INFECTIOUS ARTHRITIS

Bernard Rubin, DO MPH

Division Head, Rheumatology

Henry Ford Hospital

Clinical Professor of Medicine

Wayne State University School of Medicine

Acute Monoarthritis

Differential Diagnosis

- Infection
- Crystal-induced
- Hemarthrosis
- Tumor
- Intra-articular derangement
- Systemic rheumatic condition

ACUTE MONOARTHRITIS IS SEPTIC UNTIL PROVEN OTHERWISE !!

Risk Factors for Septic Arthritis

- Previous arthritis
- Trauma
- Diabetes Mellitus
- Immunosupression
- Bacteremia
- Sickle cell anemia
- Prosthetic joint

Pathogenesis of Septic Arthritis

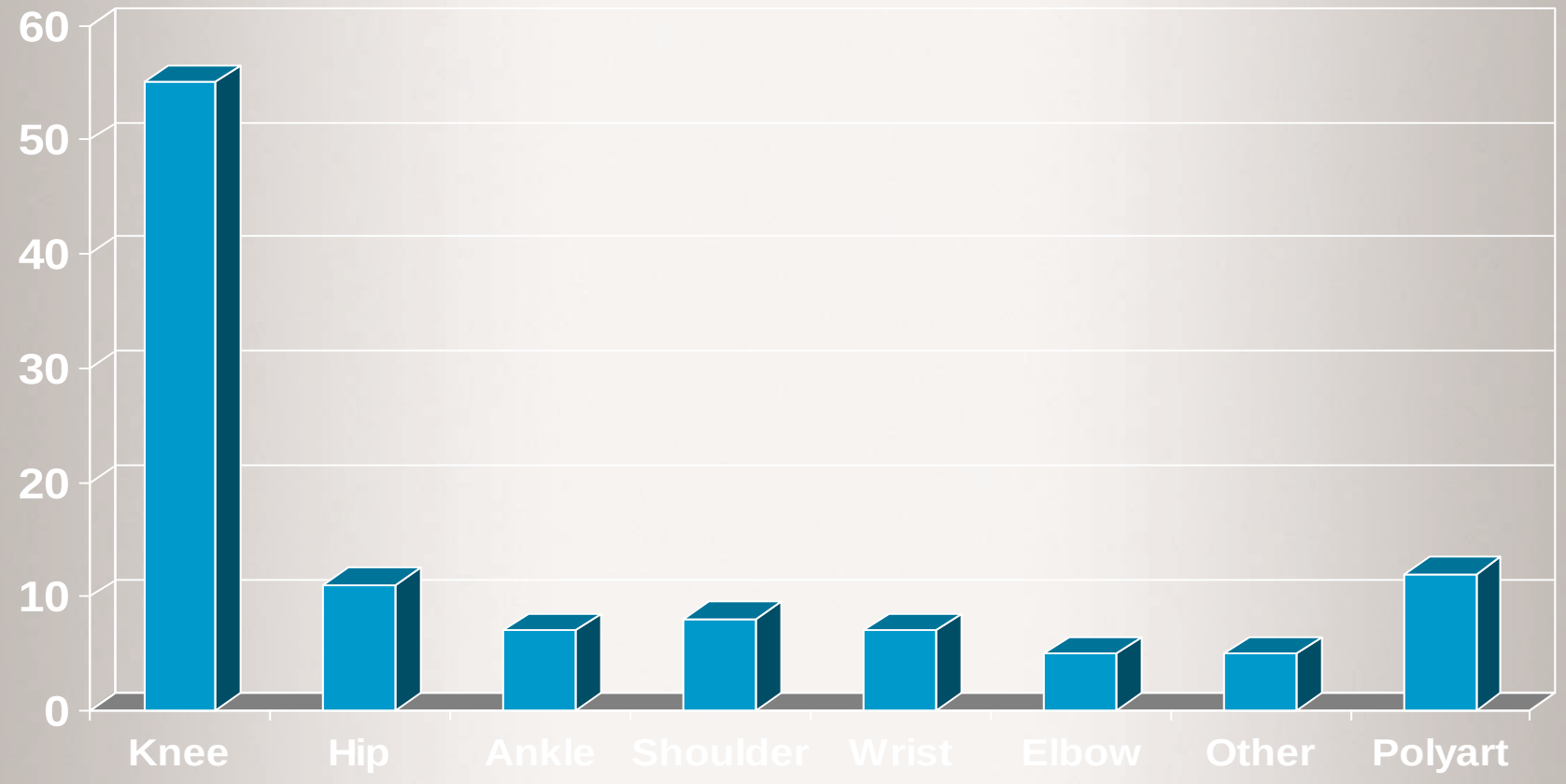
- Bacteria enter joint and deposit in synovial lining.
  - Hematogenous spread or local invasion
  - Acute inflammatory response
- Rapid entry into synovial fluid
  - No basement membrane

