Guad. 50
C 50
3/2/0
55 BPM
PW
1,8 MHz
Guad. 50
8,8 cm
Angolo 0°
Filt. 200HZ
50 mm/s
120
80
40
0
40
56
BPM
Eco adulti
S5-1
26Hz
20cm
2D
AGen.
Guad. 50
C 50
3/2/0
75 mm/s
Guad. 47
C 50
3/2/0
d-mode
3/3
75 mm/s
58 BPM
57
BPM

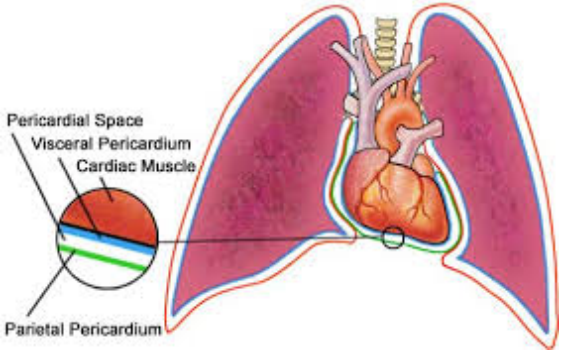
Andamento del versamento pericardico



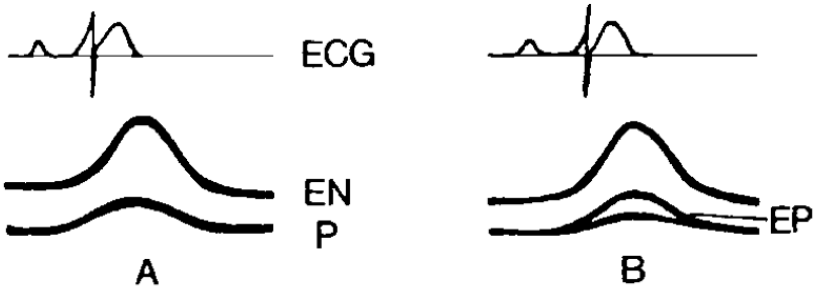
Normal Pericardial Fluid



10-50 ml of plasma ultrafiltrate



M-Mode

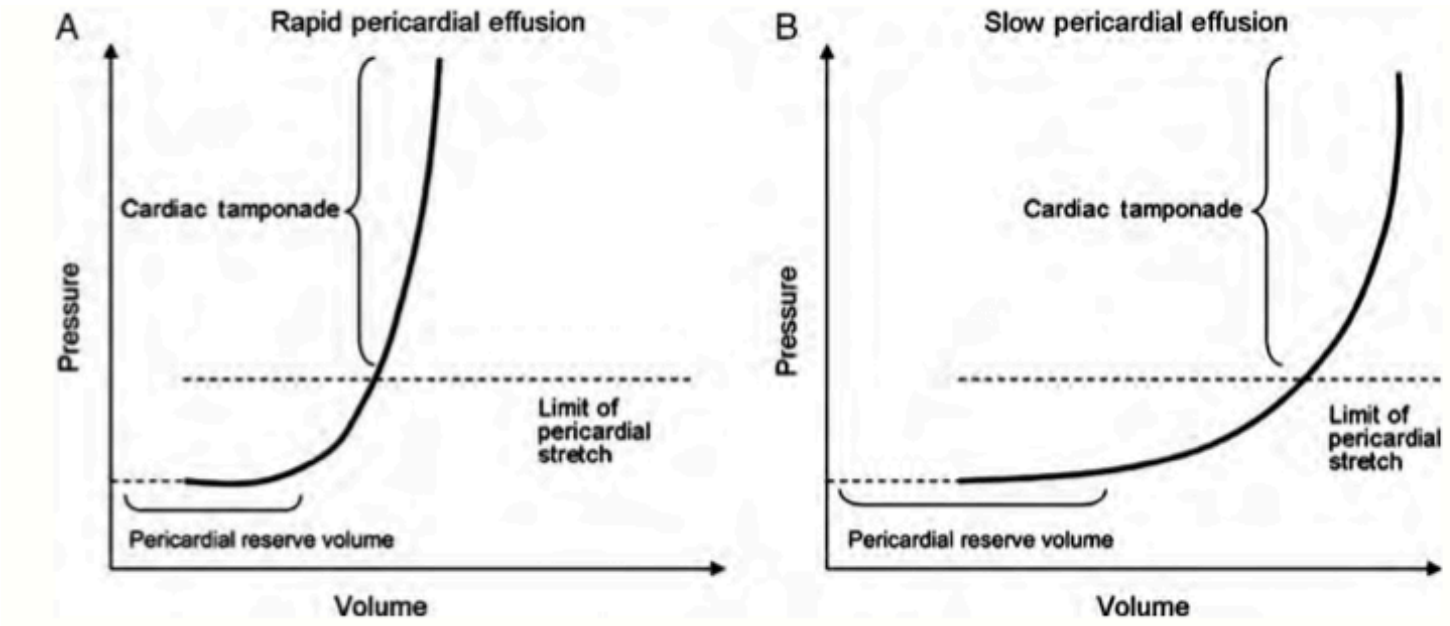


Absent or mild systolic separation of pericardial layers

Spectrum of pericardial effusions

Common finding either as incidental finding or manifestation of a systemic or cardiac disease.

The spectrum ranges from mild asymptomatic effusions to cardiac tamponade.

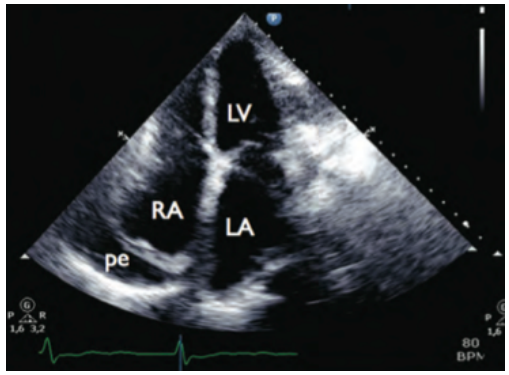


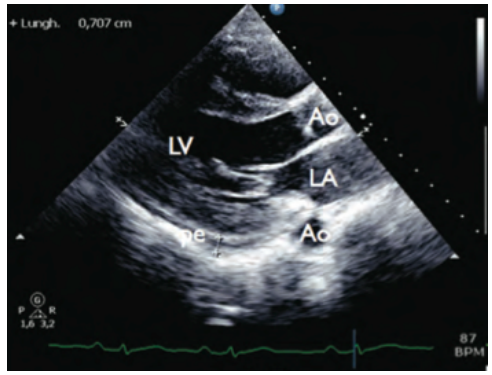
J-shaped pressure-volume curve of the pericardium

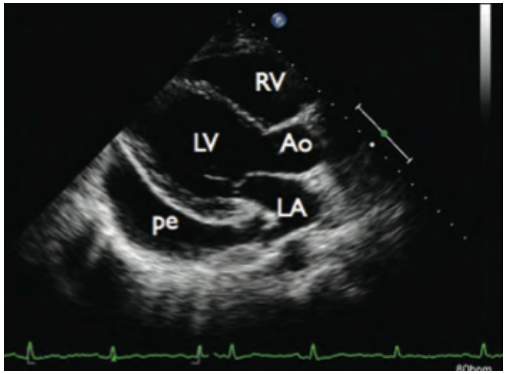
Eur Heart J 2013;34:1186-97

How pericardial fluid accumulates

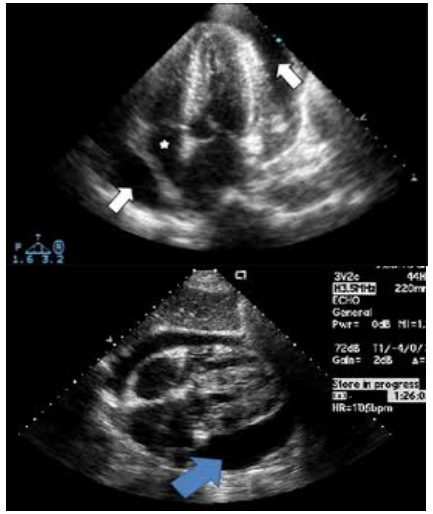
Mild (<10mm)







Moderate (10-20 mm)

