Osteoarthritis, Fibromyalgia, Infectious arthritis

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Infectious (Septic) arthritis
Infection-related rheumatic diseases

- **Septic arthritis** + osteomyelitis, gonococcal and syphilitic arthritis
- Mycobacterial, brucella, fungal, parasitic arthritis
- Viral arthritis
- Lyme disease
- Rheumatic aspects of a HIV infection
- Rheumatic fever
- Reactive arthritis
Septic arthritis

- **Definition**: microbial invasion of a joint leading to inflammation.
- **Synonyms**: infectious arthritis, suppurative arthritis, pyogenic arthritis.

**Bacteria that are commonly found to cause septic arthritis are:**
- *Staphylococcus aureus* - the most common cause in adults
- *Streptococci* - the second most common cause
- *Haemophilus influenzae* - was the most common cause in children but is now uncommon in areas where Haemophilus vaccination is practiced
- *Neisseria gonorrhoea* - in young adults (now thought rare in Western Europe)
- *Escherichia coli* - in the elderly, IV drug users and the seriously ill
- *M. tuberculosis*, *Salmonella* spp. and *Brucella* spp. - cause septic spinal arthritis
- *Pseudomonas aeruginosa* - has been found to infect joints, especially in children who have sustained a puncture wound.
Septic arthritis

- **Epidemiology:**
  2-10/100 000/year incidence in the general population,
  30-70/100 000/year in RA and in pts with joint replacement

- **Predisposing factors**

<table>
<thead>
<tr>
<th>Pre-existing arthritis</th>
<th>Diabetes mellitus</th>
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</thead>
<tbody>
<tr>
<td>Prosthetic joint</td>
<td>Intra-articular corticosteroid injection</td>
</tr>
<tr>
<td>Systemic autoimmune dis.</td>
<td>Immune suppressive therapy</td>
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<tr>
<td>i.v. drug abuse</td>
<td>Alcoholism</td>
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<tr>
<td>Older age</td>
<td>Cancer</td>
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</tbody>
</table>
## Table 1. Common Bacterial Etiologies of Septic Arthritis

<table>
<thead>
<tr>
<th>Native Joints</th>
<th>Prosthetic Joints</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gram positive cocci</strong></td>
<td>Early infection (up to 3 months post-operative)</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td><em>S. aureus</em> (including methicillin-resistant)</td>
</tr>
<tr>
<td><strong>Streptococci</strong></td>
<td><em>Streptococcus pyogenes</em></td>
</tr>
<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td><em>Enterococcus</em> sp.</td>
</tr>
<tr>
<td>Group B <em>streptococci</em></td>
<td>Gram-negative bacilli</td>
</tr>
<tr>
<td>Viridans group streptococci</td>
<td>Delayed infection (4–24 months post-operative)</td>
</tr>
<tr>
<td><strong>Gram positive bacilli</strong></td>
<td>Coagulase-negative staphylococci</td>
</tr>
<tr>
<td><em>Clostridium</em> sp.</td>
<td><em>Propionibacterium acnes</em></td>
</tr>
<tr>
<td><strong>Gram negative cocci</strong></td>
<td>Other skin commensals</td>
</tr>
<tr>
<td><em>Neisseria gonorrhoea</em></td>
<td>Late infection (more than 24 months post-operative)</td>
</tr>
<tr>
<td><strong>Gram-negative bacilli</strong></td>
<td>Coagulase-negative staphylococci</td>
</tr>
<tr>
<td>Enteric gram-negative bacilli (e.g. <em>Escherichia coli</em>)</td>
<td><em>S. aureus</em></td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>Viridans group streptococci</td>
</tr>
<tr>
<td><em>Eikenella corrodens</em> (following human bite trauma)</td>
<td>Gram-negative rods, especially <em>E. coli</em></td>
</tr>
<tr>
<td><em>Pasteurella multocida</em> (following animal bite trauma)</td>
<td>Anaerobes</td>
</tr>
<tr>
<td><em>Kingella kingae</em> (especially pediatric cases)</td>
<td></td>
</tr>
<tr>
<td><em>Haemophilus influenza</em> (especially pediatric cases)</td>
<td></td>
</tr>
</tbody>
</table>

References: 9-11, 13, 16, 19, 21, 22
Pathogenesis of septic arthritis

1. The hematogenous route.
2. Dissemination from osteomyelitis.
3. Spread from an adjacent soft tissue infection.
4. Diagnostic or therapeutic measures.
5. Penetrating damage by puncture or trauma.

