INFECTIONS OF THE BONES AND JOINTS

Malik Sallam, MD, PhD

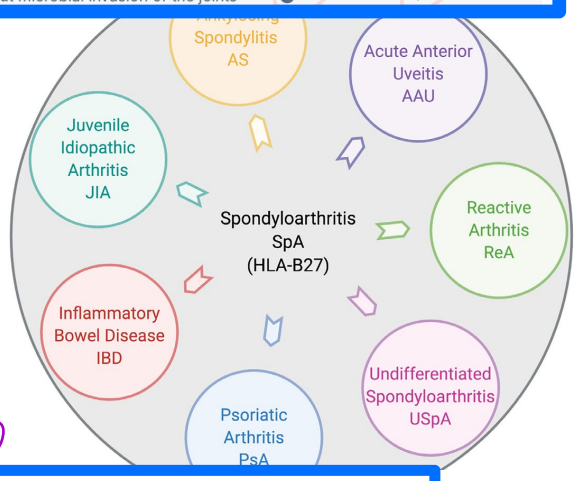
INFECTIONS OF THE BONES AND JOINTS

- Two types of arthritis are associated with microbial
  - ❖Reactive arthritis
  - ❖Septic (infectious) arthritis.
- Reactive arthritis is a **sterile** inflammation in the joint following a bacterial infection at a distant site in the body.
- Reactive arthritis (Reiter syndrome), results in urethritis, conjunctivitis, asymmetrical polyarthritis (e.g., ankles, knees, feet, and sacroiliitis), and a rash that occurs weeks after a bacterial infection.
- The most common cause of this type of arthritis is *Chlamydia trachomatis*. However, *Campylobacter jejuni*, *Yersinia enterocolitica*, *Shigella* or *Salmonella*, and *Streptococ* cause reactive arthritis.
- It occurs more commonly in patients with **HLA-B27**.

the infection happened away from the injury site. (no microbs in the joint itself)

Which of the following statements best describes why reactive arthritis is considered a sterile condition in spite of its association with pathogens?

Choice	Correct answer	Attempt answer
Its exclusive association with virus infections		
The condition affects joints only in immunocompromized individuals		
The joint inflammation occurs without microbial invasion of the joints	✓	✓



The most common pathogen implicated in reactive arthritis is

Choice	Correct answer	Attempt answer
Chlamydia trachomatis	✓	✓
Campylobacter jejuni		
Yersinia enterocolitica		
Shigella		
Salmonella		
Streptococcus		

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ETIOLOGY OF OSTEOMYELITIS

Profile	Common causes
Hematogenous	Usually only one organism
Infants	S. aureus, S. agalactiae (group B Streptococcus), E. coli
Children (1–16 years)	S. aureus, S. pyogenes (group A Streptococcus), H. influenzae
>16 years	coli,
Contiguous spread	
Diabetic foot	Proteus

Which of the following pathogen profiles is most likely to be implicated in osteomyelitis in a 4-month-old infant?

Choice	Correct answer	Attempt answer
Streptococcus pyogenes, Haemophilus influenzae, Staphylococcus aureus		
Staphylococcus aureus, Streptococcus agalactiae, Escherichia coli	✓	✓
Serratia marcescens, Staphylococcus epidermidis, Staphylococcus aureus		
Proteus mirabilis, Bacteroides fragilis, Peptostreptococcus		
Staphylococcus aureus, Campylobacter jejuni, Salmonella enterica		

ETIOLOGY OF OSTEOMYELITIS

Profile	Common causes
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Infants	
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>16 years	ds (e.g., E coli,
Contiguous spread	
Diabetic foot	S. aureus, Streptococcus, Enterococcus, gram-negative rods (e.g., Proteus mirabilis, Pseudomonas), anaerobes (e.g., Prevotella, Bacteroides, Fusobacterium, Peptostreptococcus)

A 77-year-old male diabetic patient presented with osteomyelitis of the foot and has a history of uncontrolled diabetes. Which of the following organisms is least likely to be involved in this case of diabetic foot osteomyelitis?

