Musculoskeletal System Disorders

Clinical Medicine

Flashcards

Clinical Clues to Diagnosis Pathophysiology

RISHACADEMY educate yourself to empower yourself

www.rishacademy.com

- Compartment Syndrome
- Fracture
- Gouty Arthritis
- Herniated Nucleus Pulposus
- Osteoarthritis
- Osteomalacia
- Osteomyelitis
- Osteoporosis
- Paget's Disease
- Rheumatoid Arthritis
- Sprain
- Total Joint Replacement

1 Compartment Syndrome

- Neurovascular assessment of injured area usually by crush injury or fracture
- Severe pain
- Pallor
- Pulselessnessa
- Paresthesi
- Paralysis
- Coolness to the touch.

- In a traumatic injury (e.g., fractures caused by automobile accident or crush injury), soft tissue swelling occurs. The soft tissue in this case is the muscle. Every muscle compartment is surrounded by connective tissue called fascia.
- Fascia compresses the swelling tissue, causing loss of vascularity to tissue and nerves. The muscle tissue is essentially being strangled in its own covering.
- Less problematic compartment syndrome is seen in exertional compartment syndrome and stress fracture.

2 Fracture

- Tenderness, pain, or deformity over an area of injury
- Crepitation may be heard or felt
- Range of motion is decreased

- Healthy bone is living tissue that is dynamic in nature. Osteoclasts resorb bone, while osteoblasts lay down new bone. In this way, healthy bone is always remodeled.
- A fracture is a disruption in the bone structure caused by trauma or pathology.
- Closed fractures do not disrupt the integrity of the skin; open fractures are called compound because they break through the skin as well as disrupt the integrity of the bone.
- Fracture types are comminuted, impacted, greenstick, oblique, longitudinal, and transverse.
- Fractures heal by forming a blood clot at the site and attracting cells to the site. The fracture site is known as a callus at week 1, and by week 6, osteoclasts have resorbed dead bone and osteoblasts have remodeled the site. Complete healing is usually in 1 year.

3 Gouty Arthritis

Acute pain and swelling in a joint, usually the great toe (unilaterally).
High serum uric acid levels.

Pathophysiology

In gouty arthritis, uric acid crystals are deposited in the joints and other connective tissues. The concentration in synovial fluid is higher than in plasma, so the crystals cause excessive inflammation in the joint. Joints affected are usually those at the distal area of the body, as uric acid crystals are affected by gravity. Called "the rich man's disease" because many of the foods that contain purines are considered those consumed by the wealthy.

Herniated Nucleus Pulposus

4

- Pain and numbress in the arm
- Headaches on the affected side (cervical)
 Pain and numbness radiating down the sciatic nerve in the leg (lumbar)

- The vertebrae have cushions or intervertebral disks between them to absorb shock and to keep the nerve roots away from the boney areas.
- Disks can herniate out of the normal position, and the annulus fibrosus tears. The inner portion (nucleus pulposus) pushes outward and places pressure on a nerve root.
- The most common sites are the cervical and lumbar areas.

5 Osteoarthritis

 Pain and stiffness in the weightbearing joints and the vertebral column due to wear and tear or obesity.

- The matrix of cartilage is composed of chondrocytes imbedded in proteoglycan molecules, which are large and osmotic, drawing fresh synovial fluid into the joint.
 - With excess wear and tear, the chondrocytes become inflamed and release inflammatory mediators (cytokines), causing a cascade of events that includes formation of protease, which break down the proteoglycan molecules. Eventually, the cartilage becomes worn and misshaped. Streaks and dents in the cartilage become cracks. Synovial fluid leaks into the underlying bone, causing cysts. The underlying layer of the cartilage can no longer be an effective shock absorber. Bone spurs form.

6 Osteomalacia

- Softening of bone causing bowed legs in children and soft or brittle bones in adults.
- Bone pain is often present with muscle weakness.