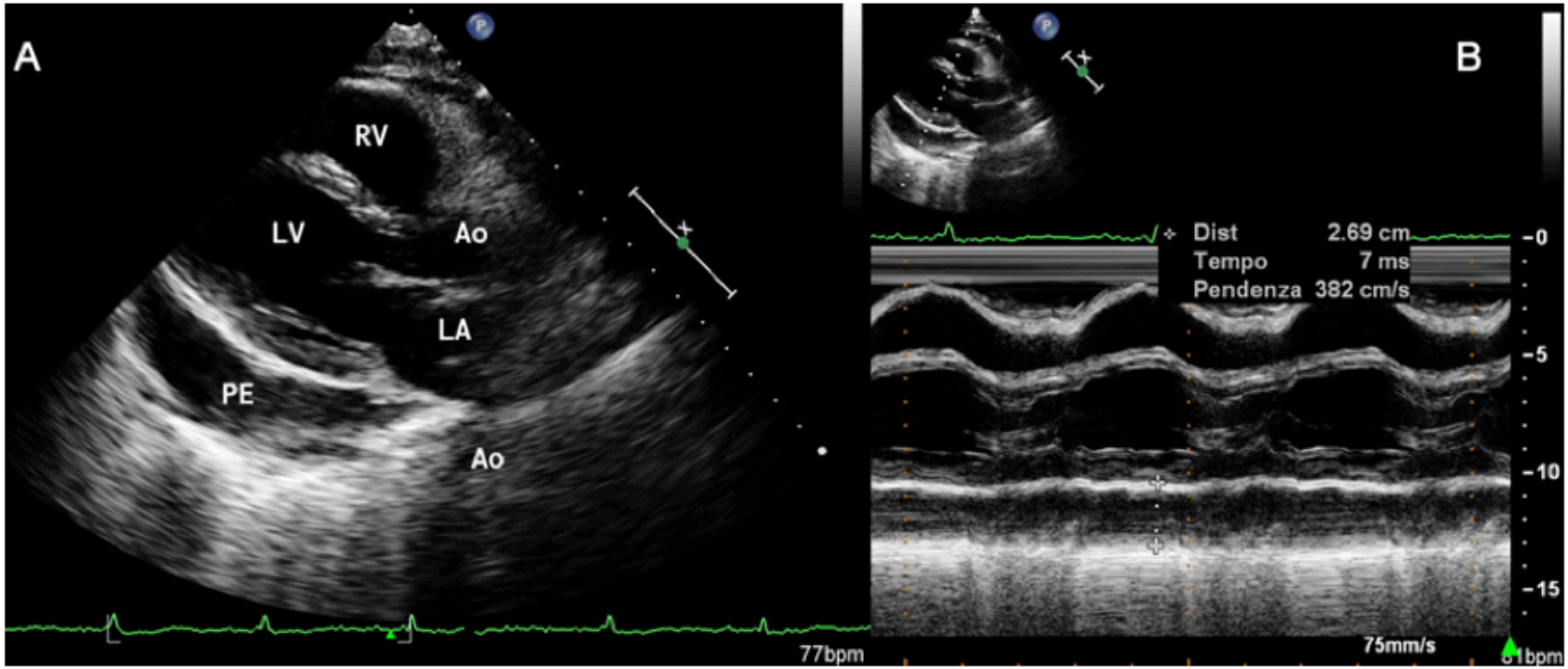


Large (>20mm)

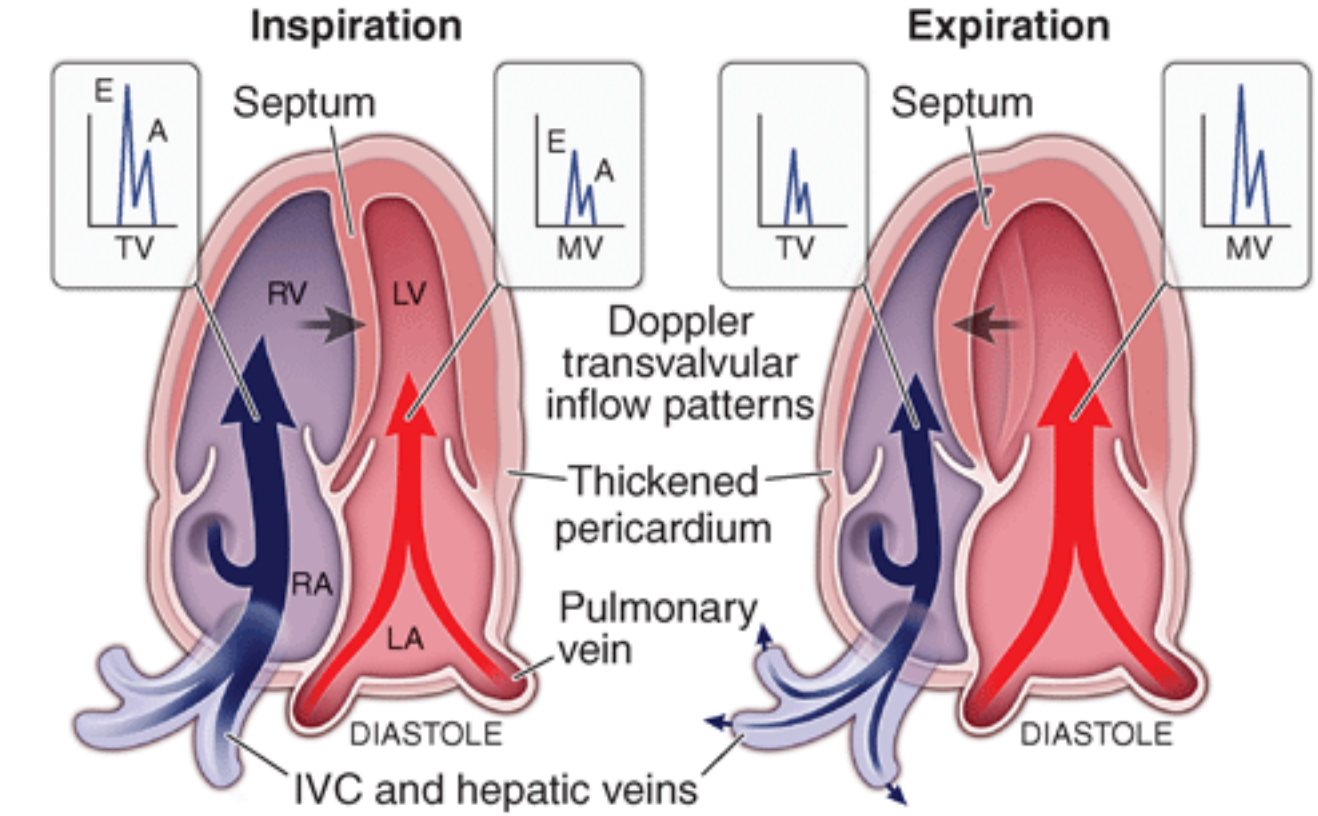
Semiquantitative Assessment

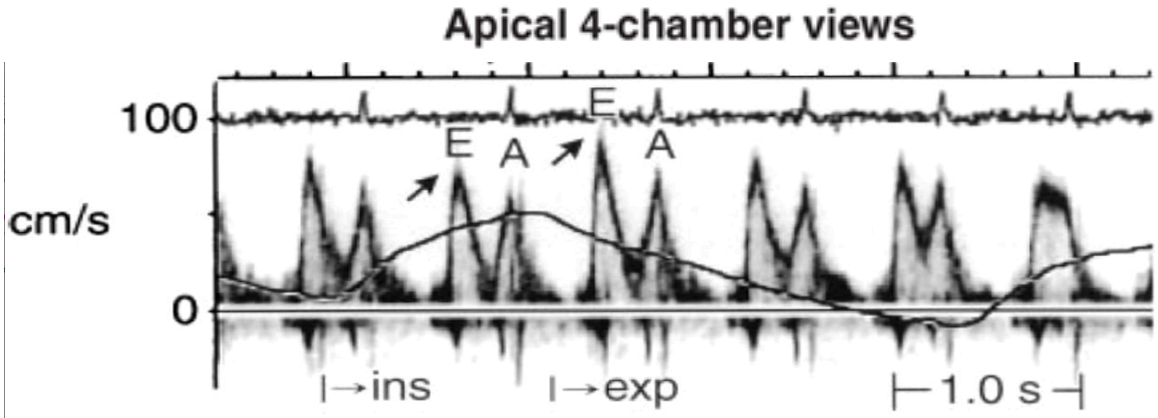
Size	Mild (<10 mm)
	Moderate (10–20 mm)
	Large (>20 mm)

