Case 2: Patient with endocarditis and pyarthros of knee prosthesis

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Patient’s history

- male, 75 y, retired car mechanic, active and good general health condition

Anamnesis:

07/2013 Empyema of the left knee

- 2011 Adenocarcinoma of prostate gland (curative treatment)
- 2010 Arthroplasty of the right knee
- 2007 removal of the right ankle joint prosthesis (arthrodesis, spongiosaplastic surgery)
- 2002 prosthesis of the right upper ankle joint
- 2001 Maisonneuve fracture (right side), surgically treated
- 1999 Appendicitis acuta
Patient’s history

07/2013 Empyema of the left knee

- fever, chills and myalgia
  → puncture and detection of pneumococci inside the empyema and in blood samples

  (initial antibiotic therapy: Co-Amoxicillin + Gentamycin
  after resistance testing: Ceftriaxon)

 → first echocardiography shows a competent aortic valve without insufficiency, degenerative changes, discharge home

After discharge, persistent general weakness till mild signs of cardiac decompensation

 → Second echocardiography
Patient’s history

Echocardiography August 2013
Patient’s history

Echocardiography August 2013
Guidelines: 2 major, 1 minor

Definition of infective endocarditis according to the modified Duke criteria (adapted from Li et al.)

**Major criteria**

1. Blood cultures positive for IE
   - Typical microorganisms consistent with IE from 2 separate blood cultures:
     - Viridans streptococci, Streptococcus gallolyticus (Streptococcus bovis), HACEK group, Staphylococcus aureus; or
     - Community-acquired enterococci, in the absence of a primary focus; or
   - Microorganisms consistent with IE from persistently positive blood cultures:
     - ≥2 positive blood cultures of blood samples drawn >12 h apart; or
     - All of 3 or a majority of ≥4 separate cultures of blood (with first and last samples drawn ≥1 h apart); or
     - Single positive blood culture for Coxiella burnetti or phase 1 IgG antibody titer ≥1:800

2. Imaging positive for IE
   - Echocardiogram positive for IE:
     - Vegetation;
     - Abscess, pseudoaneurysm, intracardiac fistula;
     - Valvular perforation or aneurysm;
     - New partial dehiscence of prosthetic valve.
   - Abnormal activity around the site of prosthetic valve implantation detected by F-FDG PET/CT (only if the prosthesis was implanted for ≥3 months) or radioisotope leukocytes SPECT/CT.
   - Definite paravalvular lesions by cardiac CT.

**Minor criteria**

1. Predisposition such as predisposing heart condition, or injection drug use.
2. Fever defined as temperature ≥38°C.
3. Vascular phenomena (including those detected by imaging only):
   - Major arterial emboli, septic pulmonary infarcts, infective (mycotic) aneurysm, intracardinal hemorrhage, conjunctival hemorrhages, and Janeway’s lesions.
4. Immunological phenomena: glomerulonephritis, Osler’s nodes, Roth’s spots, and rheumatoid factor.
5. Microbiological evidence: positive blood culture but does not meet a major criterion as noted above or serological evidence of active infection with organism consistent with IE.

**Pathological criteria**

- Microorganisms demonstrated by culture or on histological examination of a vegetation, a vegetation that has embolized, or an intracardiac abscess specimen; or
- Pathological lesions: vegetation or intracardiac abscess confirmed by histological examination showing active endocarditis.

**Clinical criteria**

- 2 major criteria; or
- 1 major criterion and 3 minor criteria; or
- 5 minor criteria.

**Possible IE**

- 1 major criterion and 1 minor criterion; or
- 3 minor criteria.

**Rejected IE**

- Firm alternate diagnosis; or
- Resolution of symptoms suggesting IE with antibiotic therapy for ≤4 days; or
- No pathologic evidence of IE at surgery or autopsy, with antibiotic therapy for ≤4 days; or
- Does not meet criteria for possible IE, as above.

Blood culture

Perforation

Fever > 38°C

Operation
Patient’s history

Operative Treatment: Aortic valve replacement (Trifecta 23mm) 08/2013
Patient’s history

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Patient’s history

Discharge and postoperative course

- In-patient rehabilitation focused on cardiovascular disease for four weeks

- Antibiotic therapy for cumulatively 6 weeks with Ceftriaxon

- Left knee at that time no issue

06/2014 Patient receives a total endoprosthesis of the left knee with a normal, uncomplicated postoperative course
Six months later... December 2014

12/2014 New empyema of the endoprosthesis!

→ detection of pneumococci inside the empyema and in blood samples

→ Echocardiography 29.12. + 31.12.: no signs of endocarditis

→ 02.01.15: Lavage and Inlay-change

→ 12 days later: persistent high inflammation values despite of Rifampicin and Ceftriaxon

→ transoesophageal echocardiography 14.01.15
Echocardiography 14.01.2015
## Guidelines: Urgency?