- Bone mineralization is diminished because of lack of calcium or vitamin D.
- Vitamin D absorbed by exposure of the skin to sunlight must be activated by two organs, first the liver and then the kidney. Any disorders of these organs decreases vitamin D availability.
- The disease is more prevalent in women because of their increased need for calcium.
- Osteomalacia is seen more frequently in persons with low sun exposure.

7 Osteomyelitis

- Increased temperature with pain and inflammation over the affected bone
- Elevated WBC and ESR.
 Bone biopsy positive for infection.

- Bone infection with microorganisms that can occur in compound fracture as well as in surgical intervention (direct inoculation), spread from surrounding tissue (e.g., cellulitis [contiguous spread]), and infection of the bone from sepsis (hematogenesis).
- When the bone becomes infected, the inflamed area forms an abscess that impairs blood flow to the intramedullary area. Bone death occurs, the periosteum peels away from the ostium, and dead bone (sequestrum) forms. The sequestrum can fall from the bone, causing more pressure and decreased blood flow to other boney areas.
- Sinuses commonly form that allow pus and debris to escape from the bone to the outer skin.

8 Osteoporosis

 Loss of bone density (by DEXA scan) seen mainly in females who weigh less than 140 lb at menopause and have never used estrogen-replacement therapy.

The mnemonic is ABONE
 (A = age, B = bulk, ONE = one never on estrogen).

- Healthy bone is living tissue that is dynamic in nature. Osteoclasts resorb bone, while osteoblasts lay down new bone. In this way, healthy bone is always remodeled. Bone remodeling occurs under the influence of hormones and from normal body movement and weight-bearing activities.
- At menopause, estrogen withdrawal causes inflammatory mediators and immune cells that encourage the differentiation of osteoclasts and increase their life span. Osteoblasts, or bone creators, are less active.
- As osteoporosis progresses, this trabecular framework is diminished and may be totally resorbed. Bone density decreases.

9 Paget's Disease

- Enlarged bone mass & deformity of the femur, skull, vertebrae, or pelvis Usually in older adults Increased serum ALP, Increased urine hydroxyproline (measured by pyrilinks and osteomark)
- Increased urine and serum calcium.

- A disease of older adults in which osteoclastic activity is followed by an exaggerated response by osteoblasts resulting in enlargement of bone.
- There are three phases: (1) the active phase (reabsorption); (2) the mixed phase (osteoblast activity); and (3) the inactive phase, in which the osteoblastic phase has exceeded the osteoclastic activity.
- Increased vasculature around the bones.
- The femur, skull, vertebrae, and pelvis are most often affected.

10 Rheumatoid Arthritis

- Swan neck deformity or ulnar deviation of the metacarpophalangeal joints.
 Fatigue, flu-like symptoms may accompany exacerbations of
- The disease
- Elevated ESR
- RF & CCP antibodies
 - present

- Rheumatoid arthritis is a systemic disease known to be genetic and autoimmune in nature. Women are affected more than men.
- Rheumatoid factor (RF) antibodies react with IgG, forming immune complexes in the body and in the synovial joints.
- Granulocytes phagocytize the immune complexes and release toxins into the tissue and into the joints.
- Synovitis occurs as well as increased formation of blood vessels in the synovial walls, which contributes to production of vascular pannus.
- The area of inflammation is "walled off" in an attempt to heal injured tissue causing more immobility and destruction.

11 Sprain

- Pain,
- Swelling &
- Heat
- Around a recently injured joint
- Usually the ankle.

- The ligaments, the strong connective tissue bands that secure bone to bone, are affected. The most likely joint is the ankle.
- The ligaments may be slightly torn or completely torn with disconnection from and a piece of the bone attached to the torn ligament.

12 Total Joint Replacement

 Replacement of the femoral head and placement of an acetabular cup (THR) (hip), or replacement of the femoral and tibial ends of the knee by metal and the knee cap by a button (TKR).

Pathophysiology

 Persons with problems like chronic osteoarthritis pain, avascular necrosis of the femoral head, or systemic lupus erythematosus (SLE) cannot perform activities of daily living (ADLs) and require the joint be replaced by prosthetic devices.