Septic arthritis
Clinical presentation

- Acute monoarthritis
  - Cardinal signs of inflammation
    - Rubror, tumor, calor, dolor
- +/- Fever
- +/- Leukocytosis

- Atypical presentations are not uncommon

Septic Arthritis
Joints Involved



Polyarticular Septic Arthritis

- More likely to be over 60 years
- Average of 4 joints
  - Knee, elbow, shoulder and hip predominate
- High prevalence of RA
- Often without fever and leukocytosis
- Blood cultures + 75%
- Synovial fluid culture + 90%
- Staph and Strep most common
- POOR PROGNOSIS
  - 32%mortality (compared to 4% with monoarticular disease)

Synovial fluid analysis is essential in the diagnosis of infectious arthritis

Synovial Fluid Analysis in Septic Arthritis

- Cell count: >50,000 wbcs/mm^3
- Differential: >75% PMNs
- Glucose: Low
- Gram stain : relatively insensitive test
- Culture: postive

Always use a wide bore needle when you suspect infection, as pus may be very viscous and difficult to aspirate

Causes of Infectious Arthritis

Organism	Clinical clues
Staphylococcus aureus	Healthy adults, skin breakdown, previously damaged joint (eg, rheumatoid arthritis), prosthetic joint
Strepotococcal species	Healthy adults, splenic dysfunction
Neisseria gonorrhea	Healthy adults (particularly young, sexually active), associated tenosynovitis, vesicular pustules, late complement deficiency, negative synovial fluid culture and gram stain
Aerobic gram negative bacteria	Immune compromised hosts, gastrointestinal infection
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Mycobacterial species	Immune compromised host, recent travel to or residence in an endemic area
Fungal species (sporotrichosis, cryptococcus, blastomycosis)	Immune compromised hosts
Spirochete (Borellia burgdorferi)	Exposure to ticks, antecedent rash, knee joint involvement
Mycoplasma hominis	Immune compromised hosts with prior gastrointestinal tract manipulation

When to order special cultures

- History of TB exposure
- Trauma
- Animal bite
- Live in or travel to endemic sites for fungi or Borrelia
- Immunocompromised host
- Unresponsive to conventional therapy

Special Populations

- Prosthetic joints
- Patients on TNF inhibitors
- Sickle cell anemia
- HIV disease
- Transplant setting

IV Drug users

- Multiple risk factors for septic arthritis
  - Soft tissue infections,
  - transient bacteremia,
  - other comorbidities- hepatitis, endocarditis,HIV
- Unusual sites
  - Fibrocartilagenous joints- SC, costochondral, symphysis
- Unusual organisms
  - S. aureus still most common
  - Gram negative infections next most common
    - Pseudomonas, Serratia, Enterobacter sp.
  - Candida