Pericardial Effusion



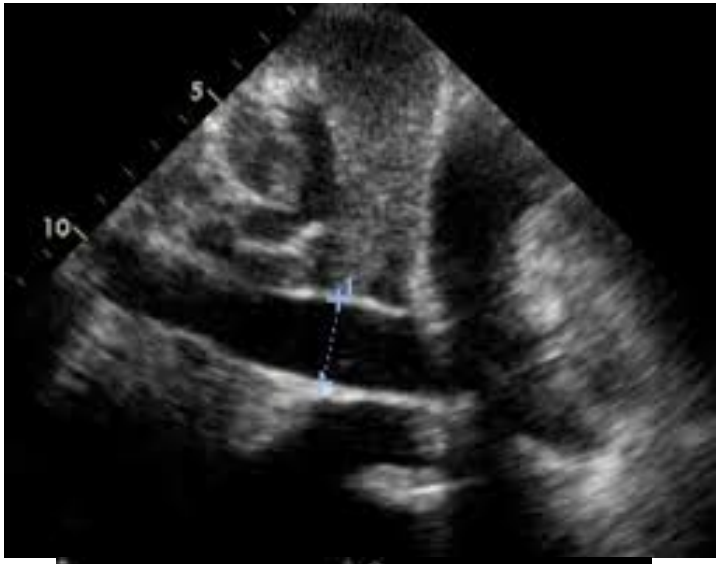
mild	<10mm
moderate	10-20mm
large	>20mm

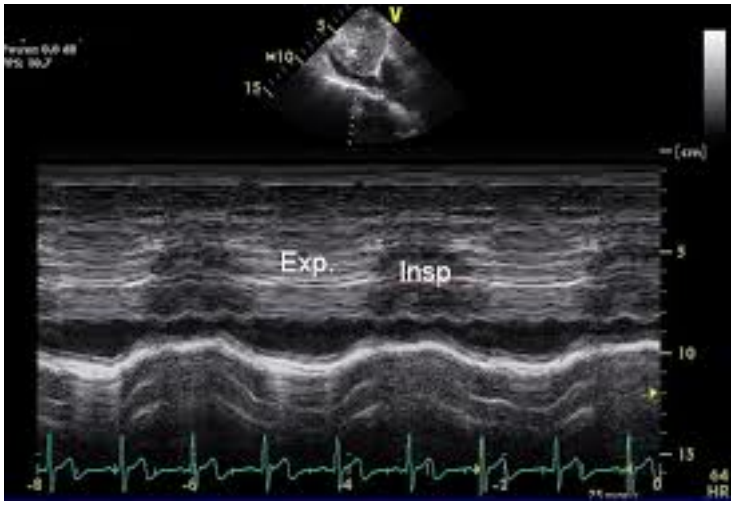


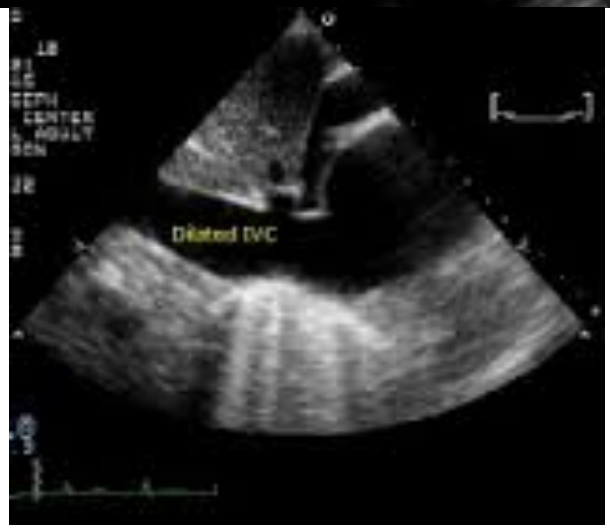


Mitral Inflow Velocity

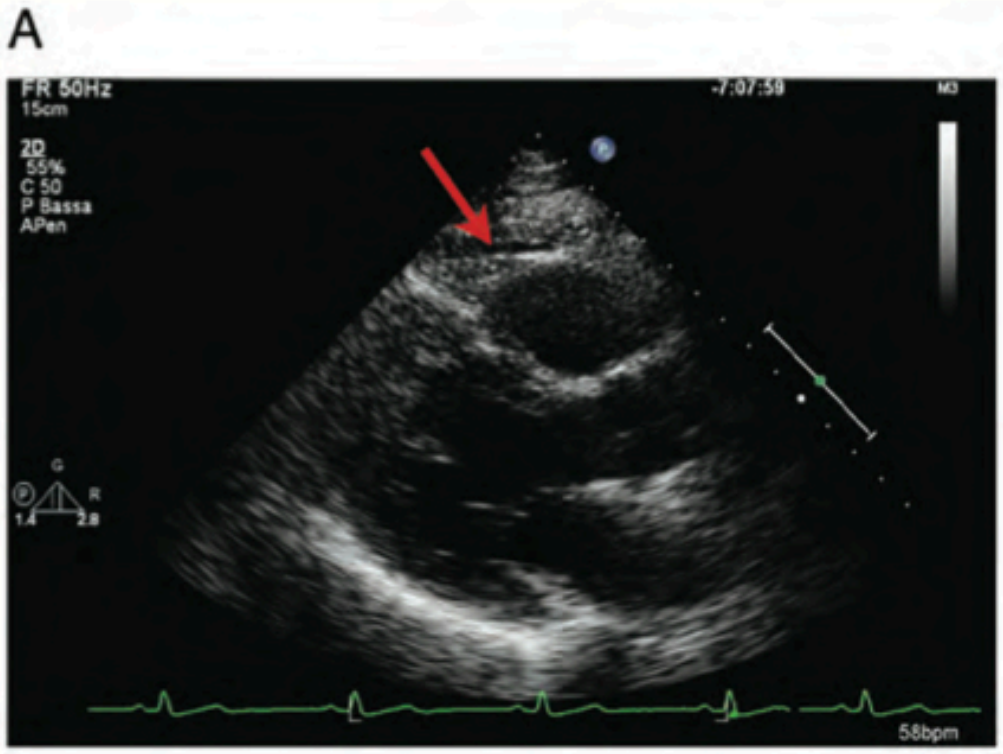
IVC plethora

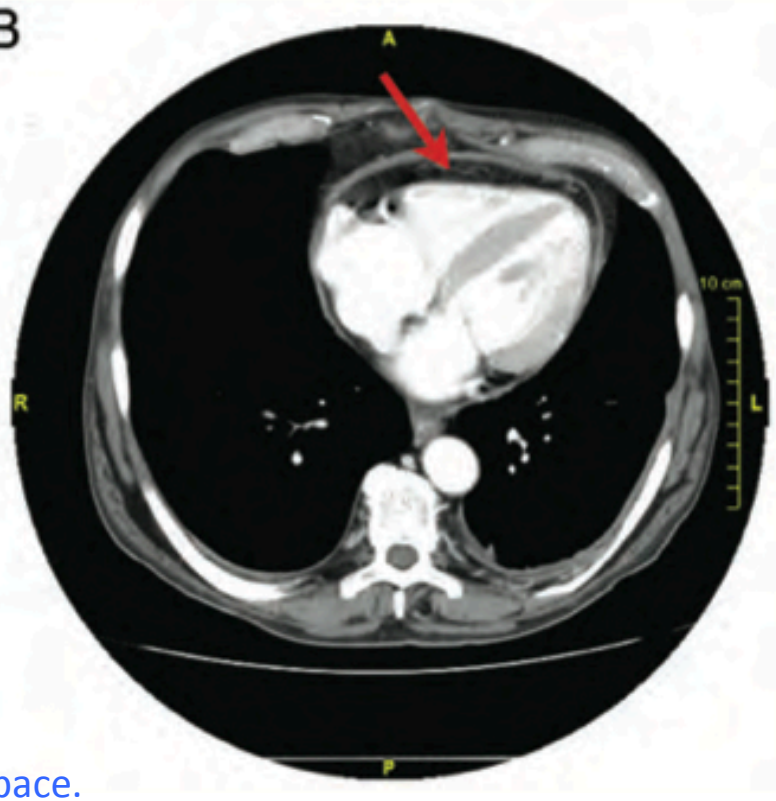






Differential diagnosis of pericardial effusion vs. epicardial fat

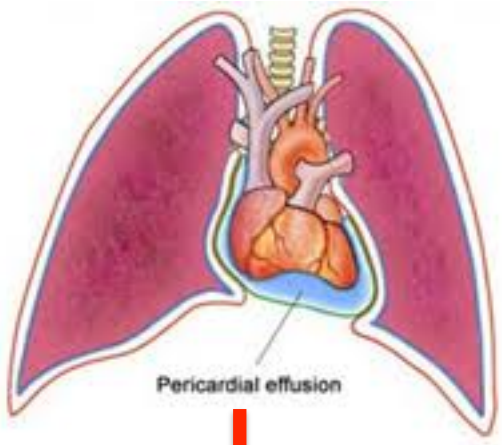




A) Echocardiographic view. Anterior pericardial echo-free space.

(B) Epicardial fat and thickened pericardium with contrast enhance- ment on CT scan.

