OSTEOARTHRITIS (OA)

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Signs & Symptoms

- Pain: Affecting joints and acute pain during or after joint movements.
- Stiffness: Joint and muscle stiffness after periods of inactivity or upon awakening.
- Swelling: Soft tissue inflammation around joints.
- Symptomatic: In advanced stages
- Loss of Flexibility or Motion: Unable to move joints through full range of motion.
- Tenderness: Light pressure or tenderness near the inflamed joint.
- Bone Spurs: Hard lumps can form around the joint and cause pressure.
- Grating Sensation: During joint movements may experience a popping or cracking sensation.

Underlying Pathophysiology

(Primary idiopathic vs. Secondary-trauma or mechanical misalignment)
- Multifactorial, not just a degenerative disease of cartilage
- Involves: trauma, mechanical factors, inflammation, biochemical changes, metabolic derangements
- Cartilage is not vascular or innervated, alone will not cause pain
- Pain from the joint capsule, synovium, subchondral bone, ligaments, periarticular muscles
- As disease progresses the non-cartilaginous components are affected:
  - bone remodeling
  - osteophyte formation
  - weakening of periarticular muscles
  - loss of ligaments
  - synovial membrane and synovial fluid
- Chronic, low-grade inflammation, innate immune/inflammatory mechanisms
- Synovial fluid contains inflammatory mediators including:
  - Plasma proteins (intra-articular protein synovial fluid)
  - Prostaglandins (PG2)
  - Leukotrienes (LXB4)
  - Cytokines (TNF-α, IL-1α, IL-1β, IL-17, IL-18, IL-21)
- Growth factors (TGF-β, FGFs, VEGFs, NGF)
- Nitric oxide
- Complement components
- These mediators induce matrix metalloproteinases and hydrolytic enzymes that breakdown cartilage and proteoglycans and collagen destruction. WBC molecules are released from the breakdown of extracellular matrix repressed by the innate immune cells (macrophages and mast cells). Osteoarthritis and the Role of Synoviocytes as Biological Key. Retained 06811.html
- Neuroanatomy of knee joint
- Early onset- “sharp”
- Later stages- chronic- “dull/achy”
- Neuronal pain of knee joint
- Sensory and sympathetic peripheral nerves fibers innervate
- Sensory cell bodies located in the dorsal root ganglion L5-S1
- Tissue injury/remodeling characteristics, molecules existing nociceptors
- Classic molecules- pro-inflammatory, bradykinin, prostaglandin
- Additional molecules-cytokines, chemokines
- Education
- Vitamin D (vitamin, glucosamine sulfate, phytochemicals)
- Pharmacological (support groups, psychologist, meditation, holistic medicine)
- Psychological (cognitive behavior therapy, exercise therapy, occupational therapy)
- Nutritional (dietary phytochemicals from foods. Nutrients, 222, 35-43; doi:10.1007/s00026-016.2015-0.0055

Introduction

Osteoarthritis (OA) is the joint health problem affecting 25% of adults. OA is one of the main contributors to disability in our society. (Mora, Przkora, & Cruz-Almeida, 2018)

Significance of Pathophysiology

Understanding the underlying cause is key for preventing, slowing the progression of, and developing the best treatment plan. Exercise has been proven to decrease pain and morbidity in OA patients. “Exercise is safe for those with knee, hand, and facet joints in OA. In addition, exercise has been shown to decrease pain...” (Blas, 2019)

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Implications for Nursing Care

- Risk factors
  - Age
  - Prior joint injury
  - Obesity
  - Genetics
  - Gender
  - African American
- Chief complaint/Pain
  - Early onset- “sharp”
  - Later stages- chronic- “dull/achy”
  - Neuroanatomy of knee joint
  - Sensory and sympathetic peripheral nerves fibers innervate
  - Sensory cell bodies located in the dorsal root ganglion L3-S1
  - Tissue injury/remodeling characteristics, molecules existing nociceptors
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Conclusion

30 million adults in the U.S. are affected by OA. Prevention, delay of progression and suppression of symptoms are multifactorial and vary from individual to individual. In general, maintaining a healthy diet, taking vitamins and low-impact regular exercise are big contributors to slowing the progression, decreasing the risk of OA. There are many innovative treatment options available to manage pain to optimize quality of life.

Asthma and rhinitis are associated with lack of TGF-beta in mice who lack TGF-beta, however more research is needed.

References


Osteoarthritis (OA)