

PERICARDPUNCTIE AL LA OLVG

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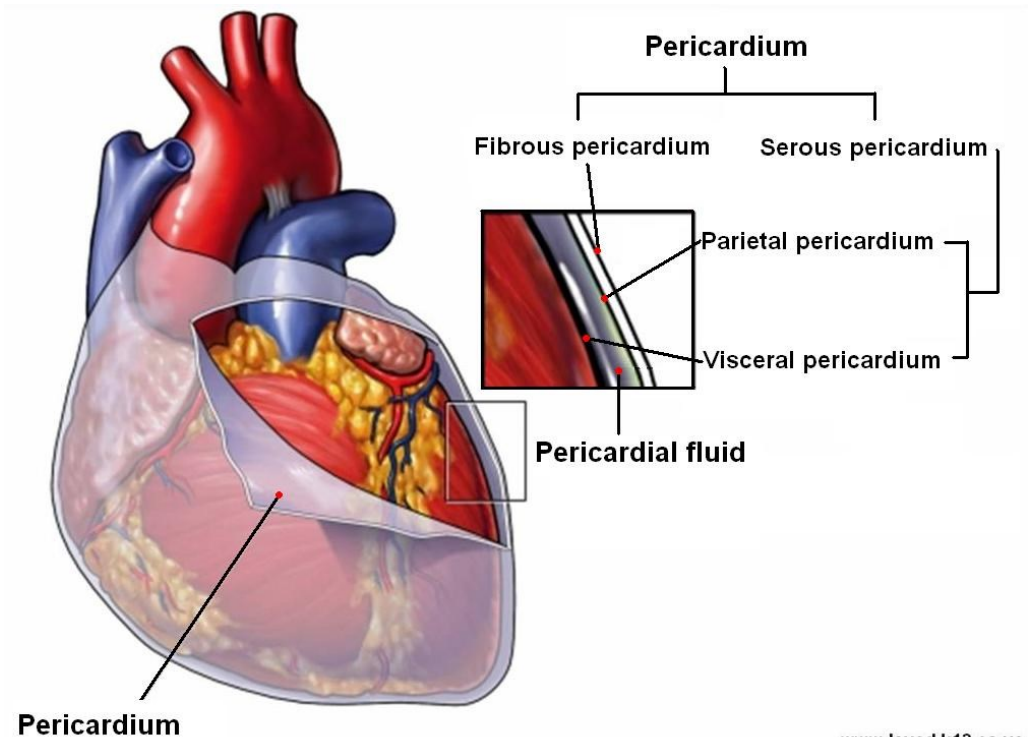
OLVG

6^e OLVG verwijzers symposium 2014



Pericard, fysiologie en pathologie

- Fysiologie: lubricatie, bescherming
- Normaal tot 20-50cc
- Pericard effusie: 100cc tot 2 liter

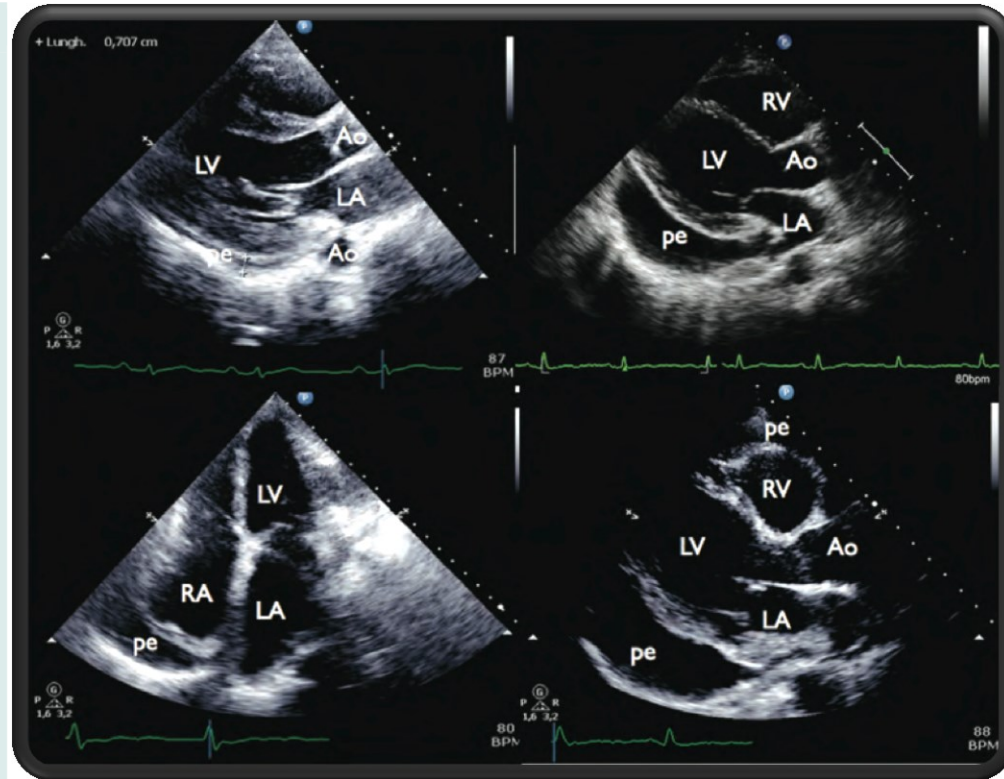


Classificatie van PE

Table 1 Classification of pericardial effusion

Onset	Acute (<1 week)
	Subacute (>1 week but <3 months)
	Chronic (>3 months)
Size	Mild (<10 mm)
	Moderate (10–20 mm)
	Large (>20 mm)
Distribution	Circumferential
	Loculated
Haemodynamic effect	Without cardiac tamponade
	With cardiac tamponade
	Effusive-constrictive
Composition/type	Transudate
	Exudate
	Hydropericardium (transudate, plasma ultrafiltrate)
	Haemopericardium (blood in pericardial space)
	Chylopericardium (chylous pericardial fluid)
	Pyopericardium (purulent pericardial effusion)
	Pneumopericardium (air in the pericardium)

