**Septic Arthritis**

**Take home points:**
1. Immunosuppression with abnormal joints is a risk factor for developing septic arthritis (SA)
2. Staphylococcus is the most common organism
3. Cannot make the diagnosis without synovial fluid analysis
4. Treatment involves appropriate antibiotic therapy and joint drainage

---

**Epidemiology**
- Most infectious arthritis occurs through hematogenous spread. Bacteria enter the joint space and trigger an acute inflammatory synovitis leading to release of cytokines which cause cartilage degradation, an increase in WBC in the synovial fluid, and a leaky synovial membrane, resulting in the exudation of plasma proteins into the synovial fluid.
- Those more prone to develop SA are post-trauma patients, HIV+, IVDU’s, diabetics, patients with pre-existing joint disease (RA, OA, crystal arthropathies, etc), the old and young, and patients with indwelling catheters. Pts can also have local extension from cellulitis.
- Can be a presenting sign of endocarditis.
- The knee is affected in 50% of adults with bacterial arthritis; wrist, ankles and hips are also commonly affected.

**Microbiology**
- Staphylococcal organisms are the most common, especially in diabetics and people with rheumatoid arthritis (over 80%).
- Streptococcal organisms are the second most common.
- In the appropriate epidemiological setting (ie young, sexually active), GC is the most common cause of septic arthritis.
- GNR are seen in IVDU’s.
- HIV infected individuals can have mycobacterial and fungal infected joints. An abnormal CXR or PPD is present in 1/3-1/2. Typically affects large weight bearing joints. May need synovial bx to make dx.

**Clinical Manifestations**
- Abrupt onset of a single hot, swollen, and very painful joint on passive and active ROM.
- Fever is common. Chills and spiking fevers are more common in children.
- 20% of septic arthritis is polyarticular infectious. This is especially common in patients with rheumatoid arthritis.
- If mycobacterial arthritis is present, the hallmark is severe pain out of proportion to physical findings.
- Gonococcal arthritis typically presents with F/C, rash, migratory polyarthralgias, and tenosynovitis. GU sx are typically absent. Cultures of synovial fluid are positive in only 50% of cases, so cx of all orifices (pharynx, urethra, cervix, rectum, skin lesions) should be sent as well.

**Diagnosis**
- Definitive dx: identify bacteria in synovial fluid examination or by culture. Culture is 90% sensitive in non-gonococcal arthritis but decreases with recent antibiotic use.
- Juxta-articular osteoporosis and bone erosions may occur after several weeks. Therefore, plain films might be of some help later in the course but are usually negative.
- Blood cultures are positive 30-50% of the time.
- With disseminated GC infection, over 80% of patients will have positive cultures from either synovium, skin, cervix/urethra, throat, or rectal swabs.
- Differentiating from crystal-induced arthropathies can be particularly difficult, as pts with gout can be febrile with leukocytosis and synovial evaluation can show high WBCs.
AD 9/02

<table>
<thead>
<tr>
<th>Dx</th>
<th>Normal</th>
<th>Non-Inflammatory</th>
<th>Inflammatory</th>
<th>Septic</th>
<th>Hemorrhagic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DJD, trauma,</td>
<td>Gout, CPPD, SLE, RA,</td>
<td>Bact, TB, fungal, sometimes gout</td>
<td>Hemophilia, trauma (+/- fx), neuropathic, hemangioma, benign neoplasms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>neuropathic, rheumatic fever, scleroderma, SLE, PMR, PAN, amyloid, Charcot jt</td>
<td>Reiter’s, AS, psoriatic, IBD assoc., myositis related, rheum fever, Behcets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bact, TB, fungal,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sometimes gout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Viscos
- High
- High
- Variable
- Variable

### WBC/m3
- <200 (<25% PMN’s)
- 200-2000 (<25% PMN’s)
- 2000-10,000 (>50% PMN’s)
- >100K (>75% PMN’s)
- 200-2000 (50-75% PMN’s)

### Glc
- = to serum
- = to serum
- >25% serum
- <25% serum
- = to serum

### Treatment

#### Antibiotic therapy
- If gram positive cocci and community acquired, the drug of choice is cefazolin 1-2 gm IV Q8. If non-community acquired, vancomycin is the drug of choice 30mg/kg IV Qd in two divided doses. At SFGH with our high population of MRSA, it is advisable to start with vanco since 42% of staph aureus isolates are cefazolin resistant.
- If gram negative, ceftazidime 2gm IV Q8 or ceftriaxone 1gm Q24. Add on gentamicin if the patient is an IDU for pseudomonas coverage. Ceftriaxone if the drug of choice for suspected GC.
- Modify with susceptibilities.
- Duration is usually 2 weeks of parenteral antibiotics and usually 14-21 days of oral therapy. Shoulder may require longer therapy 2-6 weeks.

#### Joint drainage
- Options are closed needle aspiration (which may require daily aspirations) or arthroscopic drainage.
- Serial taps may be necessary on a daily basis and should be continued until cultures are clear and synovial WBC decreases.
- Controversies exist as to whether pts need operative drainage vs needle aspirations. A few studies have shown that open surgical drainage may suggest higher morbidity and mortality, although most of these were retrospective studies.
- Arthroscopy is preferred for the hip, shoulder, and knee.

#### Outcome
- No clinical predictor. Usually is related to the patient’s co-morbid conditions and whether or not there was pre-existing destruction in the joint.
- One study showed that of 150 pts, over 30% had a poor outcome as defined by amputation, arthrodesis, need for prosthetic surgery, or severe functional decline. Risk factors were old age, prior joint disease, or artificial joint.

### References:
2) Lossos, IS et al. Septic arthritis of the glenohumoral joint. A report of 11 cases and review of the literature
3) Goldenberg, DL. Bacterial Arthritis, GC, gout, etc. UpToDate. 10.2