Choice	Correct answer	Attempt answer
Pseudomonas aeruginosa		
Staphylococcus aureus		
Prevotella species		
Haemophilus influenzae	✓	✓
Peptostreptococcus		

A 35-year-old intravenous drug user presents with fever and neck pain. Imaging reveals osteomyelitis of the cervical spine. Which of the following is the most likely microbial etiology in this case?

Choice	Correct answer	Attempt answer
Contamination from athletic footwear with Staphylococcus aureus colonization and infection		
Bacteremia in intravenous drug use favors seeding of cervical vertebrae with Pseudomonas aeruginosa	✓	✓
Peripheral vascular disease in intravenous drug users leads to anaerobic bone infections		
Repeated injections increase local joint infections with Coagulase-negative Staphylococci		
Intravenous drug user often acquire fungal osteomyelitis due to contaminated syringes		

OSTEOMYELITIS

- Some patients are more likely to develop a particular bacterial osteomyelitis because of their predisposition to certain factors/behaviors.
- IDUs are more likely to acquire P. aeruginosa infections of the cervical vertebrae.
- Athletic shoes are more likely to harbor increased numbers of P. aeruginosa and S aureus. Therefore, puncture wounds to the feet of persons wearing these shoes are more likely to result in infections due to P aeruginosa or S aureus.
- Diabetic patients with peripheral vascular disease can develop OM as mentioned earlier.
- Osteomyelitis in patients with sickle cell disease is most likely due to S aureus and Salmonella.
- Infections of prosthetic joints are most commonly due to CoNS (e.g., S epidermidis); the second most common cause of these infections is S aureus.

OSTEOMYELITIS – DIAGNOSIS

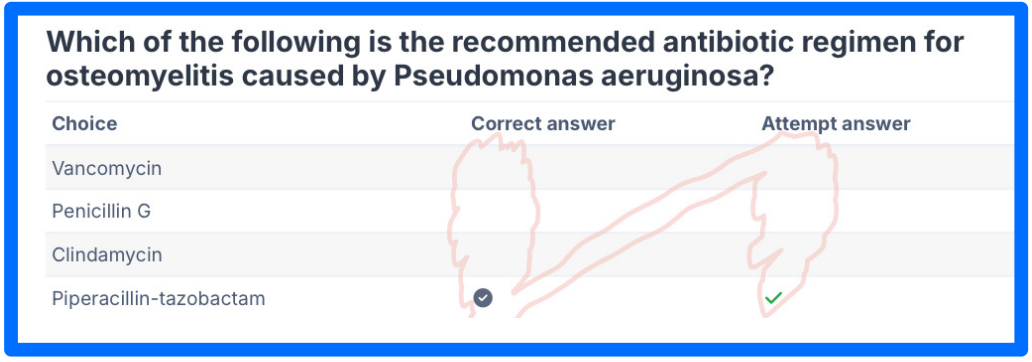
- ESR & CRP: Elevated in both acute and chronic cases
- Magnetic resonance imaging (MRI) is the imaging modality with greatest sensitivity for diagnosing osteomyelitis
- The preferred diagnostic criterion for osteomyelitis is a positive bacterial culture from bone biopsy, but clinical, laboratory, and radiographic findings can also inform a clinical diagnosis.