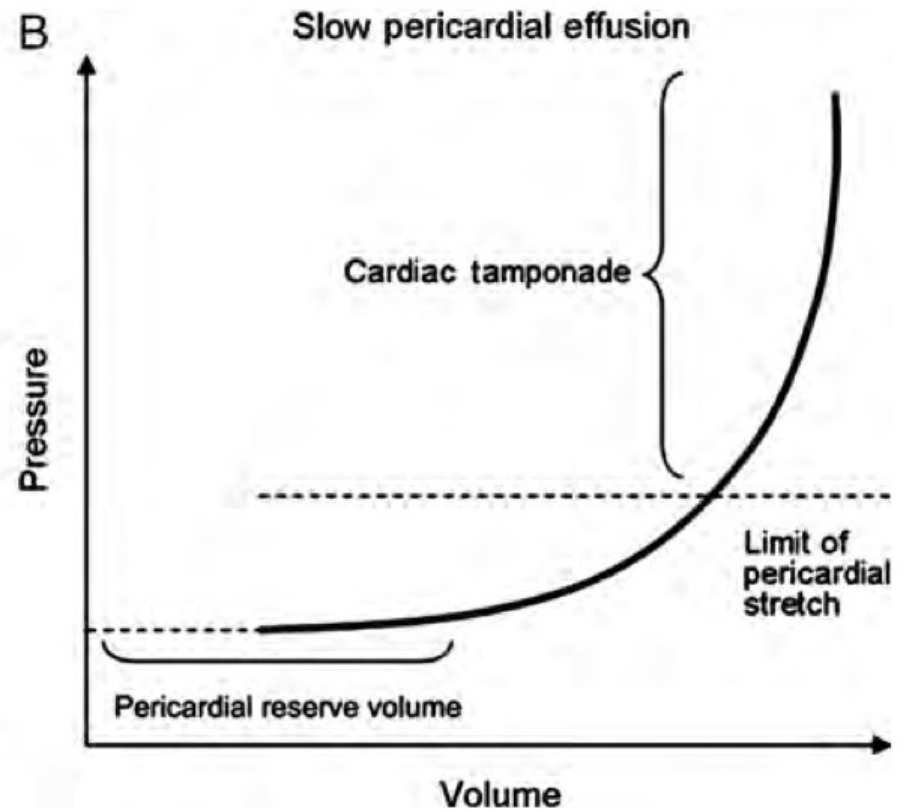
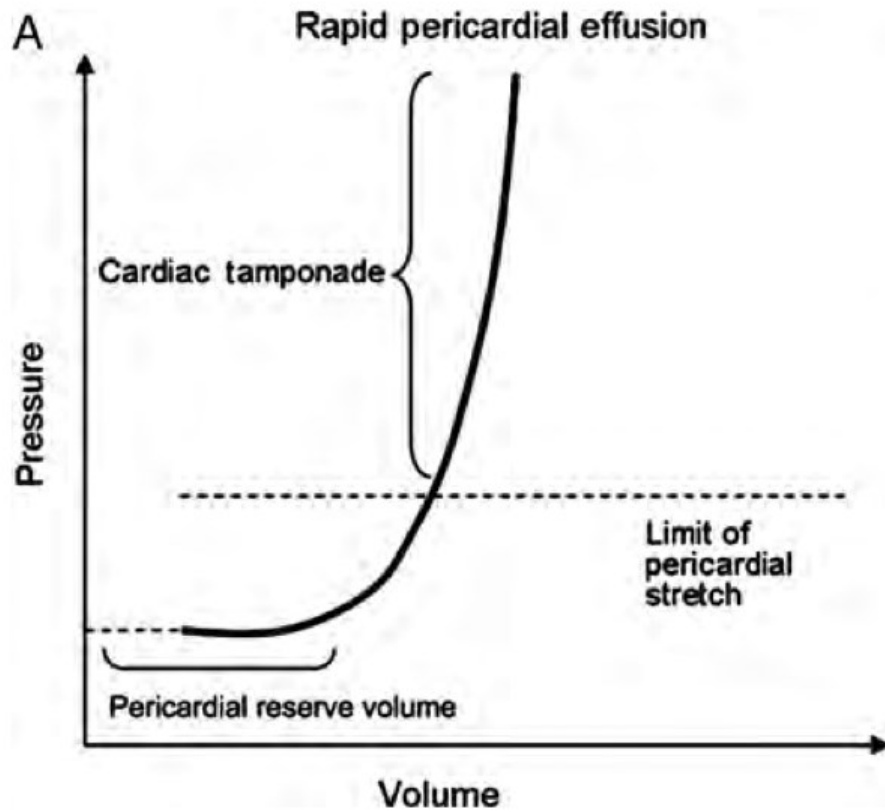
No precise definition is available for acute and subacute pericardial effusion, while the definition of chronic as >3 months is more clearly defined.



Cardiale tamponade

- Gecompromitteerde hemodynamische staat t.g.v. cardiale compressie door intra pericardiale accumulatie van:
 - Pericard vocht
 - Blood
 - Trombus
 - Neoplastische infiltratie
 - Lucht
 - Pus
- Progressief continuüm
- Irreversibel (zonder drainage) bij een kritieke tamponade

PE naar tamponade



Oorzaken van pericard effusie

Table 2 Causes of pericardial effusion

Infectious

Viral (most common: Echovirus and Coxsackievirus (usual), Influenza, EBV, CMV, Adenovirus, Varicella, Rubella, Mumps, HBV, HCV, HIV, Parvovirus B19 and Human Herpes Virus 6 (increasing reports))

Bacterial [most common: tuberculous (4–5%), *Coxiella burnetii*, other bacterial rare may include Pneumo-, Meningo-, Gonococcosis, Haemophilus, Staphylococci, Chlamydia, Mycoplasma, Legionella, Leptospira, and Listeria]

Fungal (rare: Histoplasma more likely in immunocompetent patients, Aspergillosis, Blastomycosis, Candida more likely in immunosuppressed host)

Parasitic (very rare: echinococcus, toxoplasma)

Non-infectious

Autoimmune and autoinflammatory

Systemic inflammatory diseases (more common in systemic lupus erythematosus, Sjögren syndrome, rheumatoid arthritis, systemic sclerosis, systemic vasculitides, Behçet syndrome, Sarcoidosis, Familial Mediterranean Fever)

Pericardial injury syndromes (post-myocardial infarction, post-pericardiotomy syndrome, post-traumatic)

Autoreactive

Cancer

Primary tumours (rare, especially pericardial mesothelioma)

Secondary metastatic tumours (lung, breast cancer, lymphomas, and melanoma)

Metabolic (Uraemia, Myxedema)

Trauma

Direct injury (penetrating thoracic injury, oesophageal perforation, and iatrogenic)

Indirect injury (non-penetrating thoracic injury, and radiation injury)

Mediastinal radiation, recent, or remote

Drugs and toxins (rare): Procainamide, hydralazine, isoniazid, and phenytoin (lupus-like syndrome), Penicillins (hypersensitivity pericarditis with eosinophilia), Doxorubicin and daunorubicin (often associated with a cardiomyopathy, may cause a pericardiopathy). Minoxidil. Immunosuppressive therapies (e.g. methotrexate, cyclosporine)

Haemodynamic (heart failure, pulmonary hypertension, and hypoalbuminaemia)

Indicatie pericardioscentese

Class I:

- Tamponade
- Pericardvocht >20mm tijdens diastole op TTE
- Verdenking op purulent/ tuberculeus vocht

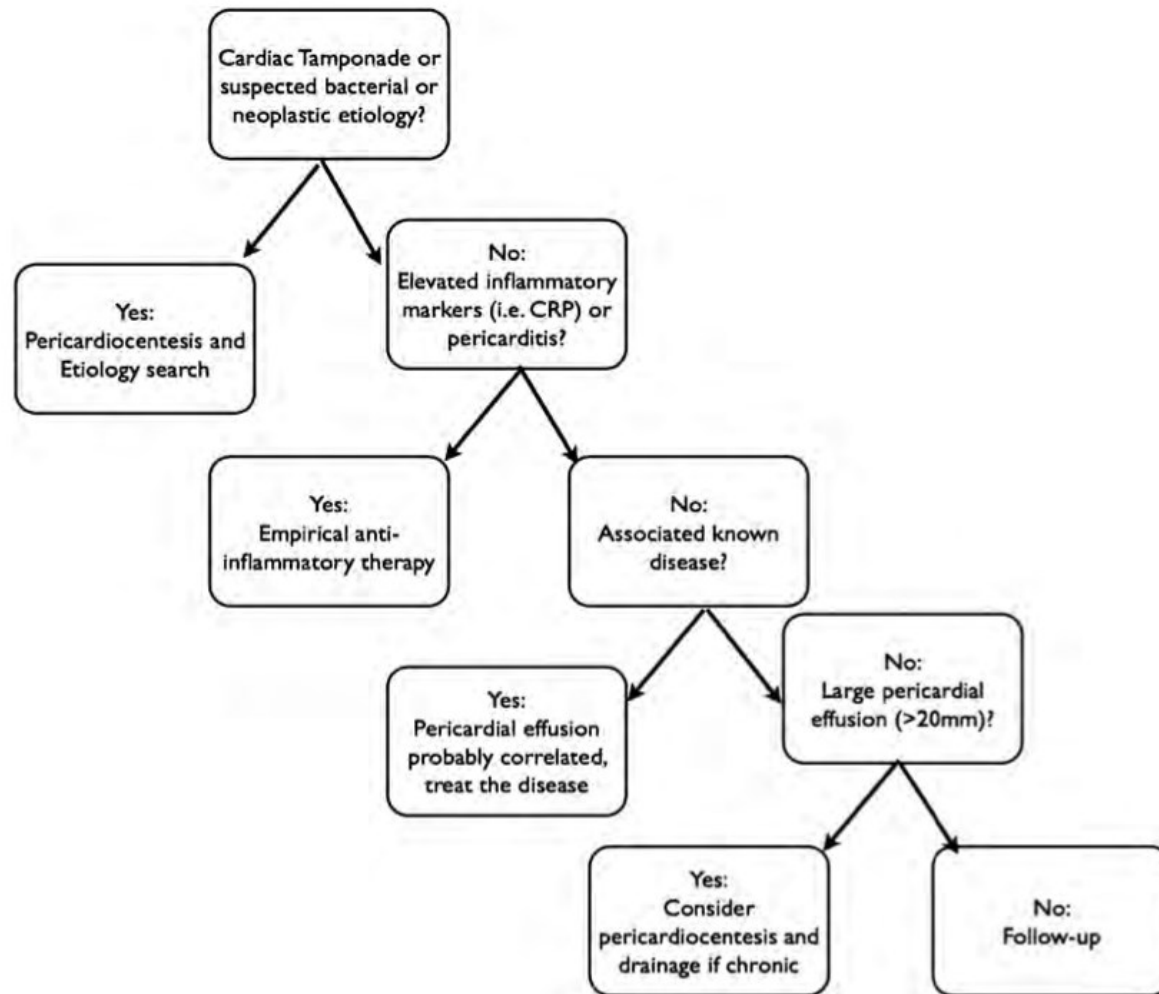
Class IIa:

