Χρόνια περικαρδική συλλογή

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○ The normal pericardium is a fibroelastic sac surrounding the heart that contains a small amount of pericardial fluid (10–50 mL), which is produced by the visceral (internal) layer of the pericardium.

○ Pericardial fluid is drained by the lymphatics of parietal pericardium.

*Circulation 2006;113:1622-1632.*
Pericardial syndromes

- Acute and recurrent pericarditis, isolated pericardial effusion, and constrictive pericarditis represent the main pericardial syndromes.

2015 ESC Guidelines for the diagnosis and management of pericardial diseases

The Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC)

Endorsed by: The European Association for Cardio-Thoracic Surgery (EACTS)

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Pericardial effusion is a common finding in clinical practice either as incidental finding or manifestation of a systemic or cardiac disease.

The spectrum of pericardial effusions ranges from mild asymptomatic effusions to cardiac tamponade.
There are few epidemiological data on the incidence and prevalence of such effusions in the clinical setting.

In an Italian referral center for pericardial diseases, the mean annual incidence and prevalence of pericardial effusion were 3% and 9% respectively.

![Graph showing incidence and prevalence percentages.](image)
### Classification of pericardial effusion

<table>
<thead>
<tr>
<th>Onset</th>
<th>Acute (&lt;1 week)</th>
<th>Subacute (&gt;1 week but &lt;3 months)</th>
<th>Chronic (&gt;3 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Mild (&lt;10 mm)</td>
<td>Moderate (10–20 mm)</td>
<td>Large (&gt;20 mm)</td>
</tr>
<tr>
<td>Distribution</td>
<td>Circumferential</td>
<td>Loculated</td>
<td></td>
</tr>
<tr>
<td>Haemodynamic effect</td>
<td>Without cardiac tamponade</td>
<td>With cardiac tamponade</td>
<td>Effusive-constrictive</td>
</tr>
<tr>
<td>Composition/type</td>
<td>Transudate</td>
<td>Exudate</td>
<td></td>
</tr>
</tbody>
</table>
Etiology: 5 published series - 956 patients with *moderate to large* effusions

- Idiopathic: 50%
- Pericarditis and infectious causes: 22.5%
- Iatrogenic causes: 17.5%
- Connective tissue disease: 10%
- Tuberculosis: >60%

In developing countries

Eur Heart J 2013;34:1186-1197.
Diagnosis

ECG: decreased amplitude of the QRS complex with electric alternans

In large effusions
Low Voltage ECG

Low voltage is defined as peak-to-peak QRS amplitude of < 5 mm in the limb leads and/or < 10 mm in the precordial leads. Low voltage may be present in the following situations:

1. Obesity
2. COPD
3. Pericardial effusion
4. Severe hypothyroidism
5. Subcutaneous emphysema
6. Massive myocardial damage/infarction
7. Infiltrative/restrictive diseases such as amyloid cardiomyopathy.

0.5 mV

zenith-to-nadir QRS
Chest Radiography
Normal until volume of fluid > 250 ml

Water bottle shaped heart
Echocardiography

Echocardiography is both specific and sensitive for the detection of pericardial effusion and can also provide information regarding the hemodynamic significance of the effusion.

Semiquantitative method
- <10mm: <300mL
- 10-20 mm: 300-700mL
- > 20 mm: > 700mL
### Major echocardiographic signs of cardiac tamponade

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

n.a., not available.
DD between transudate and exudate

<table>
<thead>
<tr>
<th>Hounsfield units</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>transudate</td>
</tr>
<tr>
<td>20-60</td>
<td>exudate</td>
</tr>
<tr>
<td>&gt;60</td>
<td>hemorrhage</td>
</tr>
<tr>
<td>Negative</td>
<td>chylopericardium</td>
</tr>
</tbody>
</table>

CT attenuation values 35 to 50 HU

Empiric anti-inflammatory therapies should be considered if a missed diagnosis of pericarditis is presumed.

- Cardiac tamponade or suspected bacterial or neoplastic aetiology?
  - Yes: Pericardiocentesis and aetiology search
  - No: Elevated inflammatory markers?
    - Yes: Empiric anti-inflammatory therapy (treat as pericarditis)
    - No: Known associated disease?
      - Yes: Pericardial effusion probably related. Treat the disease.
      - No: Large (>20 mm) pericardial effusion?
        - Yes: Consider pericardiocentesis and drainage if chronic (>3 months)
        - No: Follow-up
### Routine analyses to be performed on pericardial fluid