ROUTES BY WHICH BACTERIA CAN REACH THE JOINT
Symptoms of septic arthritis

- Depends on the type and route of infection and on host factors.
  - Fever
  - Fatigue
  - Joint pain, swelling, redness, warmth, loss of function

Morbidity: 25-50%
Mortality: 10-15%
Irreversible loss of function: 50%
Diagnostic procedure

- Case history
- Physical findings
- Laboratory findings
  - Synovial fluid
    - Leukocyte and neutrophil counts
    - Microbial testing: Gram staining,
      - Ziel-Nihlsen staining, PCR,
      - culture
  - Inflammatory markers (ESR, CRP, WBC)
  - PCT
- Imaging techniques
  - X ray
  - Sonography (joint swelling)
  - CT/MRI (early erosions/ synovial enhancement, perisynovial edema, joint effusion)
Treatment

- Removal of pus by needle aspiration or by arthroscopy
- Debridement, surgical drainage
- Synoviectomy

- Antiobiotic therapy, 1st empirically followed based on culture result. 2 weeks i.v., 4-6 weeks p.o.

- Early physiotherapy (only passive motions)
- Protection from weight bearing for ~6 weeks
# Recommendations for initial empirical antibiotic choice in suspected septic arthritis

<table>
<thead>
<tr>
<th>Patient risk group</th>
<th>Antibiotic choice</th>
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| No risk factors for atypical organisms (i.e. S. aureus, Streptococci) | Flucloxacin 2d QDS i.v. +/- gentamycin i.v.  
In case of penicillin allergy clindamycin 450-600 mg QDS i.v. |
| High risk for Gram-negative sepsis (elderly, recurr. UTI, abd. Surgery) | 2nd/3rd gen. Cephalosporin (i.e. Cefuroxim i.v. 1.5 g TDS +/- flucloxacin i.v. |
| MRSA risk (hospital or nursing home resident, leg ulcer, catheter,....) | Vancomycin i.v. + 2nd/3rd gen. cephalosporin |
| Suspected gonococcal, meningococcal infection            | Ceftriaxon i.v.                                 |
| i.v. drug users                                         | Discuss with microbiologist                     |
| ICU patients                                            | Discuss with microbiologist                     |
Osteoarthritis
Osteoarthritis

• Definition: OA is a chronic degenerative disorder of the joint – mainly the cartilage and subchondral bone - leading to pain, stiffness, reduction of movements

• Epidemiology:
  – The most frequent cause of arthritis accounting ~25-30% of physician visits.
  – Prevalence is ~12-25%, but it is strongly associated with ageing. Prevalence (by radiologic findings) over 65 yrs is 80%, but only 60% have symptoms.
Affected joints

- Spine
- Hip
- Knee
- Hand
- Foot
Symptoms and signs of OA

**Symptoms**
- Pain
- Stiffness
- Swelling
- Altered function
- Weakness
- Deformity
- Instability

**Signs**
- Altered gait
- Tenderness
- Enlargement
- Crepitus
- Limitation of motion
- Muscle spasm
- Contraction in the tendons
- Deformity
- Instability
Diagnosis

- History
  (occupation, life-style, hobbies)
- Physical findings
- X-ray
  - Joint space narrowing
  - Subchondral sclerosis
  - Subchondral cysts
  - Osteophytes
- MRI
  - Ligaments, tendons,
  - meniscus, discus
  - Condropathy
- Arthroscopy
Erosion Ulceration

Repair Osteophytes
Causes of primary OA

- Ageing
- Loss of water content of the cartilage
- Reduction of the proteoglycan content
- Degradation of collagen fibres and matrix
- Bone erosions or spurs
Molecular Pathogenesis of Osteoarthritis

