Management of postpericardiotomy syndrome

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Postpericardiotomy syndrome (PPS)

Post-cardiac injury syndrome (PCIS)

Definition

Febrile illness secondary to an inflammatory reaction involving the pleura and pericardium.

Incidence

- 2% – 30% after cardiac or major thoracic surgery
- Less common after myocardial infarction (Dressler’s syndrome), PTCA / stent, PM implantation, trauma
Clinical presentation

• Persistent pericardial and / or pleural effusions after cardiac surgery (after reaching preoperative body weight, typically within 1-6 weeks after pericardiotomy)

• Recurrence of pericardial and / or pleural effusions after discharge (up to 3 months postop)

• Elevated CRP and sometimes fever (usually around 38°C but can reach even 40°C)

• Sometimes clinically evident “inflammatory syndrome” with malaise, chest pain, irritability, and decreased appetite
Diagnosis

Clinical criteria after a cardiac injury

1. Fever without alternative causes
2. Pericarditic or pleuritic chest pain
3. Pericardial or pleural rubs
4. Evidence of pericardial effusion and/or
5. Evidence of pleural effusion with elevated CRP

Two criteria have to be fulfilled

Pathophysiology

**Anti-heart antibodies**

- **Figure 5**
  - Course of seven-year old girl L.P., with moderately severe PPS after open repair of tetralogy of Fallot, with right ventriculotomy, excision of infundibular pulmonic stenosis, and closure with a teflon patch of ventricular septal defect. Note the rise in heart-reactive antibody when clinical manifestations appeared, and the decline of elevated antibody following resolution of clinical features.

**Autoimmune response**

Target antigens exposed after the pericardium has been entered (activated helper & cytotoxic T-cells)


**Autoimmune response associated with viral infection?**


Retained Blood Syndrome?

**POSTOPERATIVE BLEEDING**

**ADEQUATE BLOOD EVACUATION**
- Recovery
  - Clinically Large Volume of Retained Blood/Clot
    - Pericardial Tamponade
    - Hemothorax
    - Acute RBS

**INADEQUATE BLOOD EVACUATION**
- Subclinical Volume of Retained Blood/Clot
  - Clot Causes Inflammation/VEGF Production and Fluid
    - Pericardial Effusion
    - Pleural Effusion
    - Sub-Acute RBS
      - Inflammation Transitions to Fibrosis
        - Postoperative Constrictive Pericarditis
        - Fibrothorax
        - Chronic RBS

**FIGURE 1.** Retained blood syndrome includes any combination of hemothorax, pericardial tamponade, pleural effusion, and pericardial effusion.

Treatment

1. Treatment of pericardial / pleural effusions
2. Medical treatment of the underlying inflammatory reaction
Treatment of pleural & pericardial effusions

Interventional evacuation (puncture ± drain)

- if safely accessible
- not septed or partially coagulated

Surgical drainage

- subxiphoidal access
- mini anterolateral thoracotomy (fenestration)

Attention: potential for iatrogenic complications (especially in patients under oral anticoagulation and / or double antiaggragation therapy)

Treatment of the underlying inflammatory reaction

**Table 5** Commonly prescribed anti-inflammatory therapy for acute pericarditis

<table>
<thead>
<tr>
<th>Drug</th>
<th>Usual dosing*</th>
<th>Tx duration†</th>
<th>Tapering‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>750–1000 mg every 8h</td>
<td>1–2 weeks</td>
<td>Decrease doses by 250–500 mg every 1–2 weeks</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>600 mg every 8h</td>
<td>1–2 weeks</td>
<td>Decrease doses by 200–400 mg every 1–2 weeks</td>
</tr>
<tr>
<td>Colchicine</td>
<td>0.5 mg once (&lt;70 kg) or 0.5 mg b.i.d. (≥70 kg)</td>
<td>3 months</td>
<td>Not mandatory, alternatively 0.5 mg every other day (&lt;70 kg) or 0.5 mg once (≥70 kg) in the last week</td>
</tr>
</tbody>
</table>

b.i.d. = twice daily; CRP = C-reactive protein; NSAIDs = non-steroidal anti-inflammatory drugs; Tx = treatment.

*Tapering should be considered for aspirin and NSAIDs.

†Tx duration is symptoms and CRP guided but generally 1–2 weeks for uncomplicated cases. Gastroprotection should be provided. Colchicine is added on top of aspirin or ibuprofen.


A DECS substudy (multicenter, randomized, double-blind, placebo controlled trial 1 mg/kg dexamethasone in 4’494 pts undergoing on-pump valve surgery)

*Incidence of PPS 14.5%, no protective effect of dexamethasone*

Treatment of the underlying inflammatory reaction

- Reduced incidence of PPS but not of Afib or all postop pericardial / pleural effusion
- Frequent Adverse Events (GI): 20%

Colchicine for Prevention of Postpericardiotomy Syndrome and Postoperative Atrial Fibrillation
The COPPS-2 Randomized Clinical Trial

Maximo Imazio, MD; Antonio Brucato, MD; Paolo Ferrazzi, MD; Alberto Pullara, MD; Yehuda Adler, MD; Alberto Barosi, MD; Aída L. Caforio, MD; Roberto Cernin, MD; Fabio Chirillo, MD; Chiara Cornoglio, MD; Diego Cupola, MD; Davide Cumetti, MD; Oleksandr Dyrda, MD; Stefania Ferrua, MD; Yaron Finkelstein, MD; Roberto Flocco, MD; Anna Gandino, MD; Brian Holt, MD; Francesco Innocente, MD; Silvia Maestrini, MD; Francesco Musumeci, MD; Jae Oh, MD; Amedeo Pergolini, MD; Vincenzo Poluzzi, MD; Arsen Ristic, MD; Caterina Simon, MD; David H Spodick, MD; Vincenzo Tarsia, MD; Stefania Trimbelli, MD; Anna Valent, MD; Riccardo Belli, MD; Florenzo Gaita, MD, for the COPPS-2 Investigators

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Prognosis

• Normally a mild, self-limited inflammatory illness, but close monitoring, even after treatment, needed
• Incidence of life-threatening pericardial tamponade <1%
• Relapse after tapering the antiinflammatory drugs in 10-15% of patients (monitoring!)
• Incidence of constrictive pericarditis after PPS: <0.5% (Correlation? Potential progression?)
Outcome

- Most cases of postpericardiotomy syndrome resolve within a few weeks
- Rarely, symptoms may occur for more than 6 months
- Relapse may occur after tapering anti-inflammatory medications and is estimated to occur in 10-15% of patients
- Most recurrences occur within 6 months of the initial surgery
Take home message

- PPS can occur in up to 30% of patients 1 week to 3 months after cardiac or major thoracic surgery.
- Recurrence or difficult to treat pleural and pericardial effusions with increased CRP and inflammatory symptoms should trigger the suspicion.
- The “retained blood theory” offers a comprehensive explanation – consider and treat accordingly!
- No effective prophylaxis known.
- Treatment consists in drainage of effusions and antiinflammatory drugs (colchicine, ibuprofen).
- Good prognosis but relapses occur – monitor your patients!
- Progression to a constrictive pericarditis not usual and not confirmed.