Management

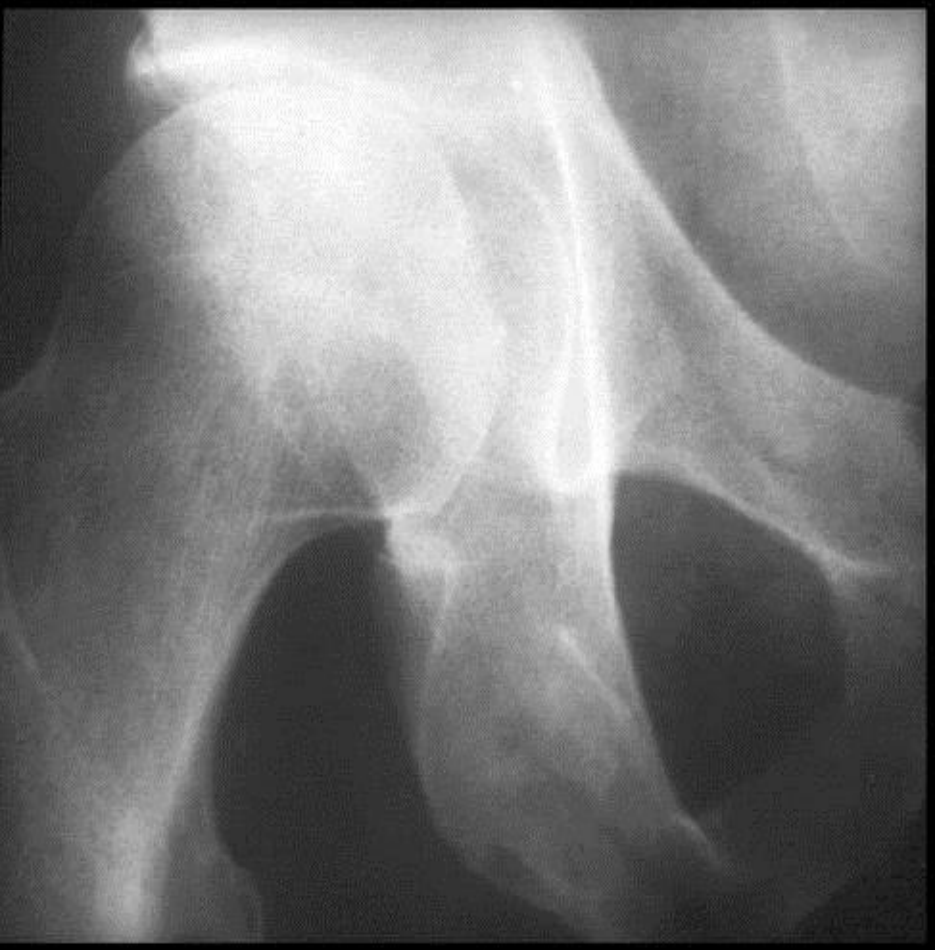
- Joint aspiration
  - **Daily or more frequently as needed**.
- Antibiotic therapy
  - Based on gram stain/culture and clinical factors
  - Duration is variable and depends on organism and host factors
- Surgical intervention
  - Only necessary if pt is not responding after 48 hrs of appropriate therapy

Empiric Therapy for Septic Arthritis

- **You must cover Staph and Strep**
  - Oxacillin
  - Vancomycin if PCN-allergic or if concern for MRSA
- If infection is hospital acquired or prosthetic joint- cover gram negatives
  - 3rd generation cephalosporin
- Empiric coverage for GC is recommended because of the high prevalence rate

Septic arthritis

- Radiographs
  - Minimal diagnostic utility
  - Document any existing joint damage
  - Evaluate for possible osteomyelitis



Septic hip-early disease

Late disease


5-14

Prosthetic joint infections

- **Stage I** within 3 months of surgery
  - Usually transmitted at the time of surgery
  - Staph and other gram positives most common
  - Pain, wound drainage, erythema, induration
- **Stage II** 3-24 months
- **Stage III** >2 years post-surgery
  - Usually caused by hematogenous spread to abnormal joint surfaces
  - Joint pain predominates