- Cartilage breakdown products
- IL-1
- NO
- PGE₂
- TNF-α
- MMP-13
- IL-8
- BMP-2
- Apoptosis
- ? TGF-β
- Mechanical forces
- Bone
- Osteoclast
- Osteoblast
- Osteophyte
Causes of secondary OA

- Alkaptonuria
- Congenital disorders of joints
- Diabetes.
- Ehlers-Danlos Syndrome
- Hemochromatosis and Wilson's disease
- Inflammatory diseases (such as Perthes' disease), (Lyme disease), and all chronic forms of arthritis (e.g. costochondritis, gout, and rheumatoid arthritis). In gout, uric acid crystals cause the cartilage to degenerate at a faster pace.
- Injury to joints or ligaments (such as the ACL), as a result of an accident or orthodontic operations.
- Ligamentous deterioration or instability may be a factor.
- Marfan syndrome
- Obesity
- Septic arthritis (infection of a joint)
Management

- Exercise
- Life-style modification
- Physiotherapy
- Pain-killers
- Joint replacement surgery
Fibromyalgia
Definition

- Chronic pain syndrome
  - widespread pain (central and peripheral pain),
  - diffuse muscular pain,
  - heightened and painful response to pressure at special tender points

- No inflammatory signs

- Vegetative and functional symptoms are often present (bowel, bladder abnormalities)
Epidemiology

- Prevalence: ~ 2-4%
- Female : male ratio = 9:1
- Disease onset between 30-40 yrs
Etiology

- Pain regulation disorder – lower threshold for pain, increased sensitivity
- Neuroendocrine dysfunction: stress reaction disorder (substance-P, IL-1, IL-8↑)
- Autonomous nerve system: changes in cardiac frequency variance
- Nociception: allodynia (normally non painful stimulus arises pain) – low pain threshold, sleep disturbance
- Genetics – Stress – Dopamine dysfunction (dysruption of normal dopamine-related neurotransmission) – Abnormal serotonine metabolism
The main symptoms of Fibromyalgia

- Pain
- Joint stiffness
- Fatigue
Clinical signs

- Diffuse pain
- Tender for pressure
- Chronic fatigue (CFS) – sleep disturbance
- Neurologic symptoms: headache, decreased tolerance to sounds, memory disturbance
- Allergy–like symptoms
- Functional cardiovasc. symptoms
- Gastrointestinal symptoms: irritable colon
- Urogenital: pollakisuria, dyspareunia
- Psychical: overlap with depression
- No laboratory changes
Tenderpoints

(1,2) Low Cervical: intertransverse spaces.

(3,4) Second Rib: at the second costochondral junction, just lateral to the junctions on upper surfaces.

(5,6) Lateral Epicondyle

(7,8) Knee: at the medial fat pad proximal to the joint line.

(9,10) Occiput: sub-occipital muscle insertions.

(11,12) Trapezius: at the midpoint of the upper border

(13,14) Supraspinatus: at origins, above the spine of the scapula

(15,16) Gluteal: in upper outer quadrants of buttocks

(17,18) Greater Trochanter: posterior to the trochanteric prominence.
Diagnostic criteria, ACR 1990.

- Generalized pain > 3 months
- Tender (not pain) by pressure < 4 kp/cm² in at least 11 from the 18 tender points
Fibromyalgia Cycle

- Pain
  - Muscle stiffness
  - Depression
  - Fatigue
  - Limited Activity

- Muscle tension
  - Daily stress
  - Activity
Aim of the treatment

- Decreasing pain
- Decreasing sleeping problems
- Solving distress, anxiety
- Decreasing muscle spasm, relaxation
- Increasing physical activity, aerob capacity
- Restoration the ability to work
Management

- Pharmacologic:
  - Antidepressants (SSRI)
  - Analgetics
  - Anti-seizure medication
  - Dopamine agonists
  - Muscle relaxants
  - Cannabinoid (investigational)

- Psychotherapy: behavioral therapy, relaxation, way of living consultation

- Physiotherapy
  - Manual technology: Swedish massage, passive soft tissue mobilisation
  - Physical therapy: subaqual exercises, stretching, low intensity aerobic, postural correction
  - Other: TENS, Weyland’s chair, CO₂ bath, tg, warm therapies, kryotherapy