Osteochondrosis and Subchondral Bone Cysts

OSTEOCHONDROSIS:

Osteochondrosis (OC) is a developmental disorder that leads to failure of bone and cartilage formation (endochondral ossification). Failure of normal bone and cartilage formation results in irregularities in the thickness of cartilage at joint surfaces. This creates areas of weakness and affects the nutrition of the deeper layers of cartilage and bone and can lead to necrosis (decay). Biomechanical influences, mainly shearing forces, lead to the formation of fissures (tiny fractures) and produce cartilage flaps, or detachment of cartilage or fragments of cartilage and bone.

DIAGNOSIS:

The typical OC patient is a yearling with effusion (swelling) of the upper hock joint or stifle joint. The horse is typically not lame, and radiographs reveal a fragment on part of the tibia called the distal intermediate ridge of the tibia or irregularities of the femur at what is called the lateral trochlear ridge. However, there are many variations on this scenario and age, lameness, effusion, and the joint affected can vary. Most OC patients are juvenile with the most severe cases being seen in foals as young as 6 months of age. OC can also only manifest itself when the horse is put into training and the joint becomes challenged by activity, which varies with discipline. Radiography is the gold standard for diagnosing OC but it is not capable of detecting subtle lesions.

DISTRIBUTION OF LESIONS:

OC is most commonly diagnosed in the tarsus (hock), femoropatellar joint (stifle), and the fetlock, but it has been described in almost every synovial joint.

CAUSE OF THE DISORDER (PATHOGENESIS):

OC is a complex disease and multiple factors are involved in the progression and development of the disorder. Biomechanical influences, exercise, failure of vascularization, nutrition imbalances, and genetics have all been linked to the disease.

TREATMENT:

Treatment of lesions depends on size, clinical signs, location, and severity. Small OC lesions in very young horses where there is still good capacity for regeneration or in very mild OC cases, nonsurgical management consisting of rest, controlled exercise, systemic anti-inflammatories, and intra-articular (within the joint) medications can

be successful. Surgical management is the treatment of choice in most cases. This involves removal and debridement of the fragments from the joint via a small incision and use of an arthroscope (surgical instrument with camera).

PROGNOSIS:

The prognosis after surgical intervention varies among joints and the severity of the lesion. However, prognosis for return to athletic activity is fair to good for the majority of joints involved.

TAKE HOME:

Things to consider when trying to prevent osteochondrosis would be to avoid feeding high energy feeds to growing animals which can lead to excessive rapid growth and secondary osteochondrosis development. Breeders should monitor sires and mares suspect of yielding offspring with osteochondrosis. Any young horse with persistent joint effusion should be evaluated with radiography. Horses with OCD that are identified and treated early may be athletic; however, if left unrecognized osteoarthritis (degenerative joint changes) and lameness can develop.

SUBCHONDRAL BONE CYSTS:

Subchondral bone cysts, also known as subchondral cystic lesions (SCLs), are a serious cause of lameness and difficult to treat. They are characterized by radiolucent (darker than normal) areas of bone often accompanied by sclerosis (boney remodeling) at a joint surface. In the past, they were considered to be part of the osteochondrosis complex, however, the location of OC lesions differs from SCLs. SCLs are found underneath the cartilage in a weight-bearing area of the joint.

CAUSE OF THE DISORDER (PATHOGENESIS):

Many mechanisms have been proposed for the development of SCLs. However, only two hypotheses have been supported experimentally. The first hypothesis is based on the hydraulic theory in which there is primary cartilage damage followed by secondary intrusion of synovial fluid. The fluid is thought to place mechanical pressure on the subchondral bone through its hydraulic action during weight bearing, resulting in necrosis of the subchondral bone plate. The second hypothesis is the inflammatory theory in which various inflammatory mediators become upregulated (increased) leading to the development of cysts.

DISTRIBUTION OF LESIONS:

SCLs occur mainly in the stifle (medial femoral condyle) and the phalanges (fetlock, pastern, coffin bone, and navicular bone) and less commonly in the carpus (knee), cannon bones, tibia, radius, talus (hock), proximal sesamoid bones, humerus, patella, scapula, and mandible. 62 % of lesions occur in males and Thoroughbreds represent the majority of affected animals.

CLINICAL SIGNS:

Horses often present with lameness in the affected limb with or without joint effusion (swelling). SCLs occur mostly in young horses between the ages of 1 and three years and lameness commonly occurs at the onset of training.

DIAGNOSIS:

Diagnosis is made via lameness examinations and radiographs. In rare cases, computed tomography, CT, has been of great value when SCLs cannot be visualized radiographically.

MANAGEMENT:

Nonsurgical management of SCLs involves rest and the use of non-steroidal anti-inflammatory drugs; however, success rate is variable. Intralesional corticosteroid injections do have better success rates but this is generally performed under arthroscopic guidance under general anesthesia. Surgical management is the treatment of choice and involves debridement of the cyst and a combination of intralesional corticosteroid injection, bone grafts, and other modalities.

PROGNOSIS:

The healing of treated SCL normally is slow and can take several months to years if just surgical debridement is used, but the use of bone replacements and growth factors to enhance bone healing shortens the healing time considerably. Younger horses have a better prognosis for complete recovery compared to older horses. If the SCLs are associated with osteoarthritis in older patients a cautious prognosis is given.

REFERENCES:

1.) Auer and Stick. Equine Surgery, 4th edition. Chapters 88 and 89.