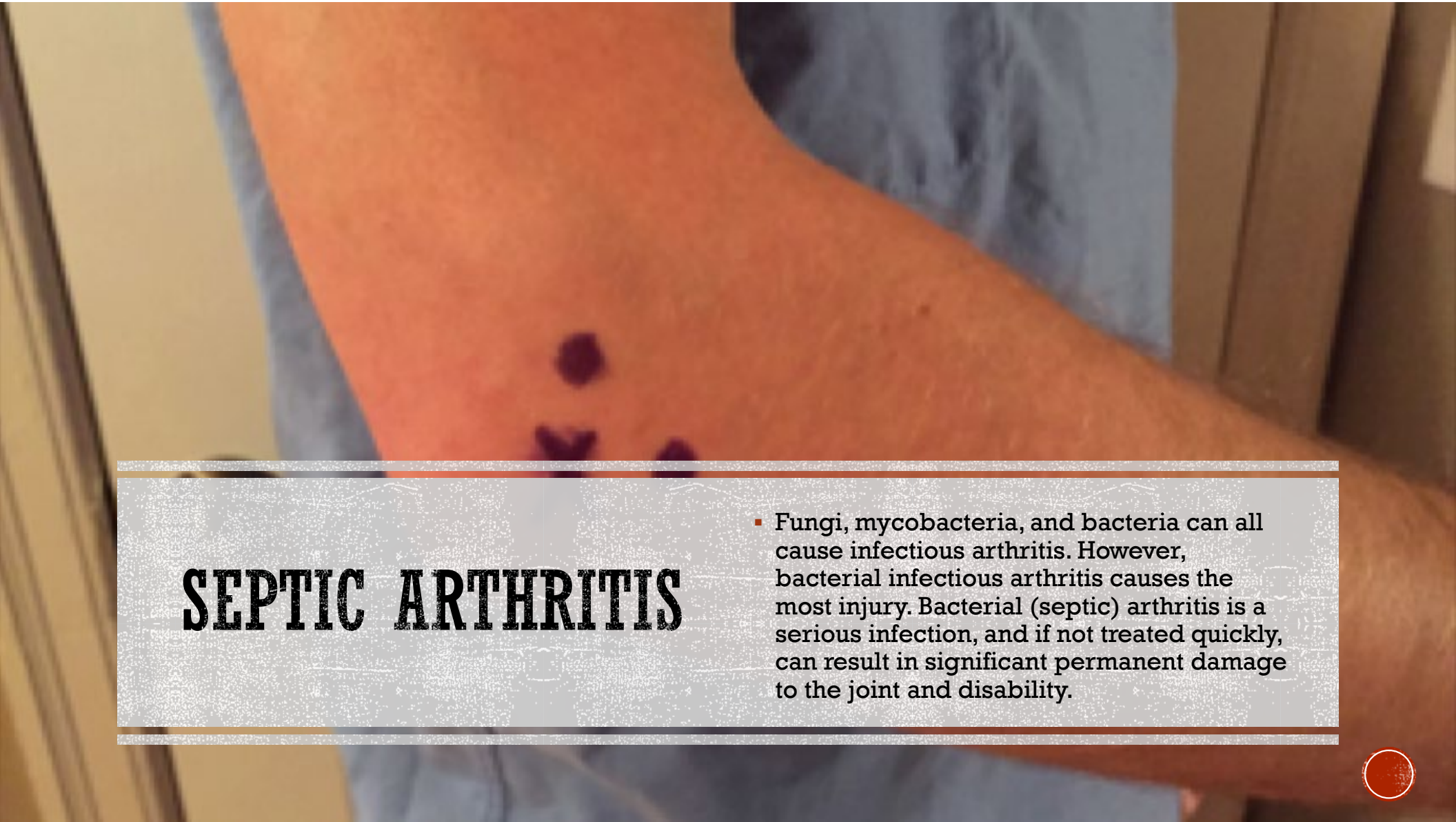
Which imaging modality is the most sensitive for the early detection of osteomyelitis?

Choice	Correct answer	Attempt answer
Ultrasound		
Plain radiograph		
CT scan		
Bone scan		
MRI	✓	✓

OSTEOMYELITIS – TREATMENT

- **Antibiotic therapy**
- Acute OM: 4–6 weeks of antibiotics; surgery usually not needed
- Chronic OM: Surgery usually required
- **Antibiotic by pathogen:**
- MSSA: Nafcillin or Oxacillin
- MRSA: Vancomycin
- Streptococcus spp.: Penicillin G
- Gram-negative rods: Ciprofloxacin
- Pseudomonas: Piperacillin-tazobactam + Gentamicin
- Anaerobes: Clindamycin or Metronidazole