- Pericardvocht 10-20mm in diastole voor diagnostiek
- (Verdenking) pericarditis carcinomatosa

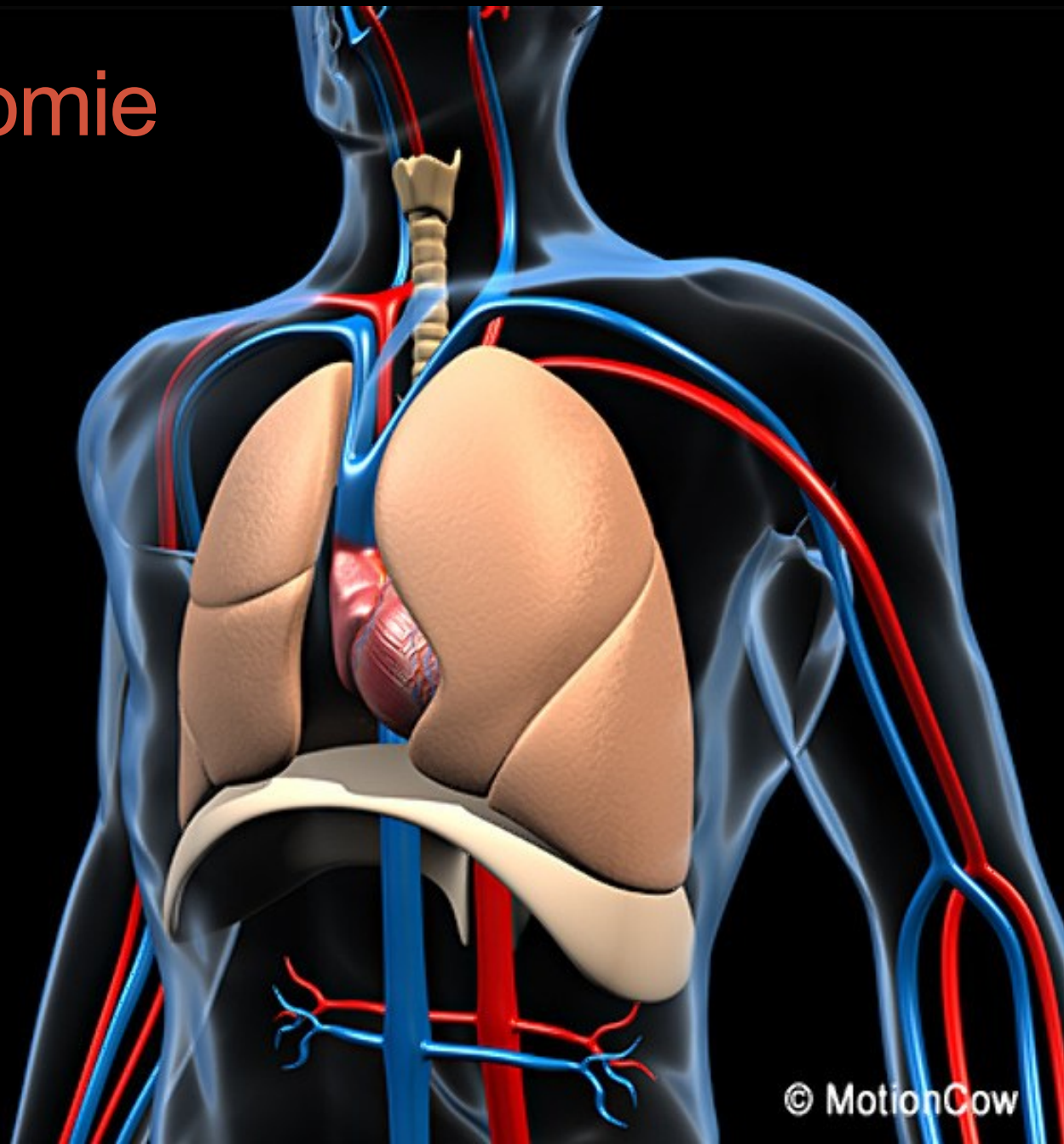
Class IIb:

- Pericardvocht <10mm tijdens diastole voor diagnostiek

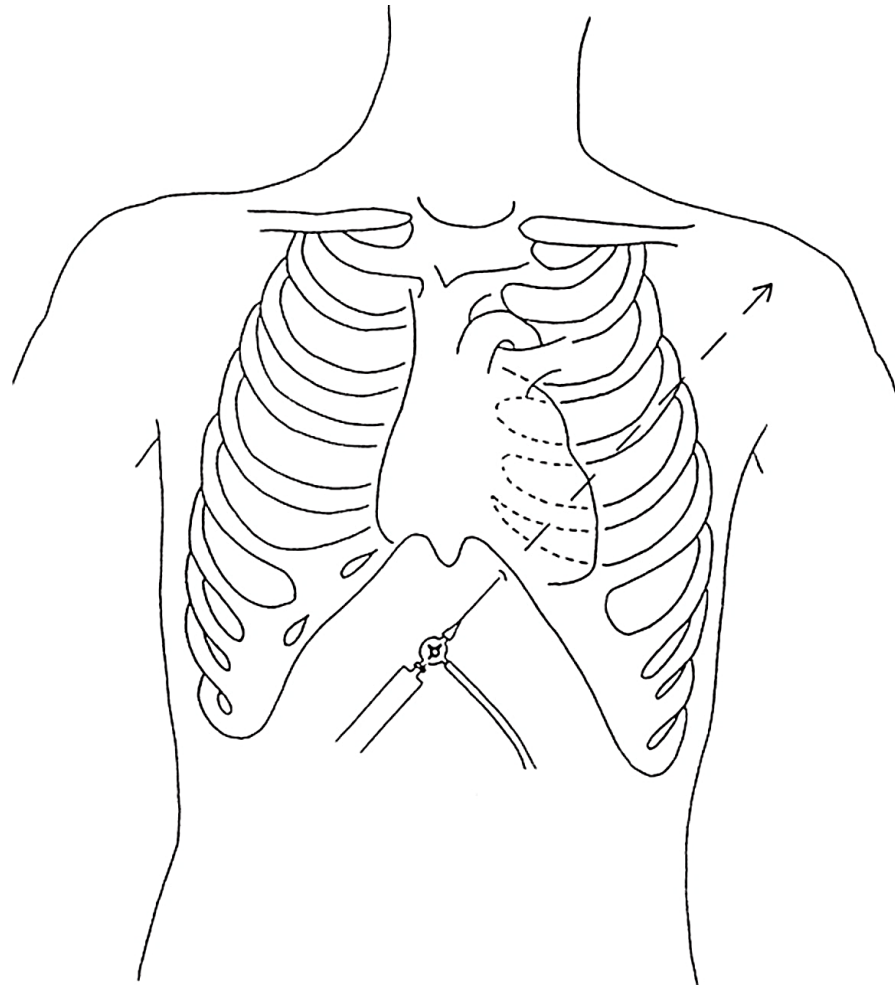
Flow chart behandelning PE



Anatomie



Klassiek: sub-xiphoidale route



History of puncture

Reported Complications of Pericardiocentesis

Reference (first author)	Date	Pericardiocenteses (no.)	Complications
Bishop ¹²	1956	40	Ventricular puncture (6)
Kilpatrick ³	1965	20	Cardiac chamber puncture (7), death (1), hypotension (3)
Fredriksen ⁶	1971	21	Cardiac chamber puncture (3)
Pradham ⁴	1976	5	Cardiac tamponade (1)
Silverberg ¹³	1977	21	Cardiac arrest (1)
Krikorian ¹⁴	1978	123	Death (5), hemopericardium (5) ventricular tachycardia (1) nonproductive pericardiocentesis (17)

