Κληρονομικές Καρδιαγγειακές Παθήσεις: Το ηλεκτροκαρδιογράφημα στην πρώτη γραμμή
Περικαρδίτιδα: Συμβουλές για το ηλεκτροκαρδιογράφημα

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Disclosures

- I have received speaker honoraria from Menarini and Novartis.
- I do not have any potential conflict of interest relevant to this presentation.
Familial occurrence of idiopathic pericarditis among the relatives of pts with recurrent pericarditis was 10%.

These data suggest a genetic predisposition in some cases. Further studies regarding HLA system and other candidate genes are warranted.
Fifty-five patients with a first episode of AIP were followed for 23.8 ± 6.3 months and recurrences were recorded.

**Conclusions:** HLA alleles may confer either susceptibility or resistance to AIP and RP. Circulating T-cell subpopulations may also predict RP. A combination of the above parameters might help to better define patients prone to recurrence.
Statistically significant differences in HLA allele frequencies between healthy controls and patients with AIP (a) and RP (b).
Electrocardiographic highlights in acute pericarditis

Sinus tachycardia is almost invariably present!
It is the most sensitive but at the same time less specific sign.

Electrocardiographic highlights in pericarditis

Concave ST elevation.
Extension beyond the perfusion territory of any single coronary artery

- T waves are upright in the leads with ST segment elevation.
- Absence of reciprocal ST segment changes or pathological q waves seen in myocardial infarction.
- PR depression is the most specific finding of acute pericarditis.
Differential Diagnosis with myocardial infarction

- Convex ST elevation.
- Extension corresponding to the perfusion territory of a single coronary artery.
Ratio $A/B > 0.25$

Pericarditis

Ratio $A/B < 0.25$

Early reporalization

PPV και NPV = 1

Circulation 1982;65:1004-1009.
Spodik’s sign: downward sloping TP segment best seen in lead II
Typical ECG features in pericarditis are observed in ~60% of cases.
ECG findings in large pericardial effusions with or without tamponade

ECG triad

1. Sinus tachycardia
2. Low voltage
3. Electrical alternans
Electric alternans = swinging heart
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.
Tips, tricks and pitfalls (cases from our clinic and pericardial unit)
Recent-onset chest pain in the presence of (sinus) bradycardia is considered to be associated with an acute ischemic syndrome rather than acute pericarditis.

This report describes a patient with acute pericarditis initially presenting with sinus bradycardia, probably due to a vasovagal response to (chest) pain.
* Sinus tachycardia in acute pericarditis: in all patients?

ECG of a 64 year-old-woman presenting with typical pericarditis (typical chest pain, small pericardial effusion, friction rub) and CRP elevation

- Creatinine 7.8mg/dL - patient in end stage renal disease
- Sinus tachycardia in ESRD may be absent due to autonomic imbalance.
- Classic finding of diffuse ST elevations are rare; more commonly, non-specific repolarization changes are noted
- It is important to know that even pericardial tamponade can have subtle presentations without hypotension, tachycardia.
Sinus tachycardia in cardiac tamponade: in all patients?

- In cardiac tamponade without sinus tachycardia, hypothyroidism should be highly suspected.
- Although emergent pericardiocentesis should be performed in clinical cardiac tamponade, patients with echocardiographic tamponade signs without a paradoxical pulse should be treated with thyroxine initially.

TSH=90mU/L

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Pericarditis: Absence of reciprocal changes?

ECG Changes Mimicking Myocardial Infarction
Costas Tsloufis, MD, a George Lazaros, MD, a Dimitrios Vassilopoulos, MD, b Panagiotis Vasileiou, MD, a Christodoulos Stefanadis, MD a

Rhythm: 110 mm/mV
<table>
<thead>
<tr>
<th>Finding</th>
<th>Acute pericarditis</th>
<th>Myopericarditis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST-segment elevation</td>
<td>Normal concavity, &lt;5 mm</td>
<td>Convex (dome-shaped), &lt;5 mm (may be &gt;5 mm in STEMI)</td>
</tr>
<tr>
<td>Distribution</td>
<td>Generalized</td>
<td>May be localized</td>
</tr>
<tr>
<td>Reciprocal changes</td>
<td>No</td>
<td>Sometimes</td>
</tr>
<tr>
<td>T-wave inversion</td>
<td>Generally after ST normalization</td>
<td>May occur before ST normalization</td>
</tr>
<tr>
<td>PR depression</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>New Q waves</td>
<td>No</td>
<td>Possible</td>
</tr>
<tr>
<td>Prolongation QT interval</td>
<td>No</td>
<td>Possible</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>Rare (&lt;10%) (generally supraventricular)</td>
<td>Common (&gt;60%) (generally ventricular)</td>
</tr>
</tbody>
</table>
Pericarditis: First ST segment subsides and then T wave inversion (in contrast with AMI) appears... but

Young patient admitted with a third recurrence of pericarditis. hs troponin normal, CRP=157md/L. CT coronary angiography without evidence of coronary artery disease.
A 44 year-old male with a history of incessant pericarditis admitted for dyspnea and generalized edema, including pleural effusions and ascites.

- Right atrial pressure on heart catheterization 25mmHg.
- After diagnostic work up (including cMR) the diagnosis of constrictive pericarditis was established.
PR depression is the most specific sign of acute pericarditis...but

Various ECG abnormalities of atrial infarction

Most evident if first degree AV block coexists. Atrial infarction is associated with increased mortality and morbidity in STEMI.

Int J Cardiol 2016;202:904-909.
Sometimes DD between pericarditis and ACS is really difficult

- A 70 year-old-woman with chest pain and normal electrocardiogram and hs troponin.
- She underwent stress-echo which was negative (no pericardial effusion was detected).
- Ten days after that he was admitted due to symptoms' persistence. Again hs troponin negative, CRP 135mg/L. Coronary angiography did not reveal coronary artery disease.
And some surprises...

A 84 year-old male with chronic large idiopathic pericardial effusion. AF of 18 months duration. He was admitted for scheduled pericardiocentesis
ECG obtained the day after pericardiocentesis and pericardial drainage
A 44-year old male with history of chronic large idiopathic pericardial effusion was admitted due to worsening dyspnea, features of near cardiac tamponade and electric alternans in the ECG.

Admission ECG

ECG obtained the day after pericardiocentesis with the catheter in place.

Brugada type 1 phenocopy triggered catheter induced epicardial inflammation

ECG obtained 2 days after catheter removal and CRP normalization

Accepted Manuscript

Brugada phenocopy in a patient underdoing pericardiocentesis for a large idiopathic pericardial effusion

George Lazaros, Emilia Lazarou, Dimitris Tousoulis

A 73 year-old woman with rheumatoid arthritis and chronic pericardial effusion subjected twice to pericardiocentesis and 3 years earlier to pericardial window. She denied further intervention since then and she is oligosymptomatic with the below depicted pericardial effusion. BP=130/80mmHg, without pulsus paradoxus.

How do you expect her electrocardiogram?
No alternans (since no swinging heart was detected), no low voltage and no remarkable tachycardia!
Conclusions

- Electrocardiogram is of paramount importance in the diagnostic work-up of pericardial syndromes.

- In the ECG interpretation the physician should be aware of the rules but also of the exceptions.
Thank you for your attention