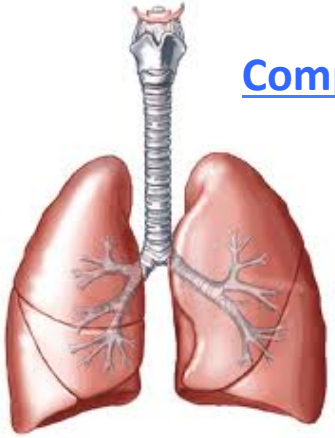
Signs and Symptoms



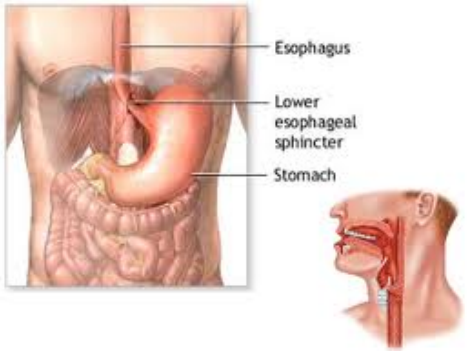
Compression of cardiac chambers:

Hypotension, Syncope
Pulsus Paradoxus,
Giugular Distension
Tachycardia,
Distant heart sounds
Dyspnoea, Orthopnoea

Compression of adiacent organs:



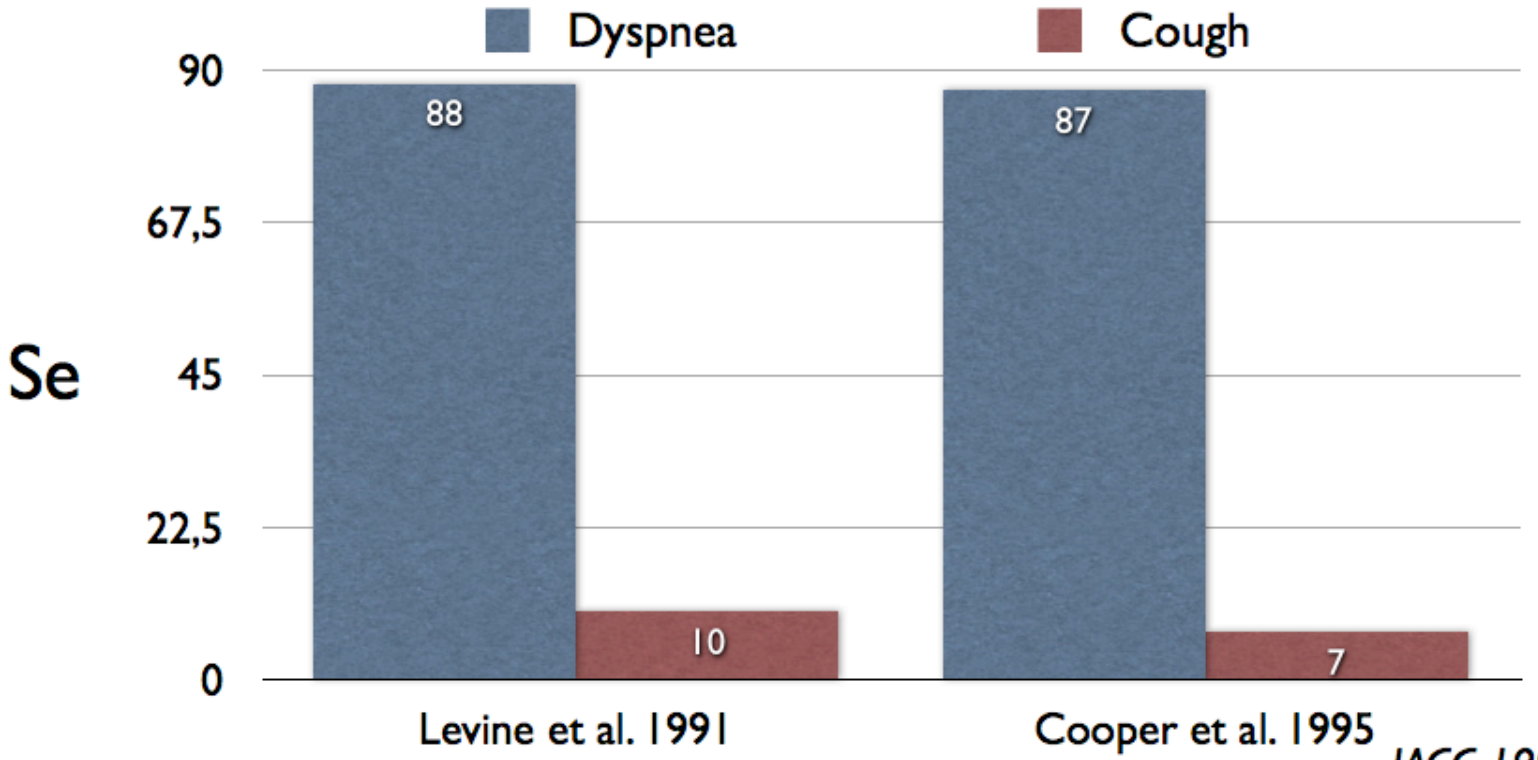
Left lung (Ewart's sign: dullness under left scapula)
Lungs (dyspnoea, cough)
Recurrent laryngeal nerve (hoarseness)
Phrenic nerve (hiccups)



Oesophagus (dysphagia)
Diaphragm (dyspnoea, nausea)

Accuracy of symptoms for cardiac tamponade

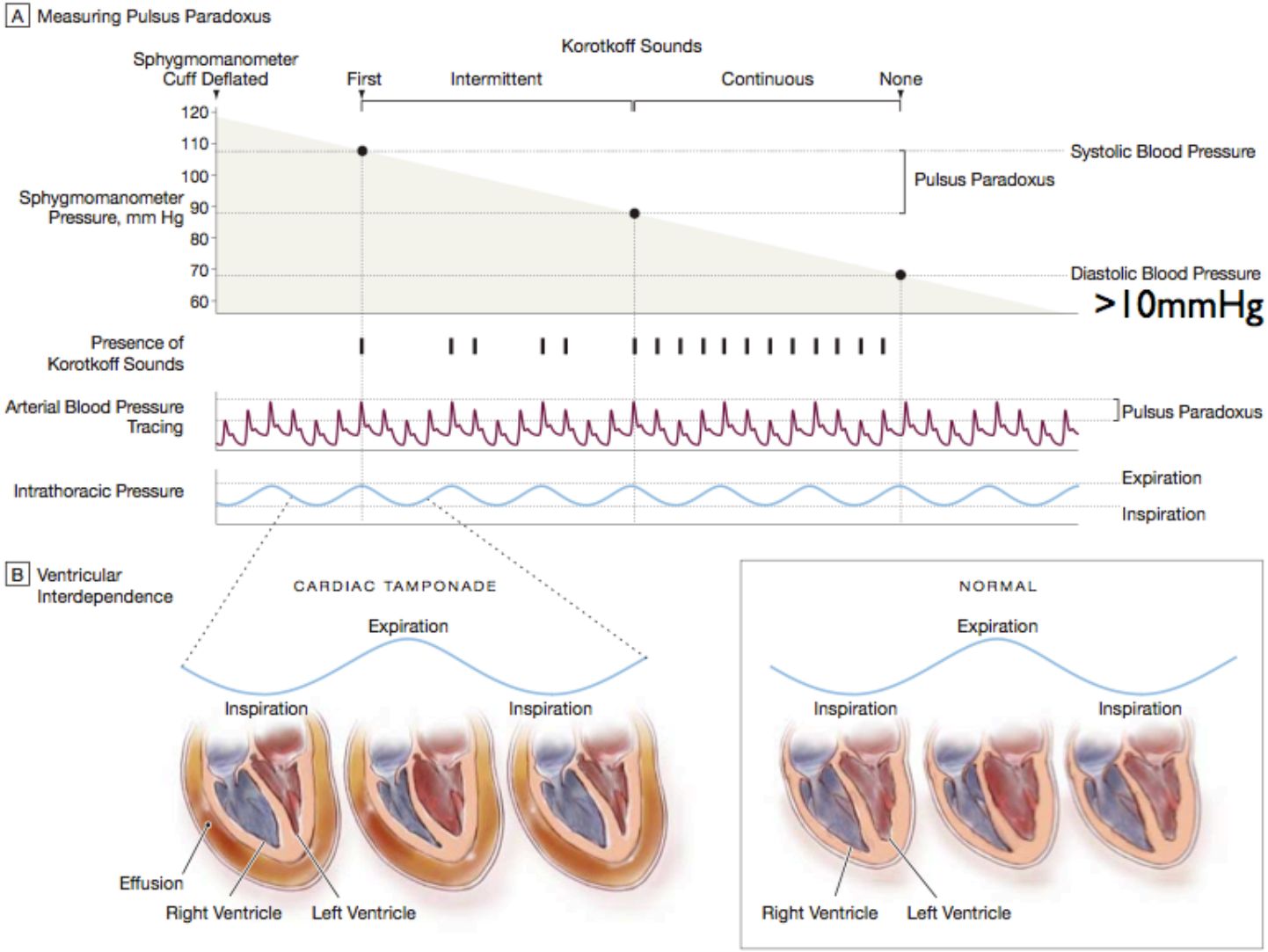
Symptom	%
Dyspnea	87-88%
Other*	<25%



Se=sensitivity; Other=chest pain,cough,fever,lethargy, and palpitations

JACC 1991;17:59-65
Br Heart J 1995;73:351-4

Pulsus Paradoxus (Kussmaul A. 1873)



The so-called paradox was the "waxing and waning" of the peripheral pulse, in contrast to the unvarying strength of the apical cardiac impulse.