Pericard punctie

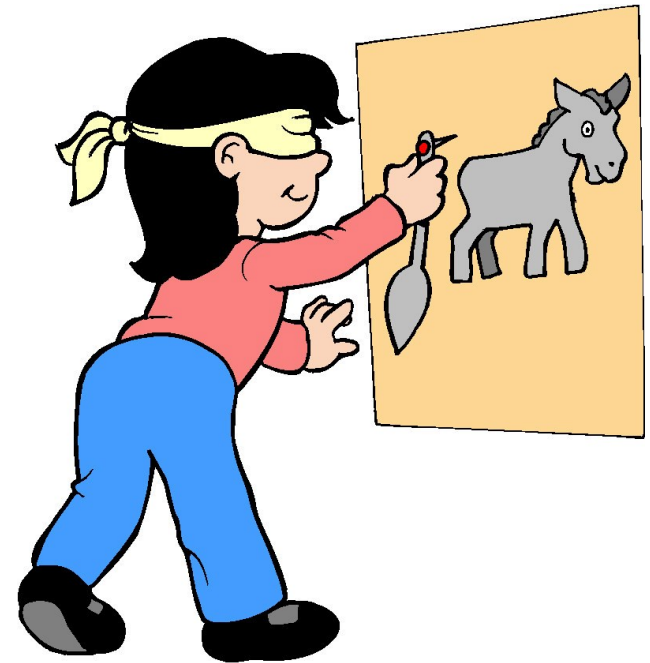


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Complicaties van pericardioscentese

- Laceratie
 - Cardiale venen
 - RV of RA
- Perforatie
- Pneumothorax
- Long injury
- Lever injury
- Infectie
- Pijn, vasovagale reactie
- Sudden decompression syndrome



Optimale punctie site

- Veilig
- Effectief
- Patiënt comfort
- Cardioloog comfort



Grootste vloeistof collectie
Dichtbij de entry site
Geen tussen liggende structuren

Echo helpt met visualisatie van:

- Pericard effusie
- Omliggende structuren
- L en RV
- Selectie optimale benadering



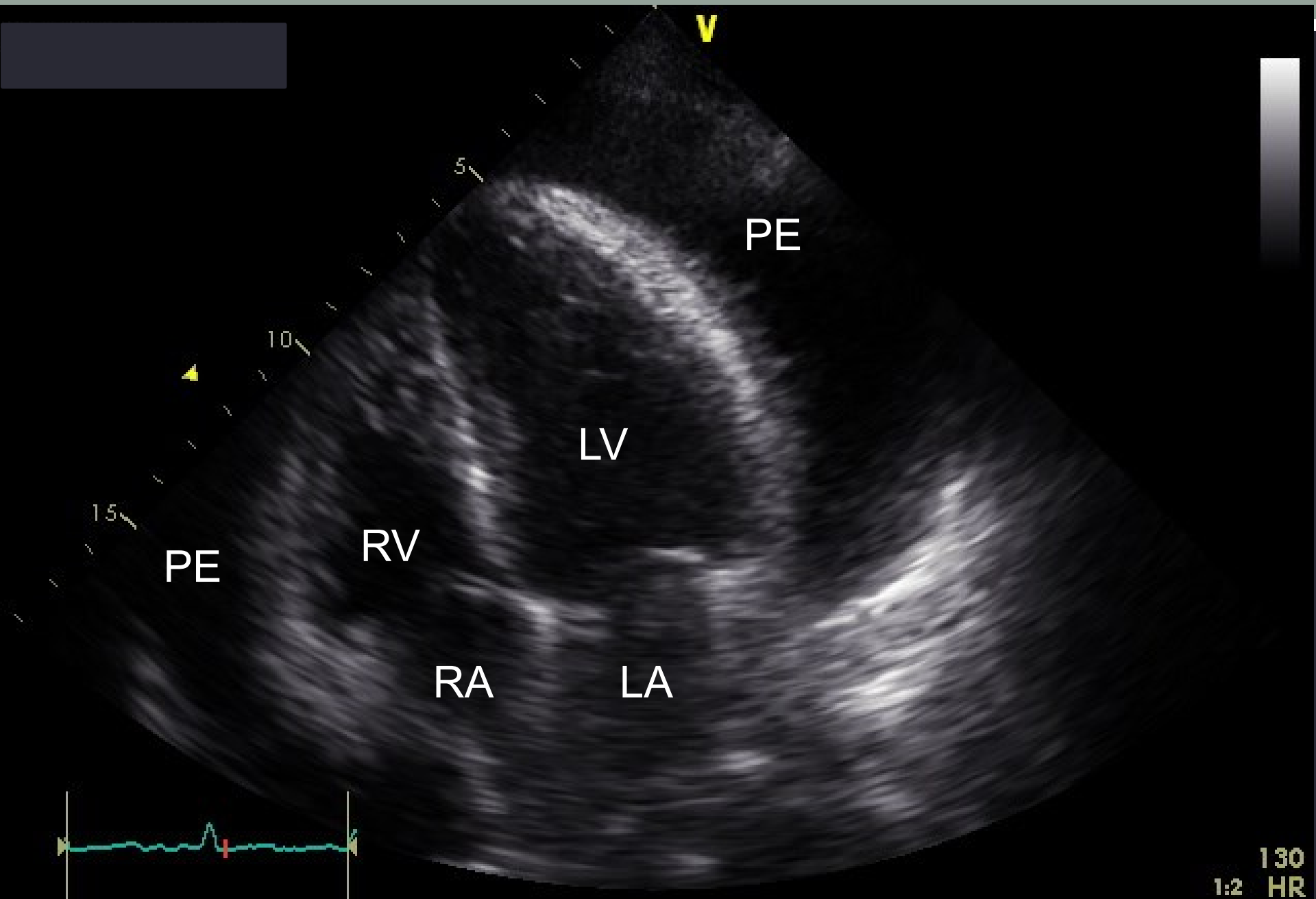
Selectie van de optimale benadering

Pericardioscentese

- Subxiphoidaal
- Intercostaal
 - Apicaal
 - Parasternaal

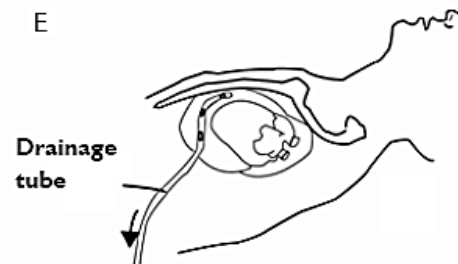
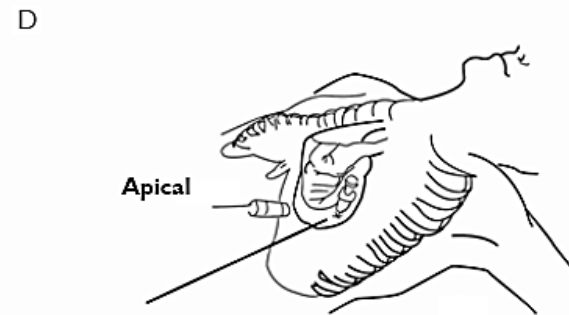
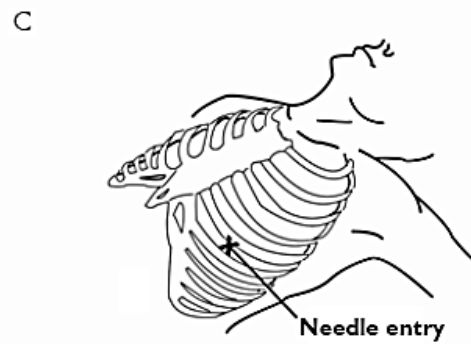
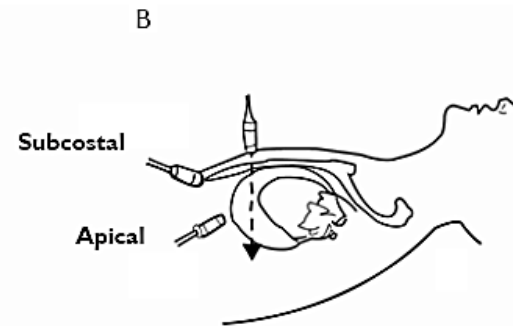
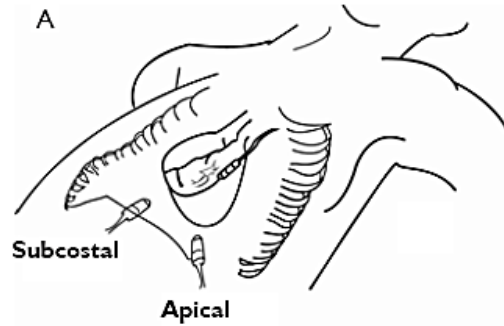
Chirurgisch

