

Pathology

Team 435



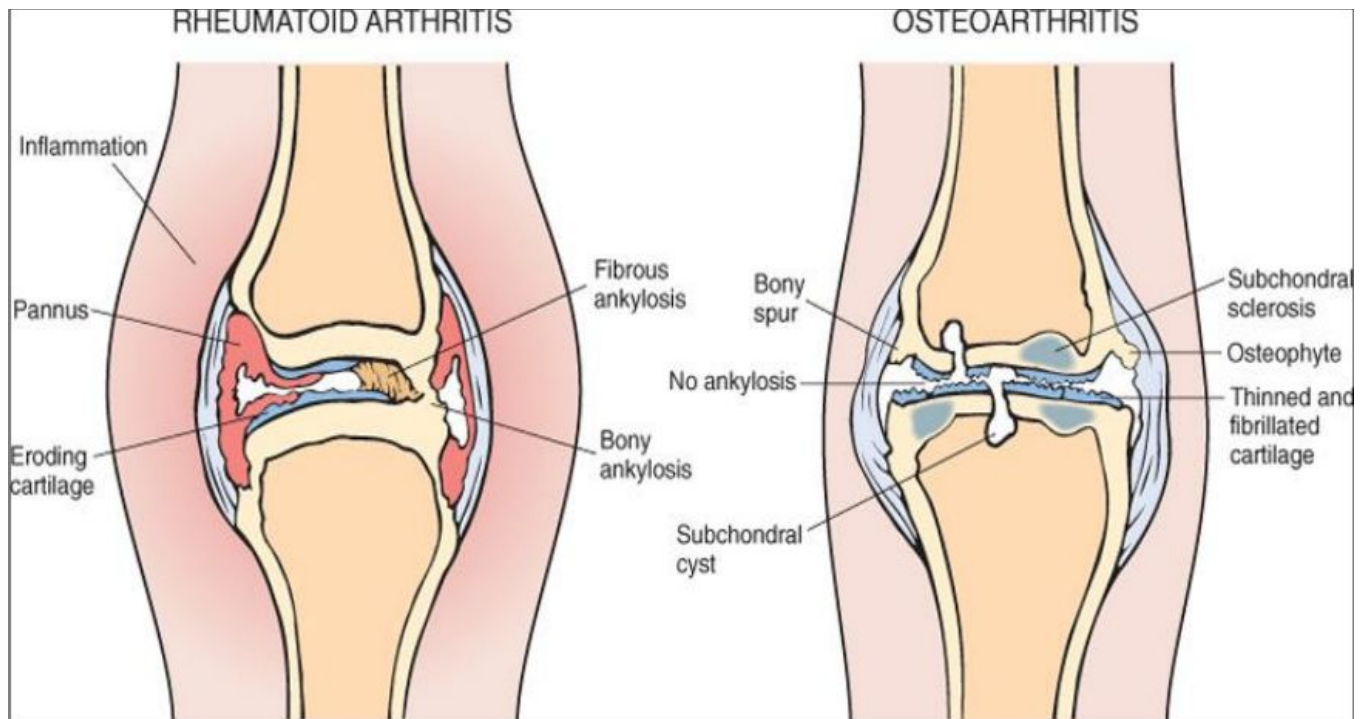
Lecture (4,5): Osteomyelitis & Arthritis

Summary & MCQs

Objectives:

- Understand the aetiology, pathogenesis, and clinical features of osteomyelitis.
- Be familiar with some of the terminology used in bone infections like: sequestrum, involucrum, Brodie abscess, and Pott's disease.
- Understand the clinicopathological features of tuberculous osteomyelitis and infective arthritis.
- Know the pathogenesis and clinicopathological features of osteoarthritis (degenerative joint disease), rheumatoid arthritis, gout, and calcium pyrophosphate arthropathy (pseudogout).

Comparison of Osteoarthritis & Rheumatoid Arthritis



	Osteoarthrosis	Rheumatoid Arthritis
Basic process	Degenerative	Immunologic, inflammatory
Site of initial lesion	Articular cartilage	Synovium
Age	50 plus	Any, but peaks at age 20–40 years
Sex	Male or female	Female > male
Joints involved	Especially knees, hips, spine; asymmetric involvement	Hands, later large joints; multiple symmetric involvement
Fingers	Herberden's nodes	Ulnar deviation, spindle swelling
Nodules	No	Rheumatoid nodules
Systemic features	None	Uveitis, pericarditis, etc.
Constitutional symptoms	None	Fever, malaise in some
Laboratory findings	None	Rheumatoid factor; ↑erythrocyte sedimentation rate; anemia, leukocytosis, hyperglobulinemia
Joint fluid	Clear, normally viscous; no inflammatory cells	Clear; low viscosity, high protein; neutrophils, some lymphocytes; immunoglobulins, complement, rheumatoid factor