Prosthetic joint infections

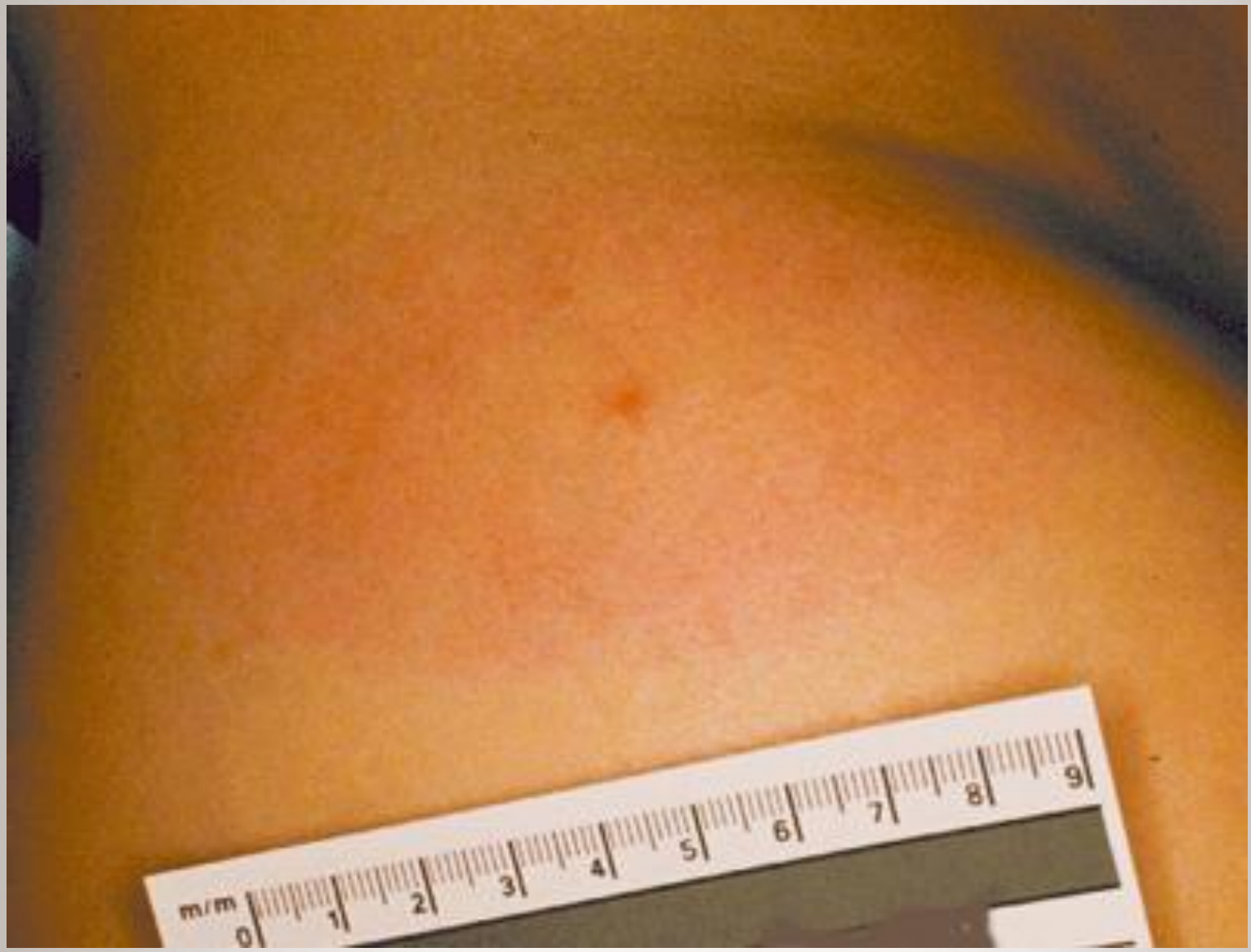
- Synovial fluid analysis
- May require biopsy
- If cultures are positive
  - Remove prosthesis
  - Treat with parenteral antibiotic until sterile
    - Usually 6 weeks +
  - Reoperate
    - Revision is at high risk for recurrent infection

Lyme Arthritis

- Caused by infection with the spirochete Borrelia Burgdorferi
- Early stage disease
  - Localized - Erythema chronicum migrans, fever, arthralgia and myalgia, sore throat,
  - Disseminated- disseminated skin lesions, facial palsy, meningitis, radiculoneuropathy, and rarely heart block
  - Early disease may remit spontaneously
  - 50% of untreated cases develop late features
- Late
  - Arthritis is a manifestation of late disease-months or years after exposure
  - Intermittent migratory asymmetric mono- or oligo-arthritis
  - 10% develop chronic large joint inflammatory arthritis