Accuracy of pulsus paradoxus

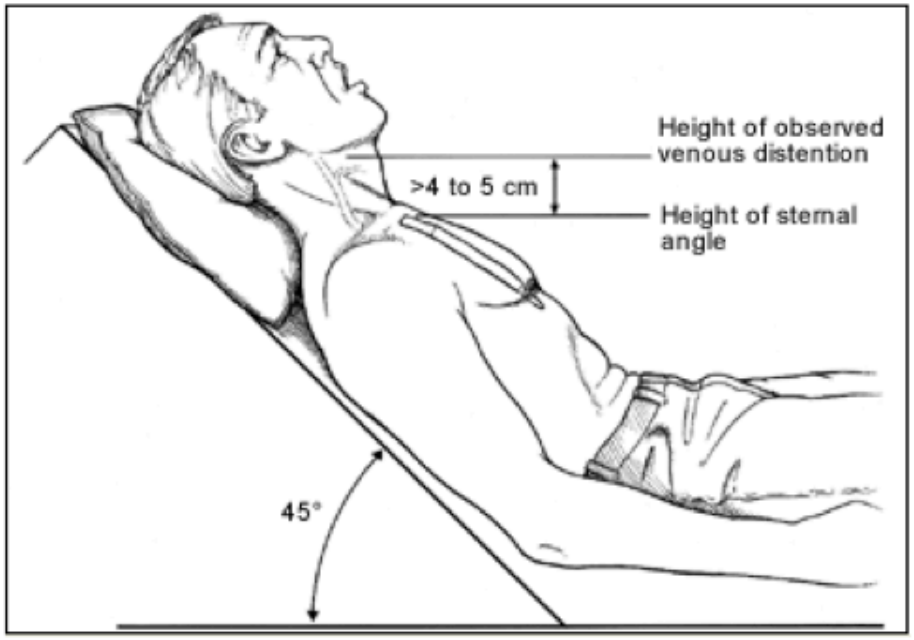
	Pulsus Paradoxus, mm Hg†	
	>12	>10
Sensitivity, %	98	98
Specificity, %	83	70
LR (95% CI)		
Positive	5.9 (2.4-14)	3.3 (1.8-6.3)
Negative	0.03 (0-0.21)	0.03 (0.01-0.24)

Abbreviation: CI, confidence interval.
*All data from Curtiss et al (N = 65).[33]
†Measured using an intra-arterial transducer.

LR=Likelihood ratio

Am Heart J 1988;115:391-8

Jugular vein distension and diminished heart sounds



Sensitivity of physical examination for cardiac tamponade diagnosis

295 patients

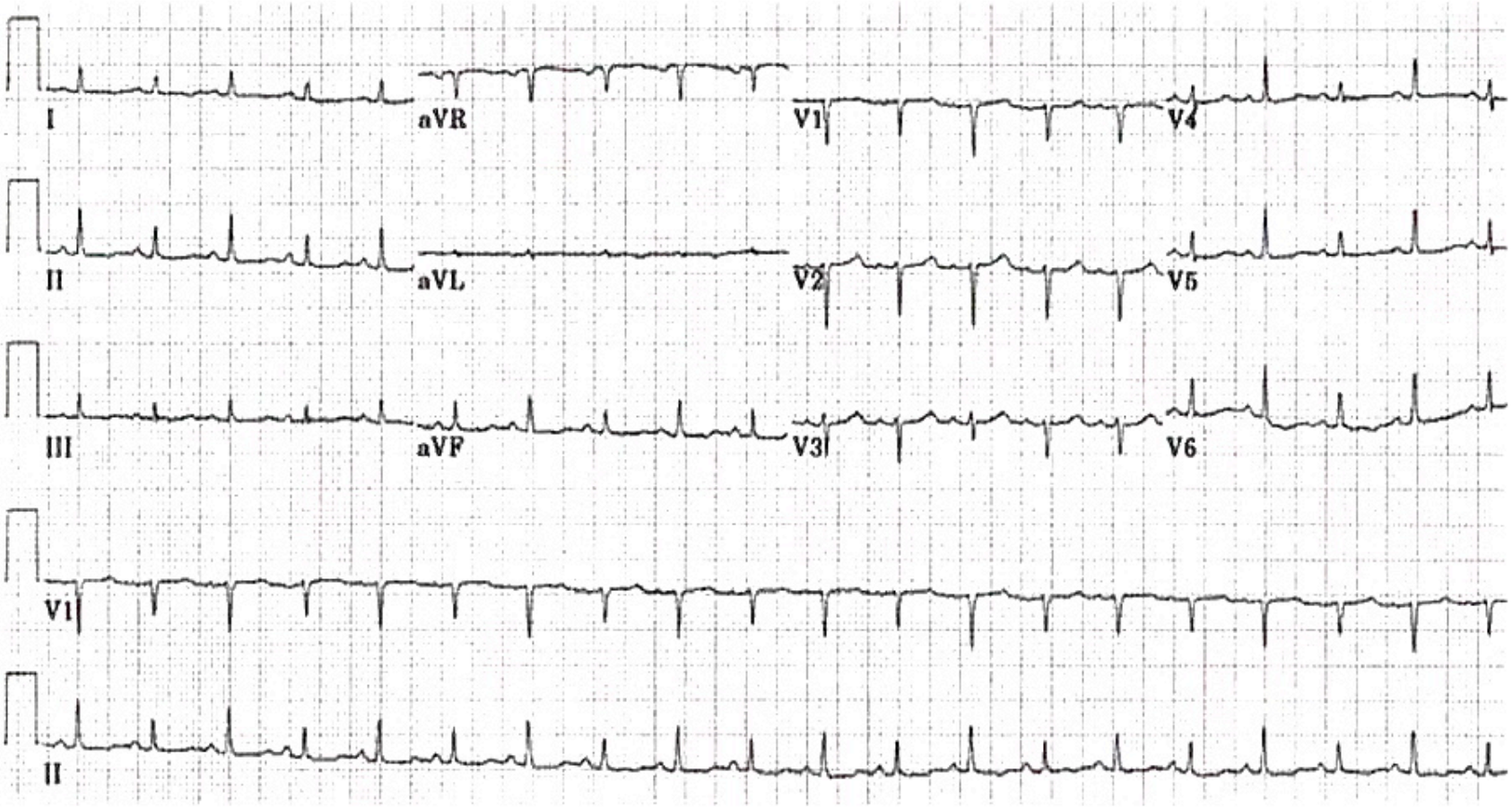
Sign	Reddy et al,[34] 1978 (N = 19)	Guberman et al,[25] 1981 (N = 56)	Singh et al,[6] 1984 (N = 16)	Curtiss et al,[33] 1988 (N = 65)	Levine et al,[6] 1991 (N = 50)	Brown et al,[26] 1992 (N = 18)	Cooper et al,[46] 1995 (N = 25)*	Gibbs et al,[47] 2000 (N = 46)	Pooled Sensitivity (95% CI)
	%								
Pulsus paradoxus >10 mm Hg	71†‡	77§	75§	98‡	86‖		56‖	80‖	82 (72-92)
Tachycardia		77			74		65	87	77 (69-85)
Hypotension		35			14		30	24	26 (16-36)
Hypertension ¶						33			
Tachypnea		80							
Diminished heart sounds		34			24			24	28 (21-35)
Elevated JVP			88		74		53	87	76 (62-90)
Peripheral edema		21			28				
Pericardial rub		29	19						
Hepatomegaly		55			28				
Kussmaul sign							26		