Arthritis	Osteoarthritis	Rheumatoid arthritis	Septic Arthritis
Definition	Sometimes called degenerative joint disease or degenerative arthritis, osteoarthritis (OA) is the most common chronic condition of the joints	Autoimmune disease in which the body's immune system mistakenly attacks the joints. This creates inflammation that causes the tissue that lines the inside of joints (the synovium)	Suppurative: An inflammation which occurs in the joints that can cause rapid joint destruction and permanent deformities Lyme: Cross-reactive immune responses to systemic infections that can lead to joint inflammation and injury.
Type of disease	Degenerative arthritis	Chronic inflammatory Autoimmune arthritis	Inflammatory, infectious.
Caused by	1- Primary: due to aging "Wear and Tear". 2- Secondary: operation or previous infection or other metabolic or congenital diseases and obesity	Abnormal response of the immune system plays a leading role in the inflammation and joint damage that occurs.	- Suppurative: bacteria - Lyme: Infection with the spirochete.
Symptoms	<ul style="list-style-type: none"> Limited range of motion or stiffness that goes away after movement. Clicking or cracking sound when a joint bends. Mild swelling around a joint. Pain that is worse after activity or toward the end of the day. 	<ul style="list-style-type: none"> Joint pain, tenderness, swelling or stiffness for six weeks or longer. Morning stiffness for 30 minutes or longer. More than one joint is affected. Small joints (wrists, certain joints of the hands and feet) are affected. The same joints on both sides of the body are affected 	<ul style="list-style-type: none"> Suppurative: Affects small joints. Sudden pain. Redness Swelling of the joint Restricted range of motion. Fever, leukocytosis, and elevated erythrocyte sedimentation rate. Lyme: Affects large joints. May cause chronic arthritis
Most common features	1- Occur in woman above the age of 50. 2- Pain after movements.	1- Occur in female at the age of 20-40. 2- Pain at rest "morning stiffness".	Caused by microorganisms
Inflammation	NO INFLAMMATION OR MILD in the synovium.	CHRONIC inflammation.	-
Investigations	<ul style="list-style-type: none"> X-Rays. Joint aspiration. Physical examination. 	<ul style="list-style-type: none"> ESR. C-reactive protein. Rheumatoid factor. CCP – most specific. 	-
Treatment	<ul style="list-style-type: none"> Joint replacement surgery Physical activity Weight management 	<ul style="list-style-type: none"> Stop inflammation (put disease in remission) Relieve symptoms Prevent joint and organ damage Improve physical function and overall well-being Reduce long-term complications 	-

Arthritis	GOUT	PSEUDOGOUT
Definition	A disease in which defective metabolism of uric acid causes arthritis, especially in the smaller bones of the feet, deposition of chalkstones, and episodes of acute pain.	Deposition of calcium pyrophosphate crystals in the synovium (pseudogout) and articular cartilage (chondrocalcinosis)
Type of disease	Inflammatory disease	Inflammatory disease
Caused by	<ul style="list-style-type: none"> • Primary cause. • Secondary cause. 	Deposition of crystals in cartilage.
Symptoms	Pain in the metatarsophalangeal joint.	<ol style="list-style-type: none"> 1. Sporadic (more common in the elderly). 2. Hereditary. 3. Secondary to other conditions, such as: <ul style="list-style-type: none"> • Previous joint damage. • Hyperparathyroidism. • Hypothyroidism. • Haemochromatosis. • Diabetes.
Most common features	<ul style="list-style-type: none"> • Occur in middle age to old males. • SEVERE pain 	<ul style="list-style-type: none"> • Common in old people (over 50) • Mimics gout. • Acute Arthritis.
Inflammation	Accumulating of crystals	Accumulating of crystals
Investigations	<ul style="list-style-type: none"> • Blood test. • X-rays. • Ultrasound. • Joint fluid test. 	<ul style="list-style-type: none"> • X-rays. • Fresh tissue. • Aspiration.
Treatment	<ul style="list-style-type: none"> • Nonsteroidal anti-inflammatory drugs (NSAIDs). • Colchicine. • Corticosteroids. 	Prevention of uric acid formation from starting.

SUMMARY OF ARTHRITIS:

- Osteoarthritis (degenerative joint disease) is by far the most common joint disease; it is primarily a degenerative disorder of articular cartilage in which matrix breakdown exceeds synthesis. Inflammation is secondary. The vast majority of cases occur without apparent precipitating cause except increasing age. Local production of proinflammatory cytokines and other mediators (IL-1, TNF, nitric oxide) may contribute to the progression of the joint degeneration. □
- Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease that affects mainly the joints, especially small joints, but can affect multiple tissues. RA is caused by an autoimmune response against self-antigen(s) such as citrullinated proteins, which leads to T cell reactions in the joint with production of cytokines that activate phagocytes that damage tissues and stimulate proliferation of synovial cells (synovitis). The cytokine TNF plays a central role, and antagonists against TNF are of great clinical benefit. Antibodies may also contribute to the disease. □
- Gout and pseudogout. Increased circulating levels of uric acid (gout) or calcium pyrophosphate (pseudogout) can lead to crystal deposition in the joint space. Resulting inflammatory cell recruitment and activation lead to cartilage degradation, fibrosis, and arthritis □
- Either direct infection of a joint space (suppurative arthritis) or cross-reactive immune responses to systemic infections (e.g., in some cases of Lyme arthritis) can lead to joint inflammation and injury. □