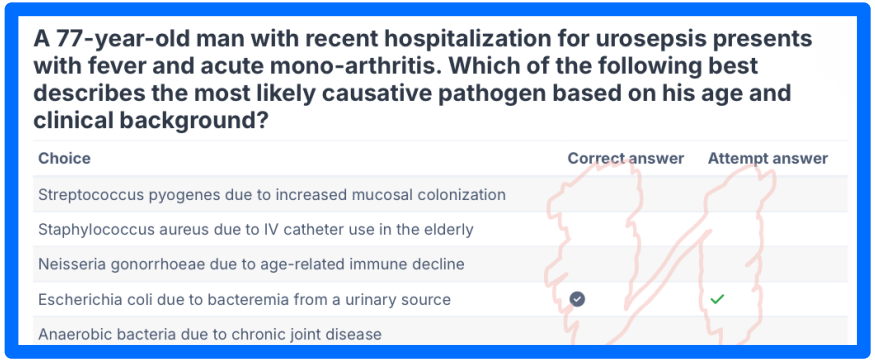


SEPTIC ARTHRITIS

- Fungi, mycobacteria, and bacteria can all cause infectious arthritis. However, bacterial infectious arthritis causes the most injury. Bacterial (septic) arthritis is a serious infection, and if not treated quickly, can result in significant permanent damage to the joint and disability.

SEPTIC ARTHRITIS – ETIOLOGY

- Most Common Causes:
- All ages: Staphylococcus aureus (most common overall)
- Young, sexually active adults: Neisseria gonorrhoeae (Gonococcal arthritis)
- Elderly: Gram-negative bacilli (e.g., E. coli, Proteus, Serratia)
- Other Pathogens:
- Streptococcus spp. (20%): S. pne
  group
- Anaerobes: Rare; usually post-tr



SEPTIC ARTHRITIS – DIAGNOSIS

- Diagnostic Workup
- Synovial Fluid Analysis (Critical Test):
- Perform: WBC count, Gram stain, and culture
- Helps distinguish: Noninflammatory, Inflammatory, Septic arthritis
- Blood cultures: Positive in many cases
- Suspected gonococcal arthritis: Collect pharyngeal, rectal, cervical, or urethral swabs
- Culture on Thayer-Martin media

A 22-year-old Australian sexually active female presented with fever, polyarthritis, and scattered pustular skin lesions. Synovial fluid analysis was negative for organisms on Gram stain and culture. Which of the following next steps is most appropriate to confirm the suspected diagnosis?

Choice	Correct answer	Attempt answer
Repeat joint aspiration and send for acid-fast bacilli staining		
Start empiric antifungal therapy and perform fungal cultures		
Obtain blood cultures and swabs from mucosal sites for culture on Thayer-Martin media	✓	✓
Perform a bone biopsy to evaluate for osteomyelitis		

SEPTIC ARTHRITIS – TREATMENT AND PREVENTION

- Nongonococcal (e.g., S. aureus, Streptococcus):
- Joint drainage & lavage (arthroscopy/surgery)
- IV antibiotics based on Gram stain/culture
- Duration: 3–4 weeks
- Poor outcomes in elderly, prosthetic joints, or preexisting joint disease
- Prevention: Prompt treatment of UTIs, SSTIs, pneumonia
- Avoid joint trauma

SEPTIC ARTHRITIS – TREATMENT AND PREVENTION

- Gonococcal (N. gonorrhoeae):
- Drain joint, then IV ceftriaxone until improvement (24–48 hrs)
- Oral antibiotics (cefixime, ciprofloxacin, etc.) to complete 7–10 days
- Residual joint damage is rare
- Prevention:
- Safe sex practices
- Identify & treat infected partners

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Choice	Correct answer	Attempt answer
Which of the following clinical findings is most characteristic of disseminated gonococcal infection in septic arthritis?		
Monoarticular arthritis with positive synovial fluid culture		
Polyarthritis with tenosynovitis and pustular skin lesions	✓	✓
Bilateral sacroiliac joint pain with high-grade fever		
Erythema migrans and arthralgia after a tick bite		

the question

THANK YOU!