Pulsus paradoxus	82%
Tachycardia	77%
Elevated JVP	76%

JAMA 2007;297:1810-8

ECG

I. Low QRS voltages
II. Electrical alternans

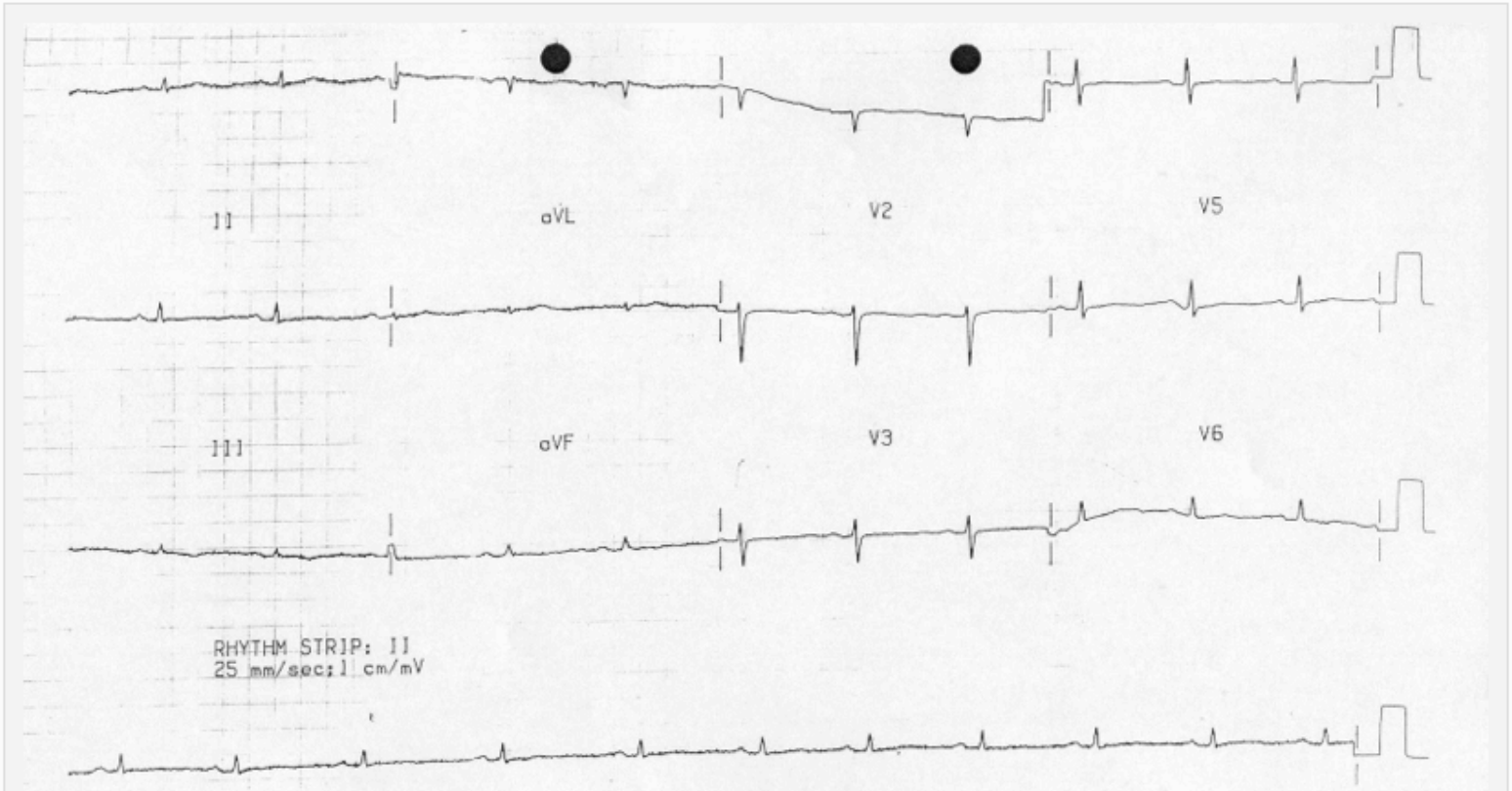


QRS low voltages

Definition

The QRS is said to be low voltage when:

- The amplitudes of all the QRS complexes in the limb leads are < 5 mm; or
- The amplitudes of all the QRS complexes in the precordial leads are < 10 mm



The "damping" effect of increased layers of fluid between the heart and the recording electrode

Sensitivity of ECG findings for cardiac tamponade

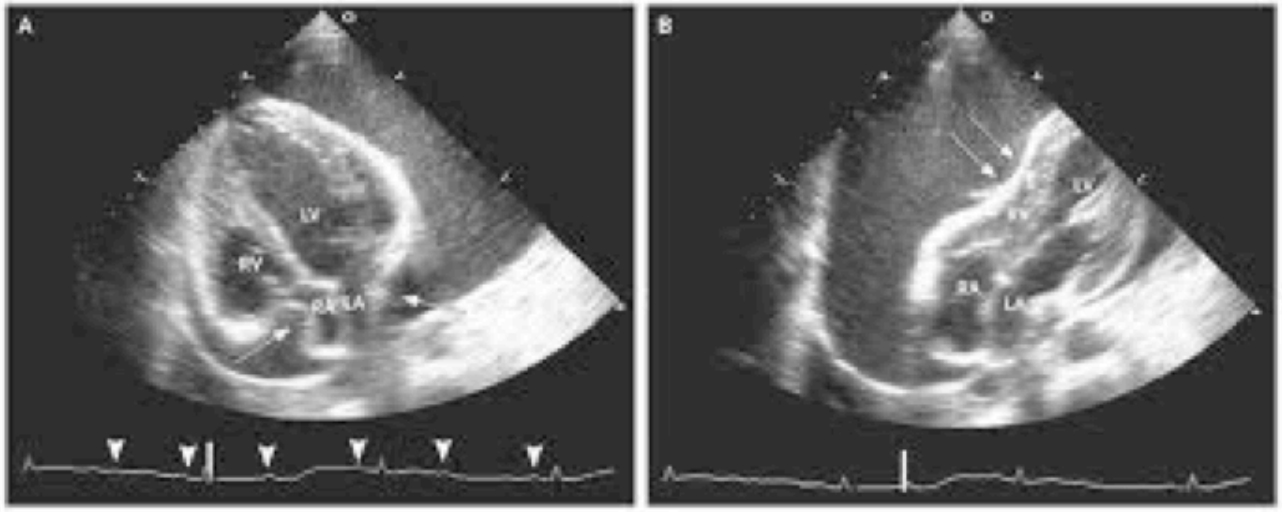
	%						
	Reddy et al,[34] 1978 (N = 19)	Guberman et al,[25] 1981 (N = 53)*	Singh et al,[8] 1984 (N = 16)	Levine et al,[5] 1991 (N = 50)	Cooper et al,[46] 1995 (N = 23)	Gibbs et al,[47] 2000 (N = 46)*	Pooled Sensitivity (95% CI)
Low voltage		40	50	56	22	39	42 (32-53)
Atrial arrhythmia	0	9		4			6 (1-11)
Electrical alternans		21		16			
ST-segment elevation		30	18				
PR-segment depression				18			

Abbreviation: CI, confidence interval.
*Not all patients had documentation of clinical findings.

Low voltages	32-52%
Electrical alternans	16-21%

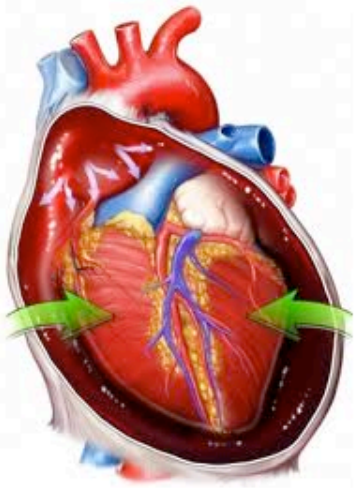
JAMA 2007;297:1810-8

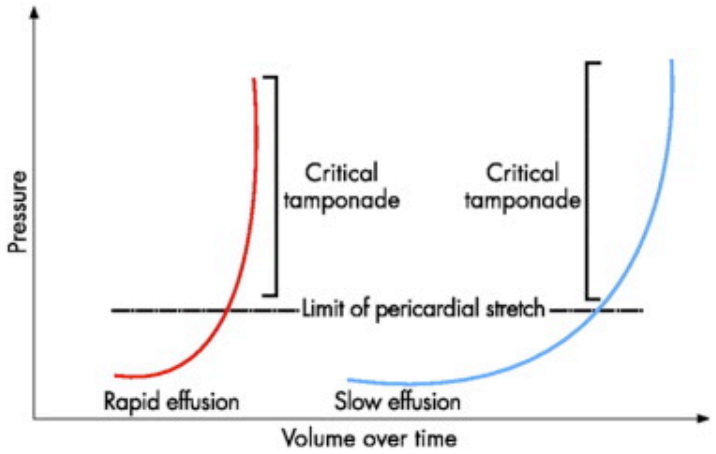
Electrical alternans- Swinging heart

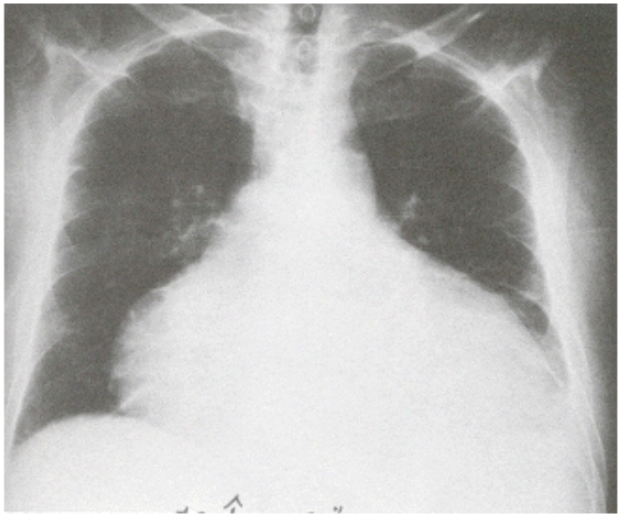


Alternating QRS voltage is produced by the heart swinging backwards and forwards within a large fluid-filled pericardium.