Check your understanding:

1. Acute osteomyelitis is most commonly caused by *Staphylococcus aureus*:
 - A. True
 - B. False
2. Rheumatoid arthritis is usually associated with a negative test for the rheumatoid factor during the active phase of the disease:
 - A. True
 - B. False
3. Acute osteomyelitis is not associated with subperiosteal abscesses:
 - A. True
 - B. False
4. Rheumatoid arthritis is associated with rheumatoid nodules in nearly all cases:
 - A. True
 - B. False
5. Acute osteomyelitis may be complicated by septicaemia:
 - A. True
 - B. False
6. Rheumatoid arthritis gives rise to _____ deviation of the fingers.
 - A. Ulnar
 - B. Radial
 - C. Humeral
 - D. None of the above
7. Acute osteomyelitis may result in the formation of:
 - A. Sequestrum
 - B. Involucrum
 - C. Both A & B
 - D. None of the above
8. Rheumatoid arthritis usually has a microscopic appearance of villous hypertrophy of the synovium with inflammatory cells
 - A. True
 - B. False
9. What is the most common organism that causes hematogenous osteomyelitis?
 - A. *Pseudomonas aeruginosa*
 - B. *Staphylococcus aureus*
 - C. Group B streptococcus

10. What is the most common organism that causes adult nongonococcal bacterial arthritis?
- A. *S. aureus*
 - B. *P. aeruginosa*
 - C. *Escherichia coli*
11. Infections in the bone can be secondary to :
- A. Bacteremia
 - B. Skin and soft tissue infections
 - C. Trauma or surgical procedures
 - D. All of the above
12. People with Sickle cell anemia may develop Arthritis by unusual bacteria like:
- A. *Streptococci aureus*
 - B. *Salmonella*
 - C. *E.coli*
 - D. T.B
13. Solid joints are:
- A. Fixed
 - B. Rigid
 - C. None of the above
 - D. Both A and B
14. An example of a solid joint is:
- A. The shoulder joint
 - B. The ankle joint
 - C. The symphysis pubis
 - D. The interphalangeal joint
15. Synovial joints allow for
- A. Minimal movement
 - B. A wide range of movement
 - C. No movement at all
 - D. Restricted movement
16. A joint is an area where two or more bones connect
- A. True
 - B. False
17. The articular cartilage of synovial joints are specialized hyaline cartilage:
- A. True
 - B. False
18. The most common cause for osteomyelitis is viruses:
- A. True
 - B. False

19. What do we call a dead piece of bone?
- A. Involucrum
 - B. Sequestrum
 - C. Periosteum
 - D. Epiphysis
20. Where does osteomyelitis usually occur in **adults**?
- A. Epiphysis
 - B. Metaphysis
 - C. Diaphysis
 - D. Epiphyseal plate
21. In chronic osteomyelitis, a rim of viable new bone formed around the sequestrum and below the periosteum is called:
- A. Epiphysis
 - B. Sequestrum
 - C. Periosteum
 - D. Involucrum
22. Formation of drainage sinuses in **osteomyelitis** usually occurs because of rupture of the dead periosteum:
- A. True
 - B. False
23. Where does osteomyelitis usually occur in **infants** (less than a year)?
- A. Diaphysis
 - B. Metaphysis
 - C. Epiphysis
 - D. Epiphyseal plate
24. Heberden's node usually affect:
- A. Lumbar spine
 - B. Proximal interphalangeal joints
 - C. Symmetrical small joints
 - D. Distal interphalangeal joints
25. All of the following are inflammatory arthritis except:
- A. Rheumatoid Arthritis
 - B. Osteoarthritis
 - C. Gouty arthritis
 - D. Osteomyelitis
26. Which part of a joint does osteoarthritis usually affect :
- A. Bone
 - B. Cartilage
 - C. Tendon
 - D. All above

27. Which of these is the best treatment for osteoarthritis:
- A. Exercise
 - B. Bed rest
 - C. Cast
 - D. None of the above
28. Rheumatoid arthritis affects about 3% of the female population in Britain
- A. True
 - B. False

Answer key:

- | | |
|-------|-------|
| 1. A | 15. B |
| 2. B | 16. A |
| 3. B | 17. A |
| 4. B | 18. B |
| 5. A | 19. B |
| 6. A | 20. C |
| 7. C | 21. D |
| 8. A | 22. A |
| 9. B | 23. C |
| 10. A | 24. D |
| 11. D | 25. B |
| 12. B | 26. B |
| 13. D | 27. A |
| 14. C | 28. A |

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