Lyme Arthritis

- Diagnosis
  - EM rash in endemic area
    - Adequate for treatment
  - Screening ELISA
  - Confirmatory Western Blot
    - IgM Western Blot – high false positive rates
      - Most useful in the first 4 weeks of disease
    - IgG Western Blot– high specificity
      - Most useful in disseminated or late stage disease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Lyme Arthritis

- Treatment
  - Early localized
    - Doxycycline 100 mg po BID or Amoxicillin 500 TID (kids) for 2-4 weeks
  - Early disseminated or late disease
    - Oral or parenteral antibiotics depending on the severity of the disease
      - Neuro or cardiac disease usually treated with IV ceftriaxone 2 g daily for 3-4 weeks.
      - Lyme arthritis may be treated with oral abx for 4 weeks.

Disseminated gonococcal infection

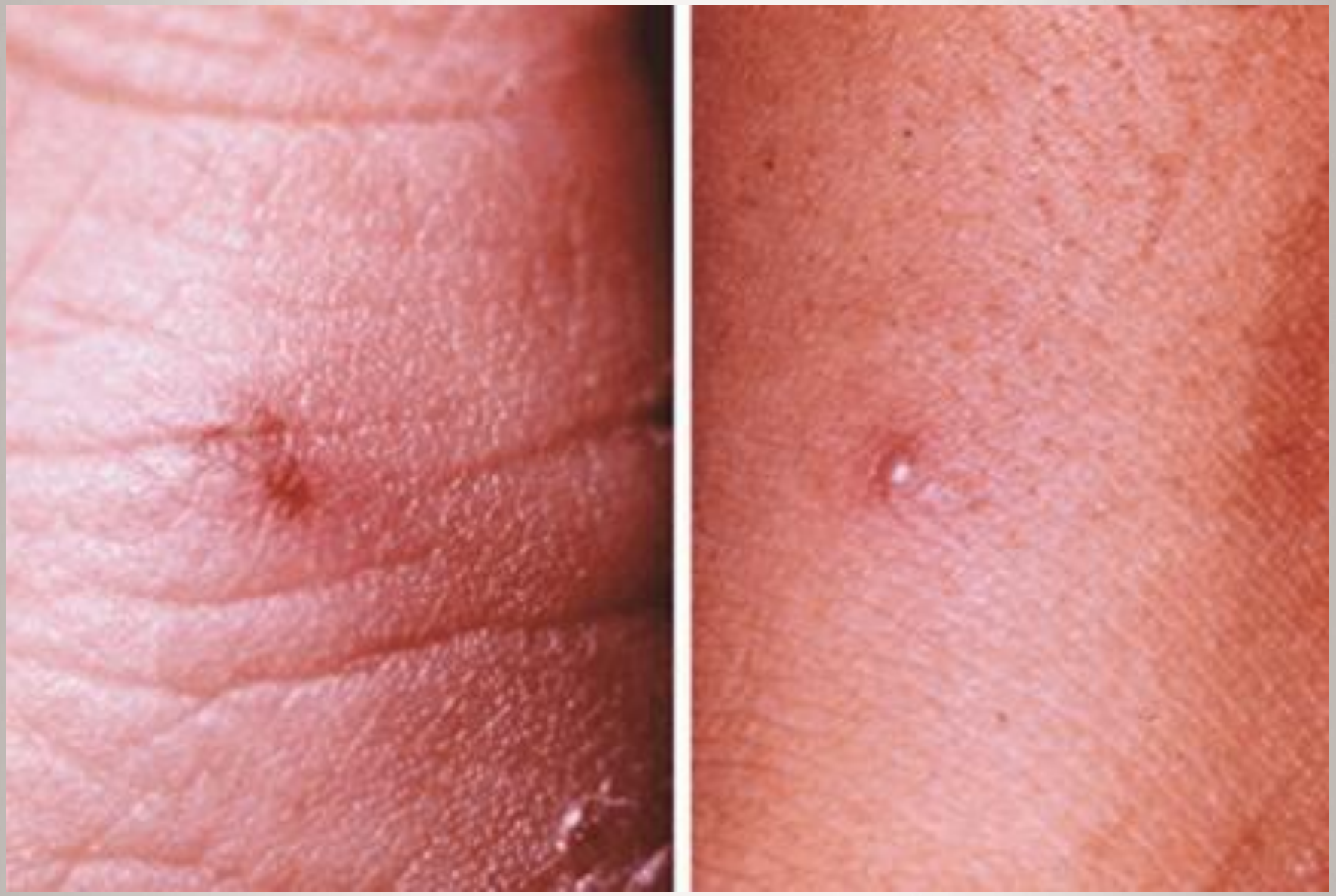
- Occurs in 1-3% on patients infected with GC
- Most patients have arthritis or arthralgia as a principal manifestation
- Common cause of acute non-traumatic mono- or oligo-arthritis in the healthy host