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Test</th>
<th>Aetiology or feature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General chemistry</strong></td>
<td>Specific gravity $&gt; 1.015$, protein level $&gt; 3$ g/dL, protein fluid/serum ratio $&gt; 0.5$, LDH $&gt; 200$ mg/dL, fluid/serum ratio $&gt; 0.6^a$ Glucose, blood cell count</td>
<td>Exudate</td>
</tr>
<tr>
<td><strong>Cytology</strong></td>
<td>Cytology (higher volumes of fluid, centrifugation, and rapid analysis improve diagnostic yield)</td>
<td>Cancer</td>
</tr>
<tr>
<td><strong>Biomarkers</strong></td>
<td>Tumour markers (i.e. CEA $&gt; 5$ ng/mL or CYFRA 21-1 $&gt; 100$ ng/mL) Adenosine deaminase $&gt; 40$ U/L, IFN-gamma</td>
<td>Cancer</td>
</tr>
<tr>
<td><strong>Polymerase chain reaction (PCR)</strong></td>
<td>PCR for specific infectious agents (i.e. TBC)</td>
<td>TBC</td>
</tr>
<tr>
<td><strong>Microbiology</strong></td>
<td>Acid-fast bacilli staining, mycobacterium cultures, aerobic, and anaerobic cultures</td>
<td>TBC Other bacteria</td>
</tr>
</tbody>
</table>

LDH, lactate dehydrogenase; TBC, tuberculosis.

$^a$These chemical features have been especially validated for pleural fluid and not pericardial fluid, although generally used also for pericardial effusion.
Management of patients with pericardial effusion

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        - No → Follow-up
Underlying condition?

- History
- Physical examination
- Laboratory tests (including thyroid function tests and serum autoantibodies)
- CT/MR/pericardioscopy-biopsy in an individualized basis
In cases of moderate to large effusions...

![Pie chart showing distribution]

- 60% known medical condition
- 40% unknown medical condition

Management of patients with pericardial effusion

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        - No: Follow-up
Pericardial effusion is considered large when a diastolic echo-free space >20 mm in width is found in any compartment of the pericardial cavity.
Case 1
Prognosis of pericardial effusion

- In secondary causes it depends on the underlying etiology itself.
- In idiopathic causes it mainly depends on the size of the effusion.

In general small and moderate chronic effusions have an excellent prognosis and a follow up every 6 months is recommended. In large asymptomatic effusions a closer follow-up (every 3-6 months) is recommended.
A small pericardial effusion is a marker of increased mortality.

10,067 subjects (in and outpatients) undergoing echocardiography at Stanford University. Follow-up 2.3 ± 1.9 years of

The purpose of this study was to determine the association of small effusions (<1cm) with outcome.
28 pts. with large idiopathic pericardial effusion
7 years median follow-up

- Large effusions have an up to one-third risk of progression to cardiac tamponade
- 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.
Long-term outcomes of idiopathic chronic large pericardial effusions: to tap or not to tap?

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BACKGROUND AND PURPOSE. The outcome of "idiopathic" (without a known definite cause after diagnostic evaluation), chronic (>3 months) large (>20 mm on echocardiography) pericardial effusions without evidence of pericarditis is poorly known. The aim of the present study is to evaluate the prognosis and outcomes of such effusions.

METHODS. Prospective cohort study including all consecutive cases of idiopathic chronic large pericardial effusions without evidence of pericarditis evaluated in 2 Italian tertiary referral centres for pericardial diseases (Maria Vittoria Hospital, Torino and Ospedale Papa Giovanni XXIII, Bergamo) from 2000 to 2015. A clinical and echocardiographic follow-up was performed with echocardiograms every 3-6 months. The following clinical events were considered as adverse events: cardiac tamponade, need for any interventional or surgical procedure (e.g. pericardiocentesis, pericardial window, and pericardiectomy).

RESULTS. In the study period, 77 patients were included (mean age 61.7 ± 14.9 years, 41 females, 53.2%).

<table>
<thead>
<tr>
<th>Effusion size</th>
<th>Baseline</th>
<th>End Fw-up</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm (95% CI)</td>
<td>26 (24-27)</td>
<td>9 (6-11)*</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

* = regression in 27 pts (35.1%)

Symptoms %

- Asymptomatic
- Dyspnea
- Chest pain
- Both
- Palpitations

18 43 27

Mean follow-up of 34 months

Adverse event | n. pts (%) |
--------------|------------|
Pericarditis   | 25 (32.5%) |
Pericardiocentesis | 19 (24.7%) |
Pericardial window | 12 (15.6%) |
Cardiac Tamponade* | 6 (7.7%) |
Pericardiectomy | 2 (2.6%) |

* = after a mean of 12 months, 3/6 pts (50%) after pericarditis

CONCLUSIONS. (1) Idiopathic chronic large pericardial effusions are often asymptomatic, and have generally a benign evolution. (2) Their progression may be unpredictable (3) There are no general rules to apply, and management should be individualized providing an echocardiographic follow-up of such pericardial effusions every 3-6 months.

Declaration of interest: None
Key questions to be answered in a patient with pericardial effusion

- i. presence/absence of hemodynamic compromise
- ii. presence/absence of inflammatory signs (including CRP and/or ESR, i.e. pericarditis)
- iii. presence/absence of known medical conditions
- iv. size of effusion
Thank you for your attention