- Subxiphoidaal
- VATS
- Mediane sternotomie
 - Pericardectomie



130
1:2 HR

Pericard Puncture



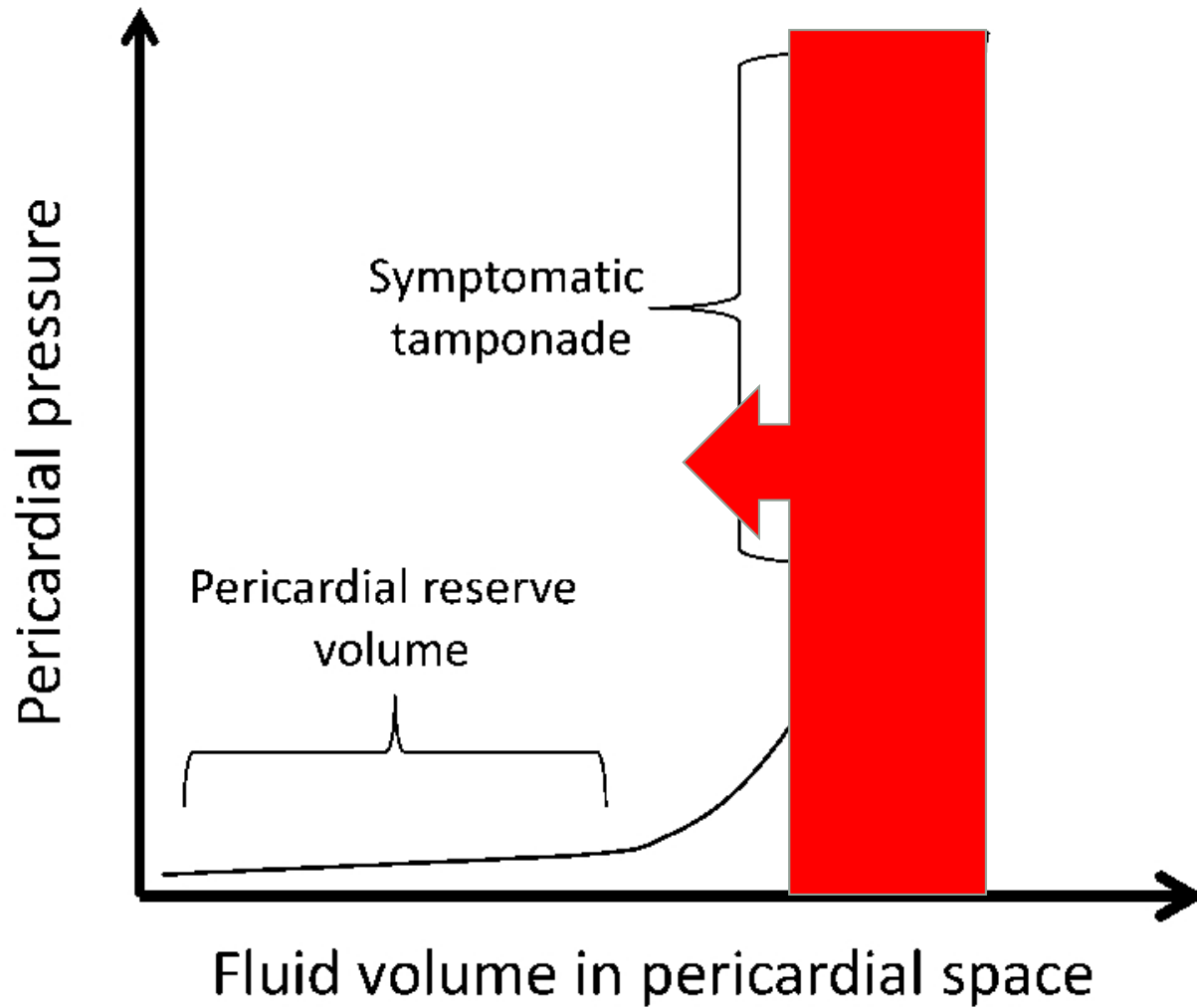
PE

Table 2 Decrease in Mortality and Complication Rates with Echocardiography Guided Pericardiocentesis

	Length of study period (years)	Total number of patients	Total number of puncture	Total success rate	Success rate on first try	Major complication rate	Minor complication rate
Mayo clinic	21	977	1127	97%	89%	1.2%	3.5%
Pediatric patients	17	73	94	99%	93%	1%	3%
Postoperative patients	19	208	245	97%	92%	2%	1.2%
Hemodynamically unstable patients (after Cath Lab procedures)			92	99%	86%	3%	2%
Yonsei clinic			291	99%	98.9%	0.7%	3%
Linköping H Centre			135	96%	98%	0.7%	7%

Met US guidance
 Betere succes-rates
 Lagere complicatie rates
 Betere survival
 Patiënt comfort

Anticiperen...



The OLVG methode:

- Vanaf 2009-2014 in het OLVG.
- Voorkeurs techniek: ultrasound guided para-apicale pericardioscentesis
- Ongeveer 30-40/jaar
- N=100, 1x partiële pneumothorax
- Alternatief voor chirurgische subxiphoidale drainage

- Voordeel t.o.v. subxiphoidale punctie:
 - Veiliger: Lever trauma, risico RV punctie.
 - Minder pijnlijk
 - Effectief

Techniek punctie

- Tevoren vaststellen beste route middels TTE
 - Sub-xiphoidaal
 - Parasternaal
 - Para-apicaal
- Antistolling geen contra indicatie voor para-apicale benadering
- Altijd *real time* echo geleid
- Onder bewaking haemodynamiek (op CCU)
- Pre-medicatie: fentanyl (50ug) en diazepam (2.5 mg) i.v.

