## Learning case: Low grade infection

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### Case summary

- **Type of infection:** Delayed low grade infection after revision surgery
- **Pathogen:** Propionibacterium acnes
- **Specialty of the case:** More than two years of diagnostic procedures without clear diagnosis or detection of microorganism.

### Previous diagnostic

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<tr>
<th>Age: 60 years</th>
<th>Date of primary arthroplasty: 07/2008</th>
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<tr>
<td>Sex: ☒ male</td>
<td>Previous revision: ☒ septic Removal 11/2009</td>
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<td>Surgical procedure: Two-stage revision, 6 weeks spacer</td>
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<td>Pathogen: Staphylococcus aureus (MSSA)</td>
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<th>Risk factors: Morbus Parkinson</th>
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### Definition criteria for PJI:

- Acute inflammation in periprosthetic tissue histopathology: ☐ yes ☒ no ☒ not checked
- Visible purulence: ☐ yes ☒ no
- Elevated serum erythrocyte sedimentation rate (ESR) and serum C-reactive protein concentration (CRP): CRP: persistent elevated between 20 and 30 mg/l
- Sinus tract (fistula) communicating with the prosthesis: ☐ yes ☒ no
- Elevated synovial white blood cell count and synovial neutrophil percentage: ☐ yes ☒ no ☒ not checked
- Microbial growth
- Synovial fluid: no growth
- Periprosthetic tissue: no growth

### Clinical Picture

- Persistent pain, intermittent effusion

### Antibiotic pretreatment

- Systemic: flucloxacillin 4 x 2gr iv 6 weeks, followed by levofloxacin 2 x 500mg, 2 x 450mg rifampicin
- Local: spacer (vancomycin 2g/40g PMMA); no antibiotics for prevention

### Imaging

- Visible signs of infection or loosening: ☐ yes ☒ no
## Case description

### History

- **07/2008** Primary Implantation of Total Knee Prosthesis
- **09/2009** Spondylodesis after transpedicular microdiscectomy L4/5
- **11/2009** Fever, Chills, CRP 123 mg/l (normal < 5 mg/l), Knee prosthesis: painful, no effusion
  - Blood cultures: Staphylococcus aureus (MSSA)
  - Removal of knee prosthesis and implantation of spacer with antibiotics (vancomycin 2g/40g PMMA)
  - Antibiotic treatment: flucloxacinil 4 x 2gr iv 6 weeks
  - Surgery: reimplantation at 6 weeks
  - Antibiotic treatment: levofloxacin 2 x 500mg, 2 x 450mg rifampicin

### Onset of symptoms

- **03/2010** Three months after revision surgery, knee is still painful with intermittent effusion

### Clinical course

- **04/2010** Stop of antibiotic treatment
- **05/2010** Joint aspirate and periprosthetic tissue cultures were negative
  - Diagnosis: Postero-lateral impingement arthrotomy with circumferential resection of hypertrophic synovialis
  - Antibiotic treatment: amoxicilin-clavulanic acid po 2x 1gr
- **08/2011** Patient presents for removal of suture material persistent swelling of soft tissues, CRP 21 mg/l
- **09/2011** X-ray shows good position of prosthesis (Fig. 1), no sign of loosening, CRP 25 mg/l
- **11/2011** after slight improvement treatment was stopped despite persistent warmth of the knee, CRP 16 mg/l
- **12/2011** Persistent pain, difficulties in walking (needs two sticks!), function F/E: 30/0, swelling, warmth, free liquid, venous insufficiency, CRP 34 mg/l, ESR 18 mm/h; progressive implant loosening (Fig. 2)
- **01/2012** Important synovitis and free liquid (Fig 3); tremor left sided; F/E: 80/5; CRP 18 mg/l
  - Diagnosis: Most likely infection: two weeks later removal knee prosthesis with synovectomy and monobloc spacer (local antibiotics in spacer 8gr gentamicin and 4 gr vancomycin)
  - Swabs and tissue cultures still negative but histology and cell count indicate infection
01/2012 Sonication of implant and culture of sonication fluid finally found a Propionibacterium acnes (to numerous to count)

02/2012 Implantation of the new knee prosthesis with systemic antibiotic treatment (amoxicillin and clavulanic acid 3x 2,2g iv for two weeks, rifampicin 2x 450mg po and 2x 500mg levofloxacin po for ten weeks)

Follow up

04/2012 Back home, walks 1,5 km, light swelling, no redness, no warmth, no joint effusion; F/E 100/0; CRP 3 mg/l; still antibiotic treatment (levofloxacin + rifampicin)

06/2012 no pain; F/E 120/0; no swelling, no effusion; CRP <2; antibiotics stopped (Fig. 4)

08/2012 end of treatment, patient cured

10/2013 follow-up visit: no complaint

Learning Points / Challenges

The onset of symptoms three months postoperatively combined with low CRP levels suggest low grade infection with difficult-to-detect microorganisms.

No microbial growth in joint fluid or tissue samples does not automatically exclude an infection.

In this case leukocyte count and differential at an early stage of the diagnostic process could have helped to diagnose the infection.

Propionibacterium acnes was only detected after sonication of the implant (due to biofilm and antibiotic pretreatment).