Osteoarthritis

A PowerPage Presented By

In recent years, owners and veterinarians have become increasingly aware of osteoarthritis (OA), and many new treatments have been introduced into the market. As in humans, management of osteoarthritis is primarily medical. It is important to be able to recognize signs of OA, the common medications used for OA, and to be able to provide an appropriate treatment regimen for your patients with osteoarthritis.

Key Points

- Progressive, chronic disease
- Seen in all animals but most importantly in dogs and horses
- Steroids are contraindicated
- Selective inhibition of Cox-2 receptors with NSAIDS is mainstay of medical management

Characteristics of Osteoarthritis

- Epidemiology
  - Estimated that 20% of adult dogs have arthritis
- Clinical characteristics
  - Joint pain, lameness
    - May occur with prolonged or certain activities
  - Limitation of movement, decreased range of motion
  - Joint effusion
  - Local inflammation
  - Altered joint fluid
    - Reduced proteoglycan concentration in cartilage
    - Alterations in size and aggregation of proteoglycans
    - Increased water content
    - Imbalance in the synthesis and degradation of matrix macromolecules
  - Bone and cartilage changes
    - Collagen fibril disruption
    - Loss of articular cartilage
    - Sclerosis of subchondral bone
    - Osteophytes and enthesiophytes
  - Synovial inflammation

Treatment

Conservative:

- Regular, limited exercise to develop muscle mass
- Maintain lean and appropriate body weight

Medical Treatment:

- NSAIDS
  - Inhibition of cyclooxygenase

        - Decreases the production of proinflammatory prostaglandins as well as inhibition of spinal cyclooxygenase activity
        - Prevents sensitization and stimulation of peripheral nociceptors
    - Cox-2 is primarily responsible for prostaglandins associated with pain and inflammation
        - Inhibition of Cox-2 is the mainstay of medical management
    - GI toxicity is greatest concern
        - Due to decreased protective prostaglandins
        - Can cause life-threatening perforating GI ulcerations
            - Risk is increased dramatically by concurrent administration of multiple NSAIDs or an NSAID and a corticosteroid
            - Concurrent corticosteroid and NSAID administration is contraindicated for this reason
    - Common NSAIDs used in small animals:
        - All work via inhibition of either COX-2 alone or both COX-2 and COX-1. Inhibition of COX-1 is thought to be associated with unwanted side effects
            - Carprofen (Rimadyl®)
            - Firocoxib (Previcox®)
            - Deracoxib (Deramaxx®)
            - Meloxicam (Metacam®)
            - Feldene (Piroxicam®)
            - Etodolac (Etogesic®)
            - Tepoxalin (Zubrin®)
- Corticosteroids
    - If delivered into joint, can inhibit production of matrix metalloproteinase activators like plasminogen activator or plasmin
    - Inhibit proinflammatory cytokine production by synovial lining cells
        - Interleukin 1 and TNF alpha
    - Also may inhibit proteoglycan and collagen synthesis resulting in changes to articular cartilage
    - Chronic administration may result in thinning of cartilage and fibrillation
    - **Bottom line:** Not the best choice for treatment of osteoarthritis and should never be given at the same time as an NSAID!
- Glucosamine and Chondroitin Sulfate
    - Common veterinary formulation is Cosequin®
        - Contains purified glucosamine, chondroitin sulfate, and manganese ascorbate
        - Glucosamine and chondroitin may provide precursors for synthesis of hyaline cartilage matrix. Glucosamine is necessary for synthesis of glycosaminoglycans
        - Manganese is a cofactor in the synthesis of glycosaminoglycans
- Polysulfated Glycosaminoglycan (Adequan®)
    - Mixture of highly sulfated glycosaminoglycans
    - Protective effect on cartilage homeostasis
    - May inhibit anabolic effects
- Hyaluronan- large linear glycosaminoglycan. Lubricant and shock attenuator
    - Anti-inflammatory
    - Interferes with oxygen-derived free radicals
    - Interferes with chemotaxis of inflammatory cells
    - Inhibits degradative enzymes
        - Unclear if there truly is a benefit in dogs