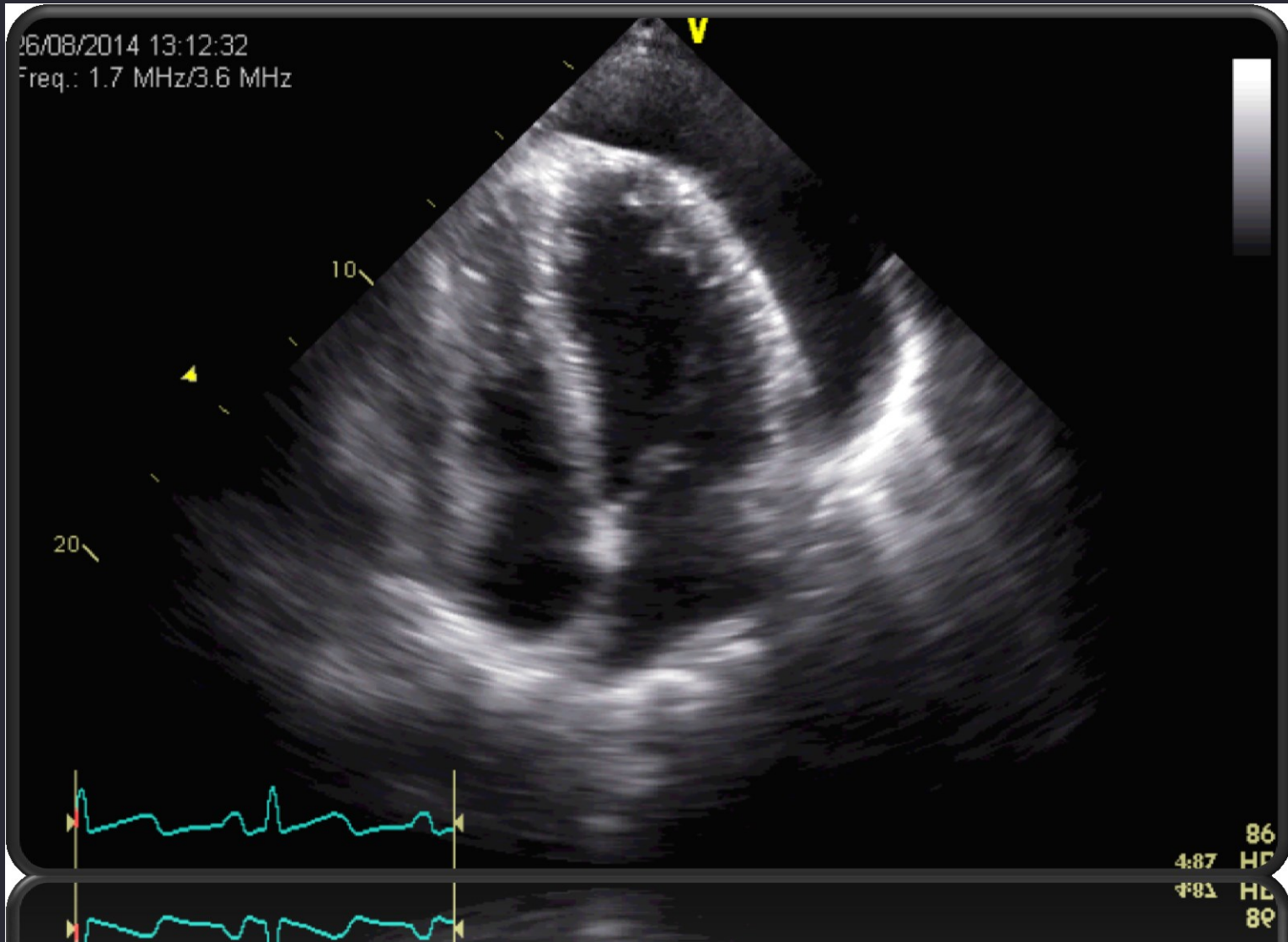
Techniek (2)

- Patiënt in rechter zijligging met linkerarm boven het hoofd
- Steriel afplakken van werkveld
- Lokale anesthesie met lidocaïne infiltratie

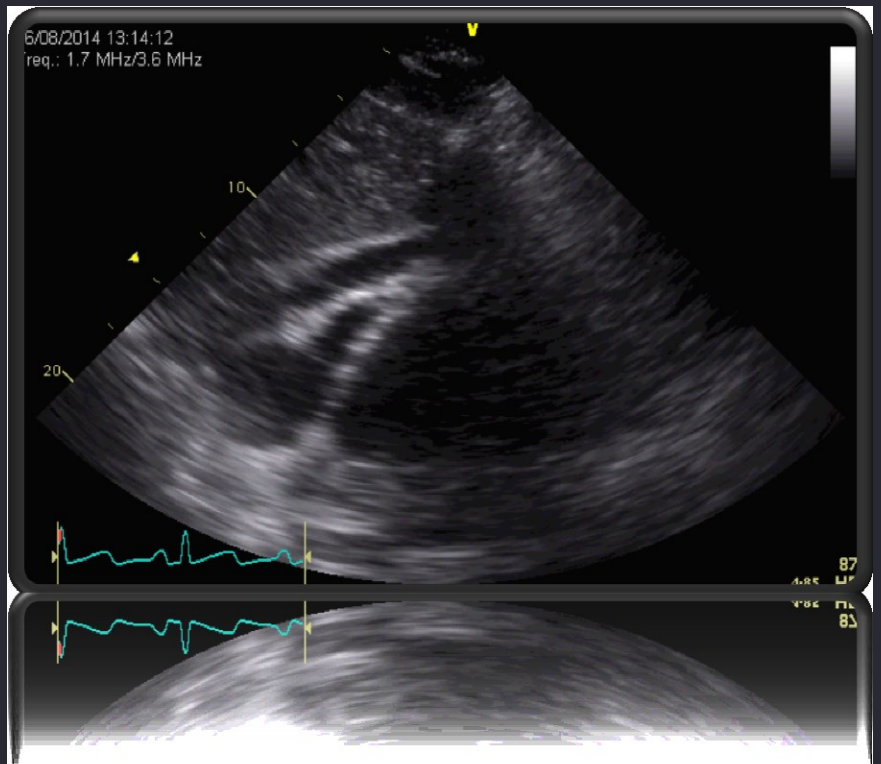
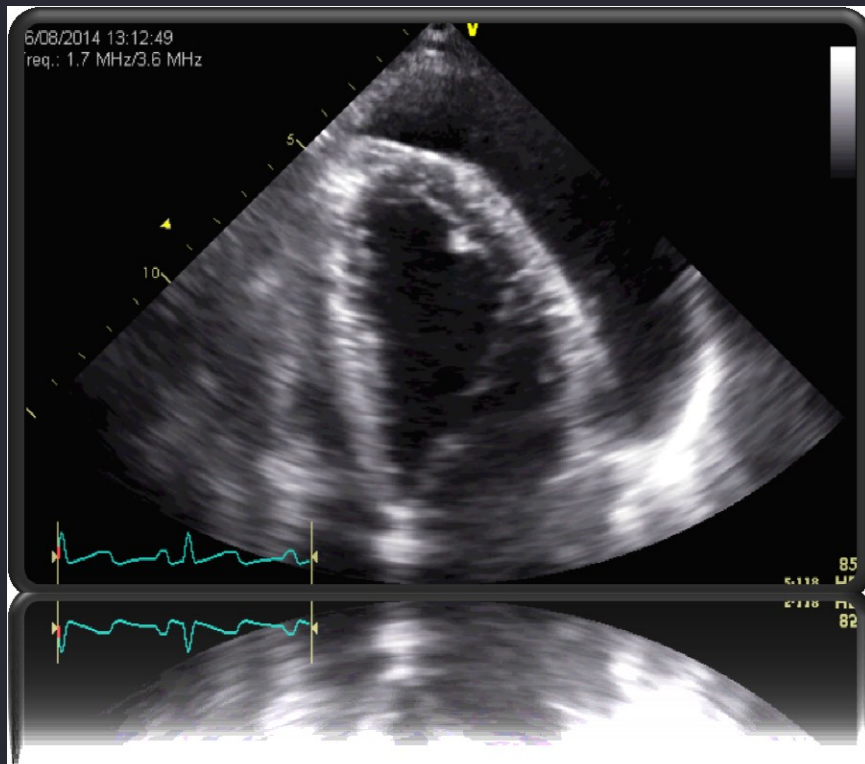
- Echogeleid aanprikken met holle naald met spuit gevuld met NACL
- Opvoeren van voerdraad.
- Plaatsen drain (pigtail/recht) (6F of 8F)

- Excursie van vocht, deels actief.
- Achterlaten redonse drain.
- Zo snel mogelijk als kan verwijderen. (<30cc 24h)
- Wees beducht op recirculatie long-oedeem na punctie
- Controle X-Thorax