Chest x-ray







"Water bottle heart"

Sensitivity of chest x-ray for the diagnosis of cardiac tamponade

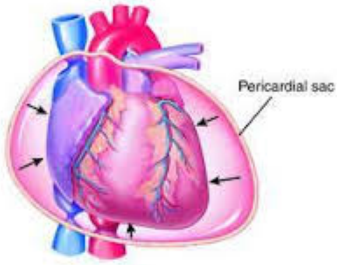
Source	Patients, No.	Cardiomegaly, %
Guberman et al,[25] 1981	53	95
Singh et al,[8] 1984	16	94
Levine et al,[6] 1991	50	68
Gibbs et al,[47] 2000	46	100
Pooled sensitivity (95% CI)		89 (73-100)

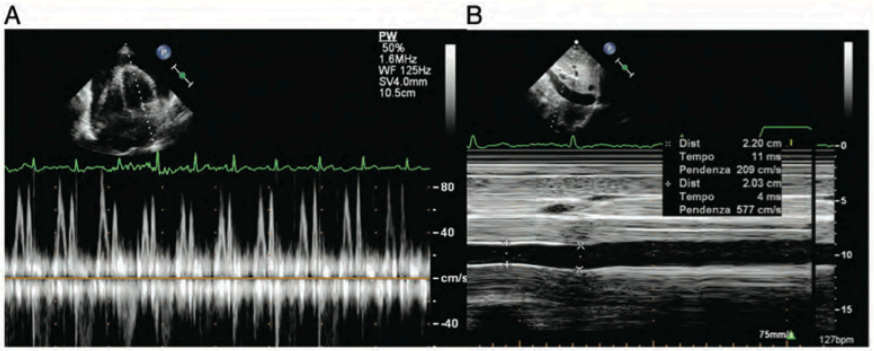
Abbreviation: CI, confidence interval.

Cardiomegaly (chest x-ray)	89%

JAMA 2007;297:1810-8

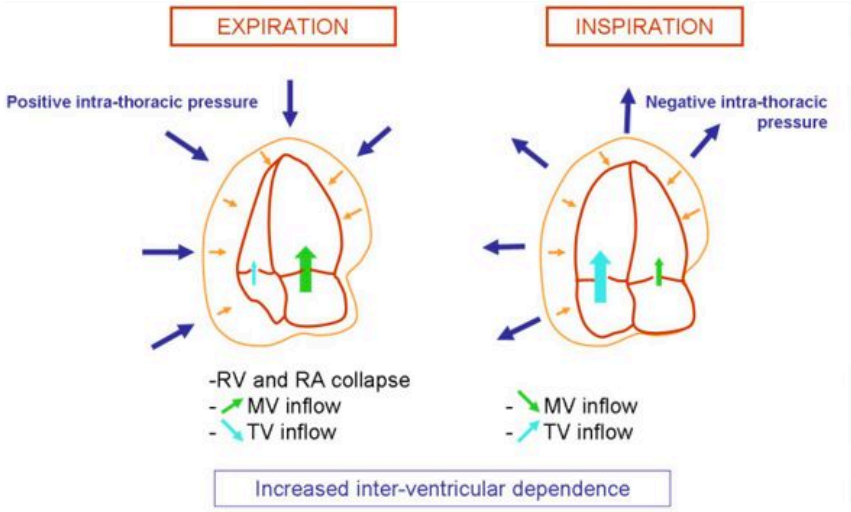
Major echocardiographic signs of cardiac tamponade





Sign	Sensitivity	Specificity
Large pericardial effusion with swinging heart	n.a.	n.a.
Diastolic collapse of right atrium (RA)	50–100%	33–100%
Duration of RA inversion by the RA inversion time index (duration of inversion/cardiac cycle length); for values >0.34	>90%	100%
Diastolic collapse of right ventricle (RV)	48–100%	72–100%
Variations in E velocities during respiration across the mitral valve, tricuspid valve, and pulmonary outflow that are greater than 25, 50, and 30%	n.a.	n.a.
Inferior vena cava (IVC) pletora (dilatation >20 mm and <50% reduction in the diameter of IVC with respiratory phases)	97%	40%

n.a, not available.

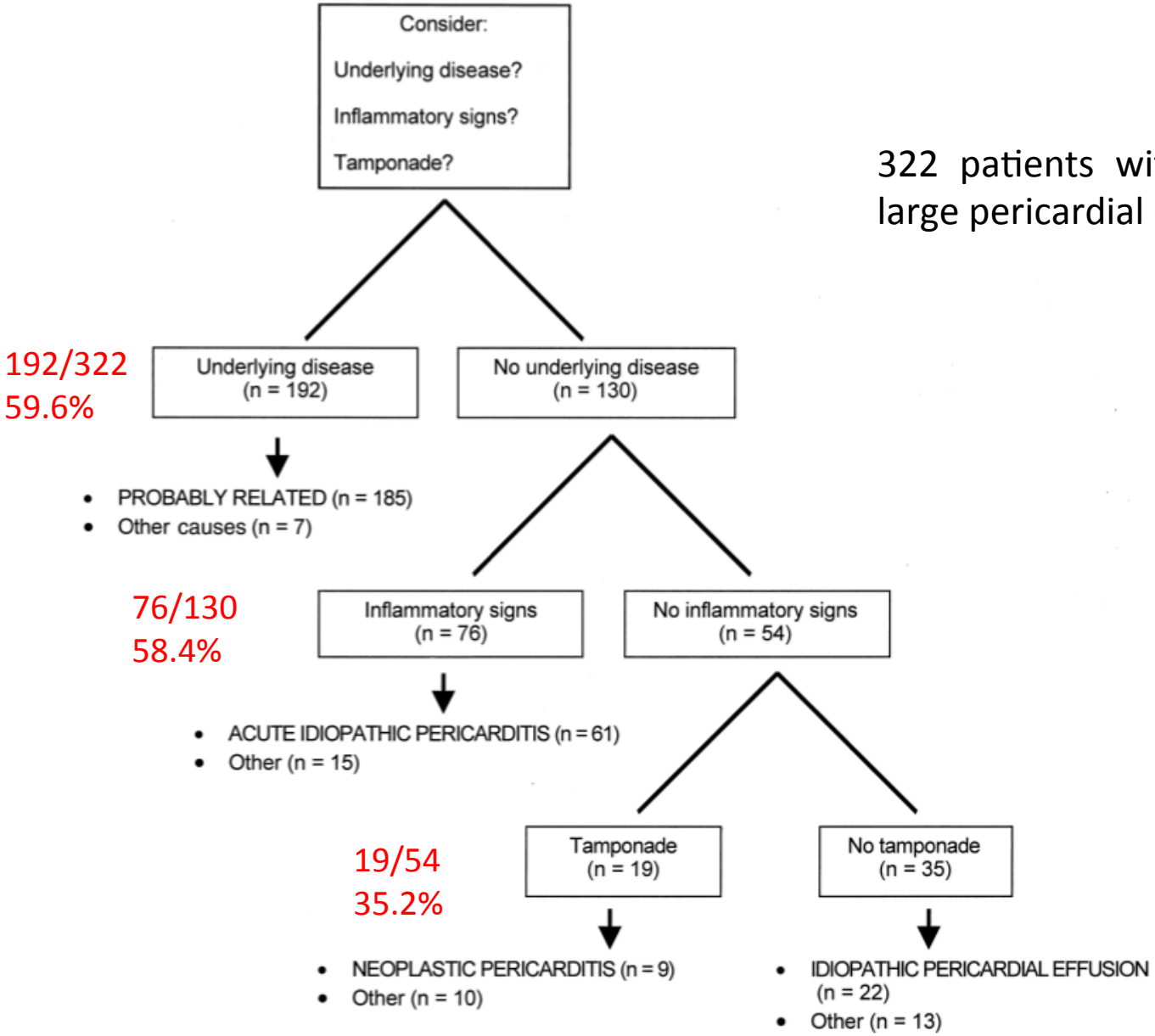


Aetiologic diagnosis of moderate to large pericardial effusions according to major published series

Feature	Corey et al.[17]	Sagrista-Sauleda et al.[18]	Levy et al.[19]	Reuter et al.[20]	Ma et al.[21]
Patients	57	322	204	233	140
Study years	1993	1990–96	1998–2002	1995–2001	2007–09
Country	USA	Spain	France	South Africa	China
Effusion size	>5 mm	>10 mm	NR	NR	Moderate to large[a]
Cardiac tamponade	NR	37	NR	NR	NR
Evaluation	Subxiphoid pericardiotomy	TB, ANA, TSH, pericardiocen-tesis, and biopsy	BCx, TSH, ANA, Q fever, viral rectal, and throat swabs	HIV, sputum, TB, BCx, blood chemistry, and serology	Pericardiocen-tesis
Idiopathic (%)	7	29	48	14	9
Cancer (%)	23	13	15	9	39
Infections (%)	27	2	16	72	29
Connective tissue diseases (%)	12	5	10	5	6
Metabolic (%)	24	6	11	0	0
Iatrogenic (%)	0	16	0	0	9

TBC 2/3 of cases

A selection of the most frequent aetiological diagnoses is reported (thus overall sum in columns may be <100%).
NR, not reported; TB, aetiology search for tuberculosis; BCx, blood cultures.
[a]All effusions requiring pericardiocentesis.