Gonococcal arthritis
Host factors

- Women > men
- Recent menstruation
- Pregnancy or immediate postpartum state
- Complement deficiency (C5-C9)
- SLE

Gonococcal arthritis

- Tenosynovitis, rash, polyarthralgia
  - Wrist, finger, ankle, toe
  - Painless pustules or vesicles***
  - Fever and malaise
  - Synovial cultures usually negative—urethral and cervical cultures may be helpful
- Purulent arthritis
  - Knee, wrist, or ankle most common
  - Synovial cultures usually positive
- These two presentations may overlap



Gonococcal arthritis
Other considerations

- Consider screening/treating for chlamydia
- HIV testing
- Syphillis testing
- Screen sexual partners

Gonococcal arthritis

- Ceftriaxone 1gm IV or IM q24 hours
- Spectinomycin 2 gm IV or IM q12 hours for ceph allergic patients
- May use fluoroquinolones if susceptible

*CDC guidelines recommend treating for at least 7 days. Patients with purulent arthritis may need a longer duration of therapy.

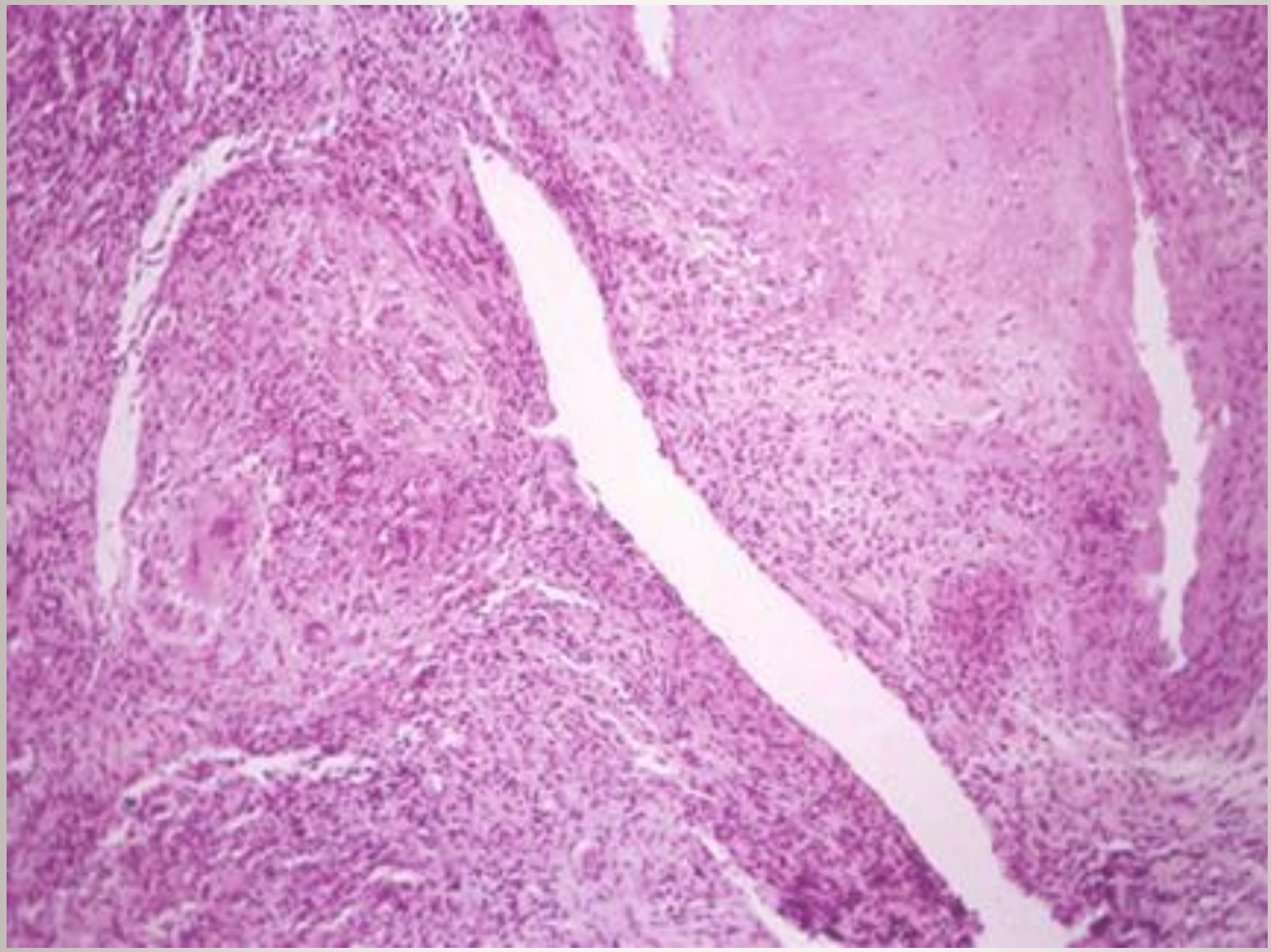
Tuberculous arthritis

- History of exposure is helpful
- PPD may be negative
- Synovial fluid stain usually negative
- Culture may take 6-8 weeks to grow
- Best yield is probably synovial biopsy

Tuberculous arthritis

- Second in frequency to vertebral infection
- Monoarticular arthritis involving large and medium joints, most commonly hip and knee
- Destruction slower than in pyogenic septic arthritis
- Diagnosis often missed or delayed, and usually requires synovial biopsy and culture

Tuberculosis Arthritis



Tuberculous synovitis

Tuberculous arthritis

