Pericardial effusion: 2 cases

Christina Attenhofer Jost
SGK 2016
Case 1. 63 yo F with chest pain

- Chest pain since 1.5 yr, left side, not related to exercise, oppression, DOE
- No cardiovascular risk factors
- Physical exam unremarkable apart from pectus excavatum, exquisite pain of the chest wall on compression, no edema, normal jugular venous pressure, no pericardial rub
- BP 110/80, HR 80bpm
- ECG normal
Case 1. 63 yo F with chest pain

- Evaluation with echo, ECG, computed tomography of the chest and cardiac CMR: pericardial effusion
- Referred to exclude pericarditis/constrictive pericarditis
5 Mayo Clinic criteria for constrictive pericarditis

Dissociation of intrathoracic and intracardiac pressures along with interventricular coupling or dependence within a fixed space:

• Respiration-related ventricular septal shift
• Variation in mitral inflow E velocity ≥14.6% (not valid in afib/flutter)
• Medial mitral annular e' velocity ≥ 9cm/sec
• Ratio of medial mitral annular e' to lateral e’ ≥0.91

• Hepatic vein expiratory diastolic reversal ratio ≥0.79

Independent predictors

Welsh.
Circ Cardiovasc Imaging. 2014
5 Mayo Clinic criteria for constrictive pericarditis

Any respiration-related ventricular septal shift (parasternal long axis)  

Variation in mitral inflow E velocity by ≥14.6%

Welsh.  
Circ Cardiovasc Imaging. 2014
Mayo Clinic criteria for constrictive pericarditis

- Medial mitral annular e' velocity of $\geq 9$ cm/sec
- Ratio of medial mitral annular e' to lateral e' $\geq 0.91$

Anulus reversus or anulus paradoxus

Welsh.
Circ Cardiovasc Imaging. 2014
Mayo Clinic criteria for constrictive pericarditis

- Hepatic vein expiratory diastolic reversal ratio ≥0.79

The presence of ventricular septal shift in combination with either medial e' ≥ 9 cm/s or hepatic vein expiratory diastolic reversal ratio ≥ 0.79 corresponded to a desirable combination of sensitivity (87%) and specificity (91%) for constrictive pericarditis.
Case 1. 63 yo F with chest pain

-18.3%
Case 1. 63 yo F with chest pain
Case 1. 63 yo F with chest pain

LV inflow

Lateral
E’ 12cm/sec

Medial
E’ 10cm/sec
Case 1. 63 yo F with chest pain

no ventricular septal shift
Case 1. 63 yo F with chest pain

CMR
- Normal sized left ventricle, EF 47\%, LVEDV 60ml
- No signs of ischemia
- Pericardial effusion up to 6mm
- No thickening of pericardium
• No echo or CMR signs of constriction or pericardial inflammation/thickening, only pericardial effusion
• TSH normal
• No signs of collagen vascular disease
• No prior malignancy, radiation therapy, infection etc.
• Simple pericardial effusion in pectus excavatum and chest wall pain
### Pectus excavatum: echocardiography and cardiac MRI reveal frequent pericardial effusion and right-sided heart anomalies

S. Oezcan¹, C.H. Attenhofer Jost¹, M. Pfyffer¹, C. Kellenberger², R. Jenni³, C. Binggeli¹, A. Faeh-Gunz¹, B. Seifert⁴, C. Scharf¹, O. Kretschmar⁵, and E.R. Valsangiacomo Buecheli⁶

<table>
<thead>
<tr>
<th></th>
<th>Echo 18 pts</th>
<th>CMR 18 pts</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVEF</td>
<td>62±7</td>
<td>59±7</td>
<td>0.05</td>
</tr>
<tr>
<td>RVOT enlargement</td>
<td>28%</td>
<td>6%</td>
<td>0.13</td>
</tr>
<tr>
<td>Localized RV wall anomalies</td>
<td>28%</td>
<td>33%</td>
<td>1.0</td>
</tr>
<tr>
<td>RV enlargement</td>
<td>0</td>
<td>28%</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Pericardial effusion</strong></td>
<td>33%</td>
<td>56%</td>
<td>0.13</td>
</tr>
<tr>
<td>Diminished RV systolic function</td>
<td>11% RV FAC&lt;33%</td>
<td>44% (RVEF&lt;52%)</td>
<td>0.07</td>
</tr>
<tr>
<td>Prominent moderator band</td>
<td>28%</td>
<td>22%</td>
<td>1.0</td>
</tr>
<tr>
<td>Any signs of ARVC</td>
<td>39%</td>
<td>56%</td>
<td>0.45</td>
</tr>
</tbody>
</table>
Pectus excavatum: echocardiography and cardiac MRI reveal frequent pericardial effusion and right-sided heart anomalies

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Steady-state free precession axial image by CMR showing microaneurysms of the RV anterior wall.