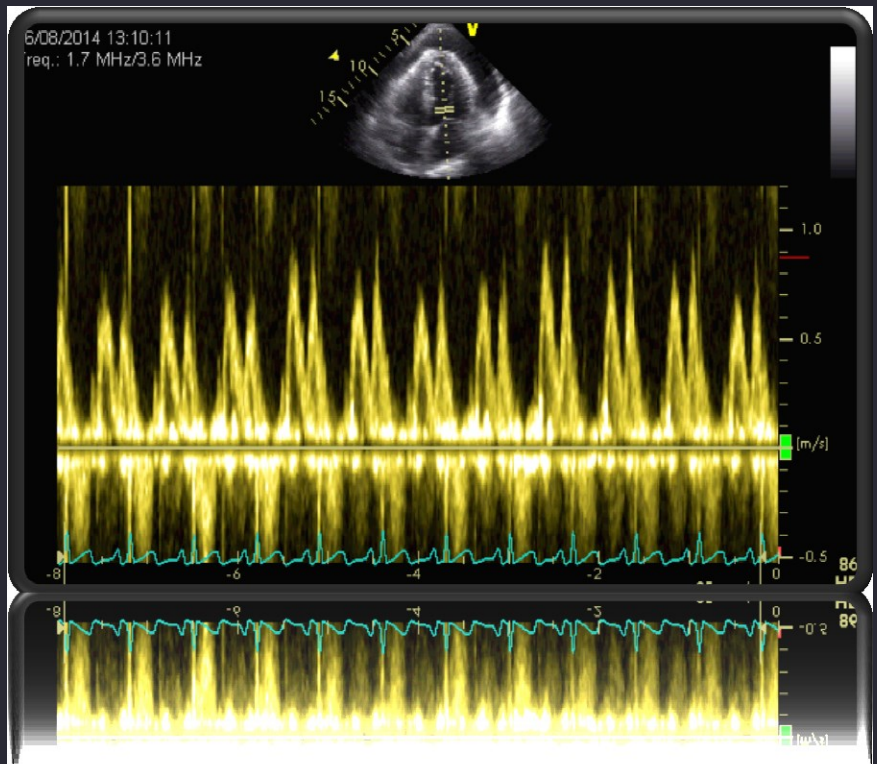
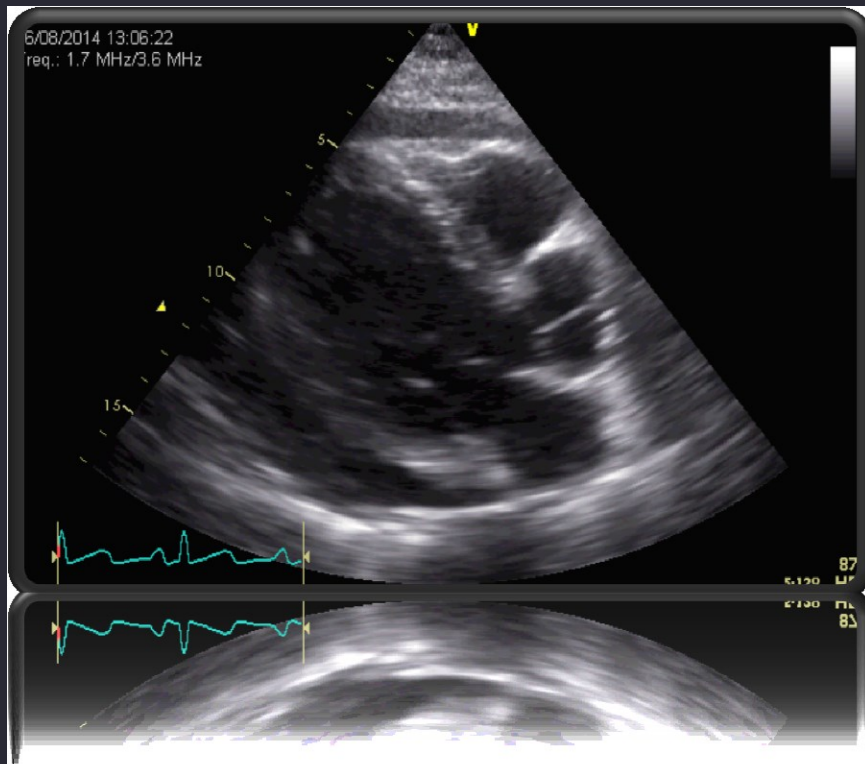
Toename PE SCAR +12 d



PE met name posterolateraal



Pre-tamponade beeld

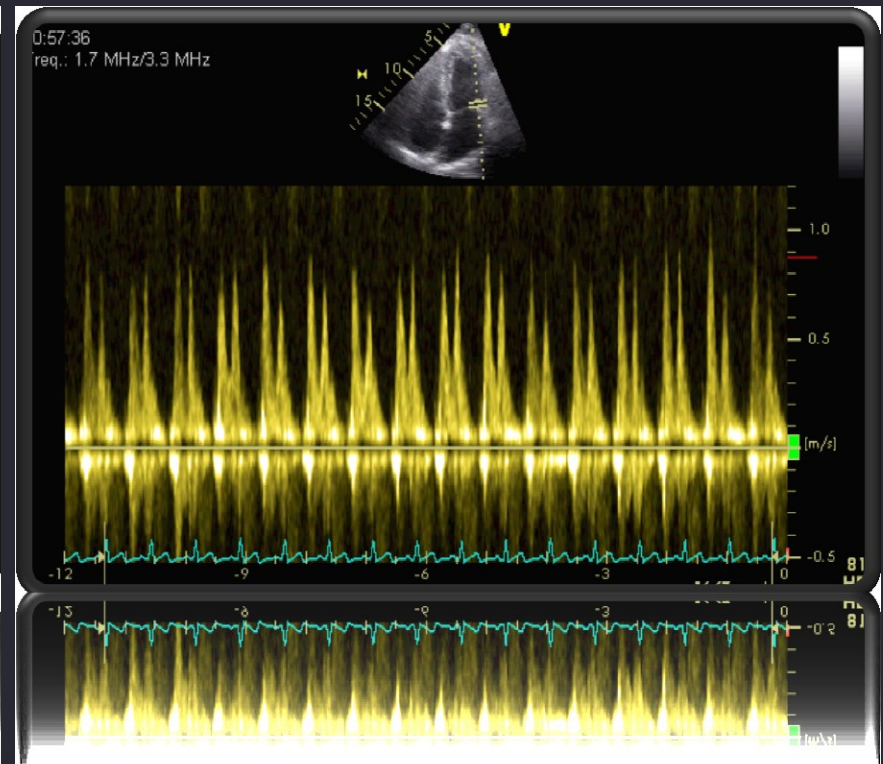
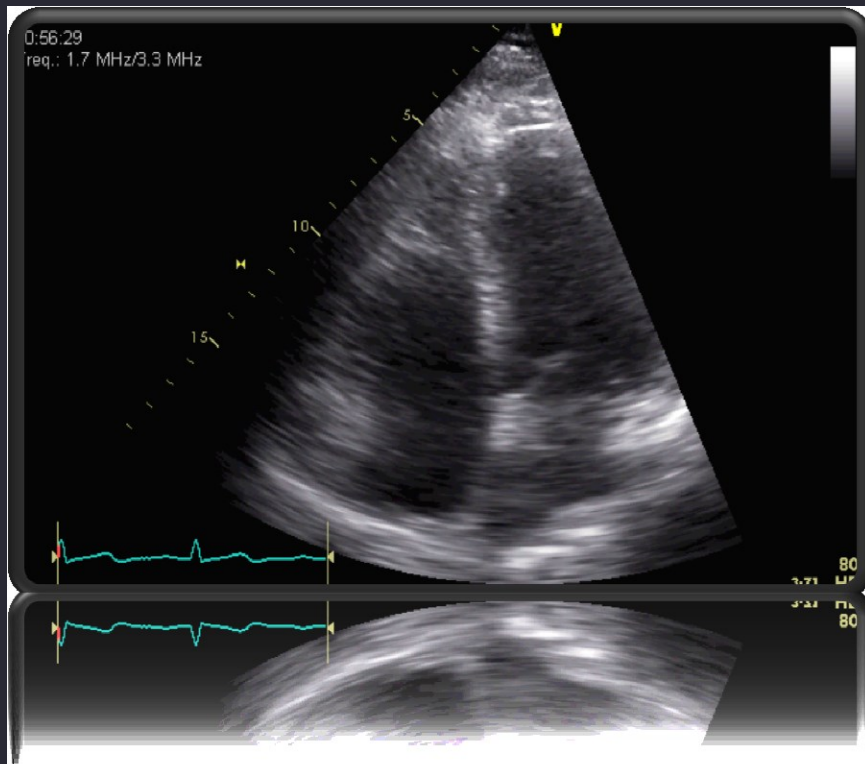


