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Subchondral bone cysts are a well recognized source of equine lameness and have discreet anatomic predilection sites. Although there is some debate about the pathogenesis of these lesions, most cysts develop in young horses during maturation and therefore are categorized as part of the Developmental Orthopedic Disease (DOD) complex. Since the cysts develop in the subchondral bone adjacent to the articular cartilage and most have an opening into the joint, cysts are categorized as part of Osteochondrosis. It is possible to have cysts develop in older horses as part of a joint traumatic event which is associated with the development of osteoarthritis, but this is the less common form. Typically, horses with subchondral bone cysts present for lameness. Depending on the joint, effusion may be modest, but detectable and a positive response to flexion can be significant. Lameness tends to be dramatic at times and improve with rest. When the cyst is actively forming and resorbing bone, the lameness is usually greater. Inflammatory cytokines are known to be present within cystic contents and along with the increased fluid pressure during the expansive phases of cyst formation are both considered to contribute to the pain and lameness. As the cyst matures and develops a sclerotic rim of bone around the margin, the pain subsides and horses can be come sound at pasture. Once lame from a cyst, most horses will again become lame when put into competitive activities, such as racing, showing, jumping etc. The etiology of developmental cysts is presumed to be similar to all other forms of developmental orthopedic disease and be linked to defective endochondral ossification. When cartilage fails to mature into bone normally, a thickened, disorganized and disregulated cartilage remains. When this cartilage is on a weight-bearing surface, such as the medial femoral condyle, this thickened cartilage collapses on loading, cavitates and cracks resulting in exposed subchondral bone. The subchondral bone begins a resorption process due to the pressure and irritation from the synovial fluid. This process continues until the bone’s reaction to wall off the cyst is successful and limits further expansion. At this time the mature cyst may not change over the horse’s lifetime and may cause intermittent lameness associated with exercise. Subchondral bone cysts in horses occur most commonly in the medial femoral condyle, but are also well recognized (in descending order) in the M/Mt condyle, P1, P3, P2, proximal medial radius, glenoid and humeral head, carpal bones, distal radius, distal tibia. Virtually any site that is a weight-bearing site could be affected. Treatment of subchondral cysts has evolved through the phases of intra-articular injections on to surgery with augmentation of various methods of cyst bone regeneration. Decades ago, affected joints were treated with what would now be considered large doses of long-acting steroids that had met with minimal success. Horses either didn’t respond or the effect was transient. With the advent of a reliable arthroscopic surgical approach to the stifle and the medial femoral condyle, surgical excava-
but the level of activity was highly variable and often not competitive performance. Augmentation of surgical debridement with bone grafting and/or forage (subchondral drilling) failed to decidedly improve results and required a second procedure (bone graft harvest) and in some instances caused an enlargement of the cyst (forage). In most of these studies a consistent finding was failure of the cyst to fill in with bone, regardless of lameness outcome. Even in horses that had resolved their lameness after surgery, the cyst may have filled in minimally or not at all. Subsequent strategies to “fill the cyst” so it would not be painful included use of synthetic cements, and included first polymethylmethacrylate (PMMA). Although this author is unaware of problems with the use of PMMA, it is permanent, non resorbable, and potentially can harbor infection or produce wear particles that could get into the joint. Due to lack of convincing success, the PMMA technique gave way to the use of biodegradable and biocompatible cements such as Norian SRS (a calcium phosphate cement) or other calcium based cements or magnesium based cements. Case reports on the use of the products are few and sufficient numbers have not been presented to convincingly show success with the cements. Simultaneously, clinicians began reporting on the use of intra-lesional, ie placed into the cyst, steroids around the same time as the use of intra-lesional blood products, such as Platelet Products. Direct injection of steroids into the cyst has reportedly had some success with ~80% return to use, but the techniques vary significantly. From injection in the standing horse by ultrasound guidance to direct injection under arthroscopic guidance. Some have reported it is important to thread the needle under the cystic lining and inject steroid in and around the lining. With the field of regenerative medicine advancing rapidly, the use of blood products to either mix with bioabsorbable cements or inject alone into debrided cysts has become popular. A brief review of available platelet products and devices for horses will be presented. Platelet products contain growth factors such as IGF, FGF, and PDGF that could stimulate healing and bone regeneration. At least the Biomet GPS device and the Harvest system have been shown to effectively concentrate bone marrow cells. Concentrated bone marrow may have promise in helping these cysts to fill with bone. Presumably if the cyst fills with bone, the pain associated with the cyst will reduce, but that remains to be proven. Other surgical techniques are currently being investigated for the treatment of cysts, including transcystic screws (ECVS abstract, 2010) and intra-cystic stem or fibroblast cells. Dermal fibroblasts genetically engineered to secrete BMP2 have been used in a clinical trial at OSU, but the outcome is pending.

BIBLIOGRAPHY