<table>
<thead>
<tr>
<th>Indications for surgery</th>
<th>Timing</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Heart failure</strong></td>
<td></td>
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<tr>
<td>Aortic or mitral NVE or PVE with severe acute regurgitation, obstruction or fistula causing refractory pulmonary oedema or cardiogenic shock</td>
<td>Emergency</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Aortic or mitral NVE or PVE with severe regurgitation or obstruction causing symptoms of HF or echocardiographic signs of poor haemodynamic tolerance</td>
<td>Urgent</td>
<td>I</td>
<td>B</td>
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<tr>
<td><strong>2. Uncontrolled infection</strong></td>
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<tr>
<td>Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)</td>
<td>Urgent</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Infection caused by fungi or multiresistant organisms</td>
<td>Urgent/elective</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Persisting positive blood cultures despite appropriate antibiotic therapy and adequate control of septic metastatic foci</td>
<td>Urgent</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>PVE caused by staphylococci or non-HACEK gram-negative bacteria</td>
<td>Urgent/elective</td>
<td>IIa</td>
<td>C</td>
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<tr>
<td><strong>3. Prevention of embolism</strong></td>
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<tr>
<td>Aortic or mitral NVE or PVE with persistent vegetations &gt; 10 mm after one or more embolic episode despite appropriate antibiotic therapy</td>
<td>Urgent</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Aortic or mitral NVE with vegetations &gt; 10 mm, associated with severe valve stenosis or regurgitation, and low operative risk</td>
<td>Urgent</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>Aortic or mitral NVE or PVE with isolated very large vegetations (&gt; 30 mm)</td>
<td>Urgent</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>Aortic or mitral NVE or PVE with isolated large vegetations (&gt; 15 mm) and no other indication for surgery</td>
<td>Urgent</td>
<td>IIb</td>
<td>C</td>
</tr>
</tbody>
</table>

- No regurgitation
- No severe decompensation
- No multiresistent infection
- Vegetation under 1.0cm

but...
Questions of therapy

Watch and wait with antibiotic therapy?

Valve operation first?

Knee operation first?

Valve and knee operation simultaneously?

Just valve operation, wait with knee operation?
Treatment plan: Antibiotics and eradication

- + Gentamycin
- Change to Penicillin G after resistance testing

- Decontamination of inflammation focus (21.01.2015)
  → complete explantation of the knee prosthesis
  → debridement

7.4 Streptococcus pneumoniae, beta-haemolytic streptococci (groups A, B, C, and G)

IE due to S. pneumoniae has become rare since the introduction of antibiotics. It is associated with meningitis in up to 30% of cases, which requires special consideration in cases with penicillin resistance. Treatment of penicillin-susceptible strains (MIC ≤ 0.06 mg/L) is similar to that of oral streptococci (Table 16), except for the use of short-term 2-week therapy, which has not been formally investigated. The same holds true for penicillin-intermediate (MIC 0.125–2 mg/L) or resistant strains (MIC ≥ 4 mg/L) without meningitis, although for resistant strains some authors recommend high doses of cephalosporins (e.g., cefotaxime or ceftriaxone) or vancomycin. In cases with meningitis, penicillin must be avoided because of its poor penetration of the cerebrospinal fluid, and should be replaced with ceftriaxone or cefotaxime alone or in association with vancomycin according to the antibiotic susceptibility pattern.

10.2.2 Extracardiac infection

If a primary focus of infection likely to be responsible for IE has been identified, it must be eradicated before cardiac surgical intervention unless valve surgery is urgent. In any case, it should be eradicated before the end of antibiotic therapy.
During knee operation:

→ intraoperative transoesophageal echocardiography:
  1) progression of the moving vegetation size (ca. 1.6cm) on the left cusp
  2) lack of insufficiency

- Computed tomography: neurocranium, thorax, abdomen to exclude further embolisation (22.01.2015)

- Coronary angiography 23.01.2015: dilatation of the aortic root
Echo during Knee operation
21.01.2015
Echo during Knee operation
21.01.2015
Treatment plan: Further diagnostics

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→ intraoperative transoesophageal echocardiography:
  1) progression of the moving vegetation size (ca. 1.6cm) on the left cusp
  2) lack of insufficiency

- Computed tomography: neurocranium, thorax, abdomen to exclude further embolisation (22.01.2015)

- Coronary angiography 23.01.2015: dilatation of the aortic root
Coronary angiography 23.01.2015
Re-Operation and clinical findings
Re-Operation: intraoperative Echocardiography
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Re-Operation and clinical findings

Intact Trifecta prosthesis, disconnection of the annulo-aorto area
Implantation of 27mm Freestyle prosthesis

Implantation of a right-ventricular and atrial pacemaker electrode simultaneously during aortic root operation

Re-Operation and clinical findings
Postoperative course and therapy

- Pacemaker-Implantation 30.01.2015
- decreasing inflammation parameters
- good recovery during hospitalisation
- Physiotherapy for mobilisation and training of the left knee
- Discharge at 35th postoperative day (in-patient rehabilitation)
- Antibiotic therapy for six weeks, no antibiotics after discharge
- Pneumococcus vaccine after hospitalisation
Postoperative course and therapy

- 04.04.2015: Discharge from rehabilitation movement therapy, sports therapy (kinetron), improvement of mobilisation, climbing stairs (>50 stairs with two forearm crutches)

- 23.04.2015: Cardiology check up
  normal function of the aortic prosthesis
  normal left-ventricular function

- 11.05.2015: Patient’s letter
  Still painfull left knee, till now no appointment for knee operation

- 10.06.2016: phone call
  New endoprosthesis April 2016
Discussion/Questions