Film pericard punctie

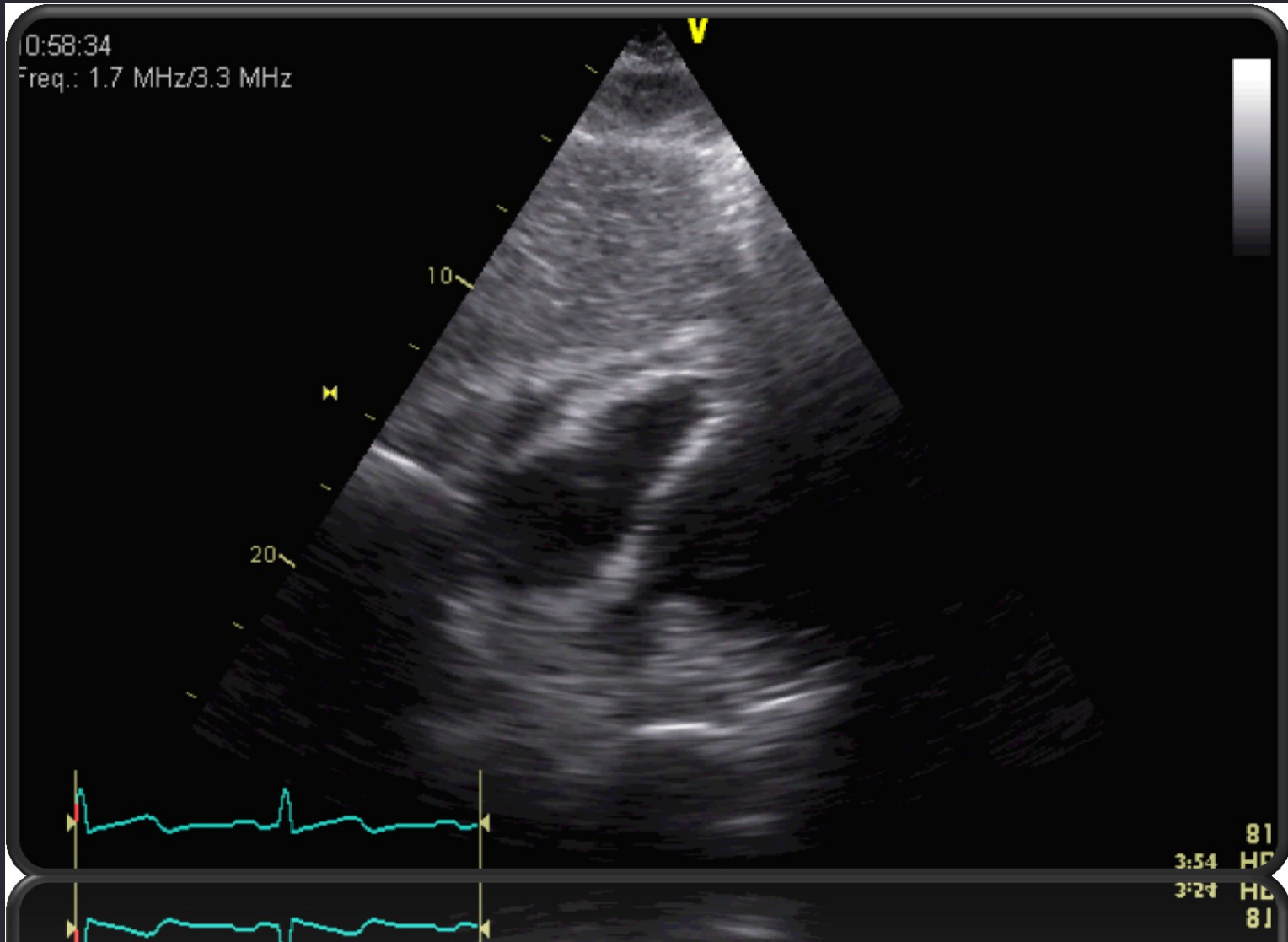
**Pericard
punctie a la
OLVG**



Controle echo na 600cc drainage



Na 1 dag ontslag



Diagnostiek punctaat

Table 5 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 Glucose, blood cell count	Exudate
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) Adenosine deaminase > 40 U/L, IFN-gamma	Cancer 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

LDH, lactate dehydrogenase; TBC, tuberculosis.

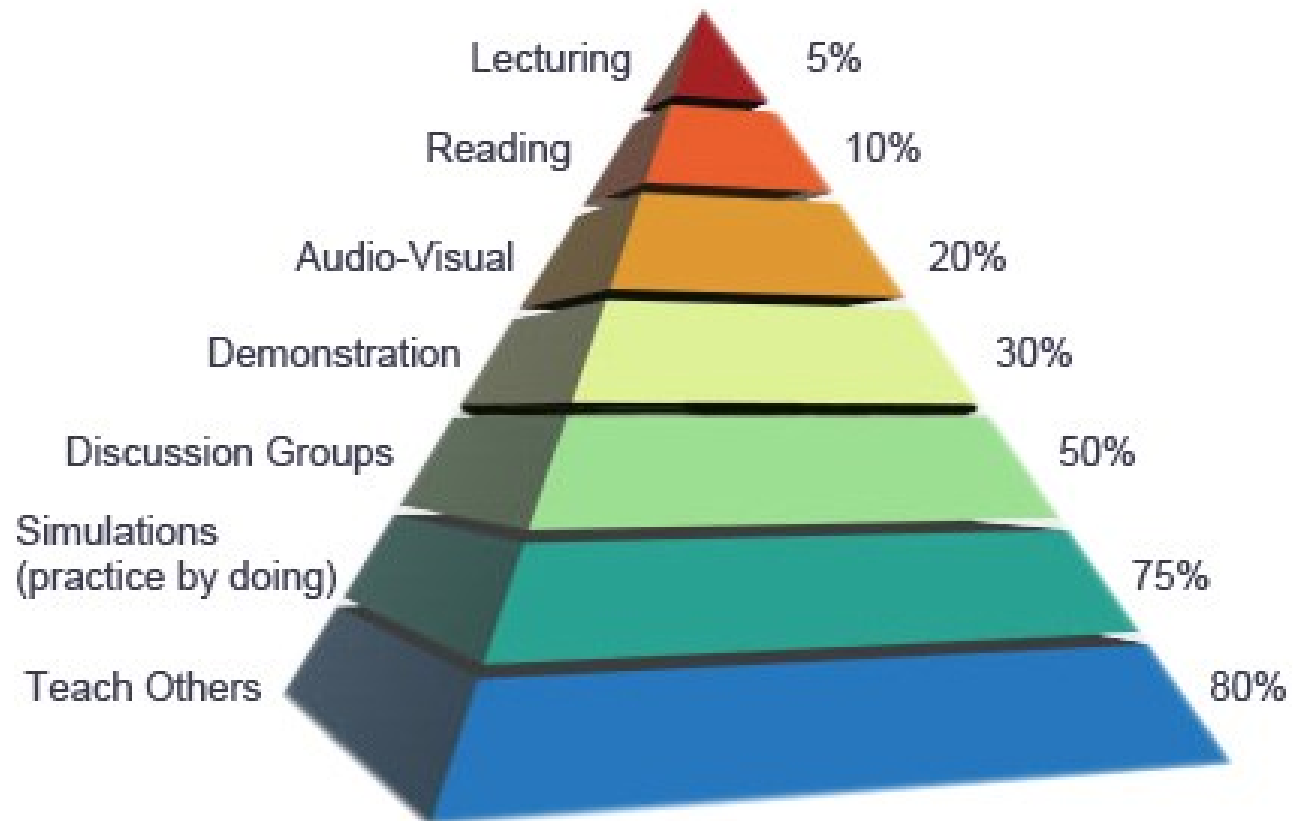
^aThese chemical features have been especially validated for pleural fluid and not pericardial fluid, although generally used also for pericardial effusion.



Conclusie

- Para apicale echogeleide pericardiocentese is:
 - Veilig
 - Effectief
 - Patiënt – en cardioloog - vriendelijk
 - Snel, ook in spoed situaties
- Indicatie stelling kan soepel.
 - Anticiperende punctie.
- Makkelijk te leren
 - AIOS
 - Algemeen/Imaging cardiologen

Learning Pyramid (Methodes of training and retention rates)



Dank u voor uw aandacht