322 patients with moderate to large pericardial effusion

Am J Med. 2000;109:95–101

LONG-TERM FOLLOW-UP OF IDIOPATHIC CHRONIC PERICARDIAL EFFUSION

JAUME SAGRISTÀ-SAULEDA, M.D., JUAN ANGEL, M.D., GAIETÀ PERMANYER-MIRALDA, M.D., AND JORDI SOLER-SOLER, M.D.

Background A large idiopathic chronic pericardial effusion is a collection of pericardial fluid that persists for more than three months and has no apparent cause. We conducted a prospective study of the natural history and treatment of this disorder.

Methods Between 1977 and 1992, we prospectively evaluated and enrolled patients with large idiopathic chronic pericardial effusion. We performed pericardiocentesis in most of the patients. We performed pericardiectomy when large pericardial effusion reappeared after pericardiocentesis. Follow-up ranged from 18 months to 20 years (median, 7 years).

Results During the study period, we evaluated a total of 1108 patients with pericarditis, 461 of whom had large pericardial effusion. Twenty-eight of these patients (age range, 7 to 85 years; median, 61) had large idiopathic chronic effusion and were included in the study. The duration of effusion ranged from 6 months to 15 years (median, 3 years). At the initial evaluation, 13 patients were asymptomatic. Overt tamponade was found in eight patients (29 percent). Therapeutic pericardiocentesis, performed in 24 patients, was followed by the disappearance of or marked reduction in the effusion in 8. Five of the 24 patients underwent early pericardiectomy, and in 11 large pericardial effusion reappeared. Cardiac catheterization, performed in 16 patients, showed elevated intrapericardial pressure (mean [±SD], 4.75±3.79 mm Hg) and reduced transmural pressure (1.0±2.50 mm Hg) before pericardiocentesis. Both of these abnormalities in pressure improved significantly after pericardiocentesis. Pericardiectomy, performed in 20 patients, yielded excellent long-term results. At the end of the follow-up period, 10 patients had died, but none had died from pericardial disease.

28 casi con versamento pericardico grave CRONICO

13/28 (46%) asintomatici

Follow-up 18 mesi-20 anni (medio di 7aa):

Tamponamento cardiaco:
8/28 (29%)
Pericardiocentesi:
24/28 (86%)
Pericardiectomia:
20/28 (71%)

LONG-TERM FOLLOW-UP OF IDIOPATHIC CHRONIC PERICARDIAL EFFUSION

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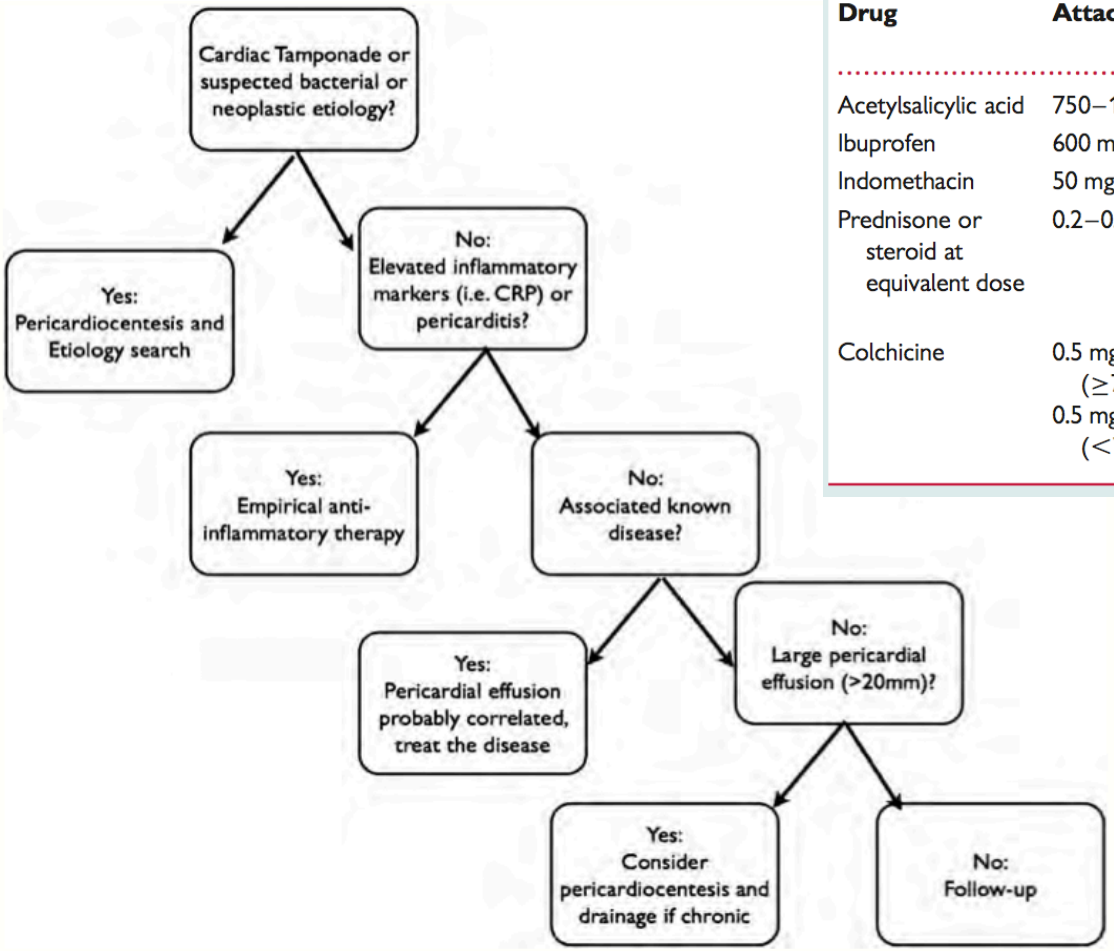
Conclusions Large idiopathic chronic pericardial effusion is well tolerated for long periods in most patients, but severe tamponade can develop unexpectedly at any time. Pericardiocentesis alone frequently results in the resolution of large effusions, but recurrence is common and pericardiectomy should be considered whenever a large effusion recurs after pericardiocentesis. (N Engl J Med 1999;341:2054-9.)

A simplified algorithm for pericardial effusion triage and management



Drug	Attack Dose	Treatment length	Level of evidence[a]
Acetylsalicylic acid	750–1000 mg t.i.d.	1–2 weeks	B
Ibuprofen	600 mg t.i.d.	1–2 weeks	B
Indomethacin	50 mg t.i.d.	1–2 weeks	C
Prednisone or steroid at equivalent dose	0.2–0.5 mg/kg/day	First episode: 2 weeks Recurrence: 4 weeks	B
Colchicine	0.5 mg b.i.d (≥70 kg) 0.5 mg once (<70 kg)	First episode: 3 months Recurrence: 6 months	B A

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Routine analyses to be performed on pericardial fluid

Analysis	Test	Aetiology or feature
General chemistry	Specific gravity> 1015, protein level >3 g/dL, protein fluid/serum ratio >0.5, LDH >200 mg/dL, fluid/serum ratio >0.6[a]	Exudate
	Glucose, blood cell count	
Cytology	Cytology (higher volumes of fluid, centrifugation, and rapid analysis improve diagnostic yield)	Cancer
Biomarkers	Tumour markers (i.e. CEA >5 ng/mL or CYFRA 21-1 >100 ng/mL)	Cancer
	Adenosine deaminase >40 U/L, IFN-gamma	TBC
Polymerase chain reaction (PCR)	PCR for specific infectious agents (i.e. TBC)	TBC
Microbiology	Acid-fast bacilli staining, mycobacterium cultures, aerobic, and anaerobic cultures	TBC Other bacteria

Indications for pericardiocentesis:

1. **Cardiac Tamponade**
2. **Moderate to Large Pericardial Effusions with suspicion of bacterial or neoplastic aetiologies**
3. **Symptomatic Moderate to Large Pericardial Effusions refractory to Medical Therapy**

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Conclusions (I)

- Pericardial effusion is a common finding in clinical practice either as incidental finding or manifestation of a systemic or cardiac disease (60% of unselected cases).
- The spectrum of pericardial effusions ranges from mild asymptomatic effusions to cardiac tamponade.
- The aetiology is varied (infectious, neoplastic, autoimmune, metabolic, and drug-related), being tuberculosis the leading cause of pericardial effusions in developing countries and all over the world.

Conclusions (II)

- Management is guided by the haemodynamic impact, size, presence of inflammation (i.e. pericarditis), associated medical conditions, and the aetiology whenever possible.
- Pericardiocentesis is mandatory for cardiac tamponade and when a bacterial or neoplastic aetiology is suspected.
- Pericardial biopsy is generally reserved for cases with recurrent cardiac tamponade or persistence without a defined aetiology, especially when a bacterial or neoplastic aetiology is suspected and cannot be assessed by other conventional and less invasive means.