- Treatment of articular TB include 6-9 months with multidrug; e.g. isoniazid (300mg) and rifampin (600mg) for one month, then isoniazid (900mg) and rifampin (600mg) twice weekly for 8 months.
- Multidrug resistant cases are becoming more common

Take Home Points

- Acute monoarthritis is septic until proven otherwise
- Synovial fluid analysis must be performed
- Choose appropriate empiric antibiotics
- Consider unusual pathogens in the setting of immunocompromised host
- Serial synovial fluid analyses should be performed to document clearance of infection
- Consult orthopedics if not improving with aggressive percutaneous drainage and antibiotics

Case

- 70 y/o female with RA being treated with MTX and Infliximab develops a slowly progressive swelling and effusion of her right knee. Plain films show articular cartilage narrowing and bony erosions. Synovial fluid WBC count is 35,000/mm^3. Routine CXR negative. What should be done next?

Question

A) Increase infliximab dose

B) Inject corticosteroid and observe response

C) Consider smear and culture of synovial fluid and synovium for mycobacterium

D) Apply tuberculin skin test

E) None of the above

Question

Which of the following statements about arthritis caused by *Neisseria gonorrhea* infection is false?

A.) *N. gonorrhea* is culture positive in fewer than 50% of cultured synovial fluid

B.) The most common cause of acute monoarthritis in sexually active adolescents is gonococcal arthritis

C.) In DGI associated with tenosynovitis, dermatitis, and polyarthralgias, *N. gonorrhea* can often be cultured from the skin lesions

D.) Empiric antibiotic therapy should include a 3rd generation cephalosporin

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