A bright layer of fluid (arrows) around the posterior wall of LV representing the pericardial effusion.
70 year old woman with pectus excavatum: ARVC?!?
Pectus excavatum

- Cardiopulmonary morbidity
- Psychosocial impact
- 1:400
- Males >>> females
- CTD, neuromuscular disease, Noonan, Turner, MEN type 2b
- Exercise intolerance 82%; chest pain 68%; Shortness of breath 42%

From wikipedia.de
Pectus excavatum in CTD

- Marfan syndrome: 1:5000-1:10'000, FBN 1 mutation
- Noonan syndrome: 1:1000-1:2500; PTPN11 mutation
- Turner syndrome: 45X, 1:2500

Cobben
Eur J Med Gen 2014
Echo in Pectus Excavatum

- **RV changes**
  reversed curvature RV free wall, RV and RVOT enlargement, rounding of RV apex, sacculation of RV free wall (microaneurysms), regional or global RV dysfunction, prominent RV sacculations, moderator band hypertrophy, prominent crista terminalis, regional RV wall thinning
- **Mitral or tricuspid valve prolapse**
- **Pericardial effusion**
- **Aortic root enlargement**

Silbiger 2016
Mitral- and tricuspid valve prolapse

ASD>VSD, PAVSD, aortic root enlargement

CTD

“ARVC” like

Pericardial effusion
Case 2. 75 y male with dyspnea and edema

- 1942 diphtheria
- 1965 tuberculosis neck, tuberculostatic RX
- 1993 brucellosis with epididymitis
- 2009 chronic hepatitis C, genotype IB (liver biopsy)
  - treatment with faldaprevir and deleobuvir, relapse!
  - then successful standard treatment with Peg-INF and Ribavirin 2011
Case 2. 75 y male with dyspnea and edema

- Current problem: Since one year, dyspnea, loss of appetite, increase in BW by 4-5kg, edema, abdominal bloating, palpitations, some memory loss
Case 2. 75 y male with dyspnea and edema

- 68kg, 182cm BP 141/74, HR 75/min, O2 Sat 93% . Elevated JVP. Heart examination unremarkable. Hyperpigmentation lower extremities. Liver at rib cage, indurated. Spleen not palpable.
Case 2. 75 y male with dyspnea and edema

Holter ECG 48 hours: 433 VPCs; no VT, 247 APCs
Case 2. 75 y male with dyspnea and edema
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Case 2. 75 y male with dyspnea and edema
### DD constrictive pericarditis
(Up-to-date)

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idiopathic or viral</td>
<td>42 - 61%</td>
</tr>
<tr>
<td>Post-cardiac surgery</td>
<td>11 - 37%</td>
</tr>
<tr>
<td>Post-radiation therapy</td>
<td>2 - 31%</td>
</tr>
<tr>
<td>Primarily after Hodgkin’s disease or breast cancer</td>
<td></td>
</tr>
<tr>
<td>Connective tissue disorder</td>
<td>3 - 7%</td>
</tr>
<tr>
<td>Postinfectious (Tbc or purulent pericarditis)</td>
<td>3 - 15%</td>
</tr>
<tr>
<td>Miscellaneous causes (malignancy, trauma, drug-induced, asbestosis, sarcoidosis, uremic pericarditis)</td>
<td>1 - 10%</td>
</tr>
</tbody>
</table>
CXR: no pericardial calcification. Effusion both sides. Consolidation right base DD dystelectasis
Lab tests June 2015

- Hb 13.5, WBC 3.1, platelets 113, lymphocytopenia 0.44x10E9/l
- INR 1.09, D-Dimers 0.34, yGT 198, alkPhosph 205, normal GOT, GPT, Calcium
- Hb A1c 5.8%, BNP 47, NT-proBNP 482, Cholesterol 3.4, LDL 1.8, TSH 2.6, fT4 16, CRP 0.9
- 2 weeks later: WBC 3.18, platelets 127
- ACE 50 (20-70), normal protein electrophoresis
CT chest and abdomen

lymphadenopathy with calcified, increased and enlarged lymph nodes in the chest and abdomen; bronchiectases with peribronchial infiltrates in the middle lobe of unknown etiology
Case 2. CMR Aug 24, 2015

- Pleural effusion both sides
- Thickened pericardium
- Septal shudder
- No significant calcifications
- Tiny late-enhancement (midline) inferior and inferolateral basal segment
- Increased signal apex RV, inferolateral

- CONSTRUCTIVE PERICARDITIS, Tbc?
Case 2. 75 y male with dyspnea and edema

- **Pulmonary function testing normal** incl. diffusion capacity
- **Bronchoscopy:** chronic deforming bronchitis, hemorrhagic pleural effusion, multiple small nodular pleural lesions on both sides
- **Puncture pleural effusion:** no malignant cells, bacterial cultures negative, culture and PCR negative for Tbc
Case 2. Thoracoscopy

- Aug 2015: pleura without adhesions, granulomatous inflammation
  Pericardial thickening, adherent to the heart, inflammatory reaction
- Right side: ML segment resection, pericardial biopsy and pleural abrasion, talk pleurodesis
- Biopsy: Sarcoidosis (Interferon-induced) with constriction and signs of biventricular failure
- 2009 chronic hepatitis C, genotype IB (liver biopsy)
  - treatment with faldaprevir and deleobuvir, relapse!
  - successful standard treatment with Peg-Interferon and Ribavirin 2011
Interferon-induced sarcoidosis

• Hep C, 43yo male: peginterferon and ribavirin
• After 5 months red changes and hyperpigmentation scars, non-caseating granulomas
• IF induced sarcoidosis: 70% lung/lymphnodes, skin in 60%
• IF stop, systemic steroids as needed, frequently benign with clinical remission

Cardoso. BMJ Case Reports 2011
### Case 2. Interferon induced sarcoidosis

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prednisone</td>
<td>25mg</td>
<td>1-0-0 (for a total of 6 months)</td>
</tr>
<tr>
<td>Torasemide</td>
<td>10mg</td>
<td>½-0-0</td>
</tr>
</tbody>
</table>

- **Sarcoidosis**: Lung, heart (right, left, pericardium), brain?
- **Medication**
  - Prednisone 25mg 1-0-0 (for a total of 6 months)
  - Torasemide 10mg ½-0-0

- **PET-CT**: calcified lymph nodes, some activity heart, FDG uptake right lung
- **Cardiac CMR, echo**: improvement
<table>
<thead>
<tr>
<th></th>
<th>Definite cardiac sarcoidosis 9 patients</th>
<th>Possible cardiac sarcoidosis 23 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age, years</td>
<td>64.11 (+/- 11.32)</td>
<td>58.34 (+/- 13.35)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>Male</td>
<td>5 (55.55%)</td>
<td>12 (52.17%)</td>
</tr>
<tr>
<td></td>
<td>4 (44.44%)</td>
<td>11 (47.82%)</td>
</tr>
<tr>
<td>Sinus rhythm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>9/9 (100%)</td>
<td>22/23 (95%)</td>
</tr>
<tr>
<td></td>
<td>0/9 (0%)</td>
<td>1/23 parox (5%)</td>
</tr>
<tr>
<td>QRS duration (mean)</td>
<td>130.666 (+/- 33.52)</td>
<td>109.91 (+/- 33.56)</td>
</tr>
<tr>
<td>PR interval (mean)</td>
<td>158.222 (+/- 66.34)</td>
<td>150.21 (+/- 52.64)</td>
</tr>
<tr>
<td>AV block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- first degree</td>
<td>5/9 (55.55%)</td>
<td>6/23 (26.08%)</td>
</tr>
<tr>
<td>- second degree</td>
<td>1/9 (11.11%)</td>
<td>3/23 (13.04%)</td>
</tr>
<tr>
<td>- total AV block</td>
<td>1/9 (11.11%)</td>
<td>0/23 (0%)</td>
</tr>
<tr>
<td></td>
<td>3/9 (33.33%)</td>
<td>3/23 (13.04%)</td>
</tr>
<tr>
<td>Pacemaker</td>
<td>4/9 (44.44%)</td>
<td>3/23 (13.04%)</td>
</tr>
<tr>
<td>Complete right bundle branch block</td>
<td>2/9 (22.22%)</td>
<td>5/23 (21.73%)</td>
</tr>
<tr>
<td>Complete left bundle branch block</td>
<td>1/9 (11.11%)</td>
<td>1/23 (4.34%)</td>
</tr>
<tr>
<td>Pericardial effusion/thickening</td>
<td>0/9 (0%)</td>
<td>3/23 (13.04%)</td>
</tr>
<tr>
<td>Ventricular tachycardia</td>
<td>2/9 (22.22%)</td>
<td>6/23 (26.1%)</td>
</tr>
<tr>
<td>Scar by echo</td>
<td>4/9 (44.44%)</td>
<td>4/23 (17.39%)</td>
</tr>
<tr>
<td>Scar by CMR</td>
<td>5/9 (55.55%)</td>
<td>6/23 (26.08%)</td>
</tr>
<tr>
<td>Myocardial biopsy</td>
<td>5/9 (55.55%)</td>
<td>4/23 (17.39%)</td>
</tr>
<tr>
<td>Immunosuppressant therapy</td>
<td>6/9 (66.66%)</td>
<td>4/23 (17.39%)</td>
</tr>
</tbody>
</table>
Sometimes you may be wrong and sarcoidosis can be the culprit.
end