Medical options for treating musculoskeletal pain and injury in horses

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Selection of treatments for joint disease in horses is complicated by the fact that there are so many options to choose from. Consequently, the decision for use of a specific medication or group of medications is often dictated by subjective decision making and word of mouth. With this in mind, the goals of using medication for management of joint disease are:

Relieve pain and inflammation in and around the joint
Restore the normal anabolic/catabolic balance within the joint
Improve strength and conditioning
Preemptively manage the disease process

Intraarticular corticosteroid use in horses is widespread and used in all breeds and disciplines. Information concerning the use of corticosteroids for treating joint pain in horses has been in the literature for over 50 years. Since that time there have been numerous objective studies, both clinical and experimental, that have evaluated the use of the medication. In vivo studies have shown that betamethasone (BM) had no detrimental effects in an osteochondral fragment model of osteoarthritis. However, it is only available at this time in compounded form, leading exposure of veterinarians to potential liability claims. Methylprednisolone acetate (MPA) has been shown to cause a nonsignificant reduction in lameness in the same model, but also to cause significant reduction in synovial fluid PGE_2, and intimal hyperplasia and vascularity in the synovial membrane. However, articular cartilage damage was worse in treated joints. Using these data, and data obtained from other studies, it has been concluded that MPA causes articular cartilage damage in high-motion joints with repeated use. Triamcinolone acetanide (TA) has also been studied using the OA model, and induced significant decrease in lameness, decrease in synovial fluid total protein, increase in synovial fluid hyaluronan and glycosaminoglycan concentrations, and significant synovial membrane and articular cartilage benefits both in treated and remote joints. This has lead to the conclusion that TA may actually be chondroprotective. However, the biggest drawback to the use of TA is its perceived potential for causing laminitis, limiting its use for treatment of multiple joints in a single horse.

Corticosteroid-induced laminitis is thought to result from the ability of glucocorticoids to induce insulin resistance in cells. This has been shown experimentally in horses treated with systemic TA at a dose of 0.05 mg/kg, specifically resulting in hyperglycemia, hyperinsulinemia and hypertriglyceridemia. The reduction in glucose use by the peripheral tissues has been shown to induce separation between basal epidermal cells and their basement membrane, which is classic for hoof separation in laminitis. However, a review of clinical cases in one hospital showed that for horses without a history of laminitis, 40 – 80 mg of TA per horse did not induce laminitis in 205 horses. Until publication of this paper, 18 mg per horse was the recommended dose, which was based

on review of clinical cases in which no incidence of laminitis resulted in 1500 doses of TA when given at or below that dose. Regardless of these reports, however, there are still anecdotal reports of laminitis occurring shortly after doses of TA are given, and widespread use of high doses. It is uncertain whether the McCluskey, et al paper has dictated that the standard of care for TA dosing be raised.

Another contentious point often raised is the ability of MPA to induce ankylosis in low motion joints, specifically the distal intertarsal and tarsometatarsal joints. Objective studies have repeatedly shown that MPA can induce significant articular cartilage erosion in high motion joints. However, it is unknown whether the same can occur in low motion joints. There is no clinical or experimental evidence to show that MPA induces ankylosis in low motion joints, and in fact, facilitated ankylosis is often necessary due to failure of intra-articular medication to control joint pain.

Both clinical and experimental evidence has shown that doses lower than those used in the past are common and effective for treating joint disease. Use of these lower doses and selection of type of corticosteroid based on age, use and type of joint have improved effective management of horses with joint pain. As an example, stifle pain in western performance horses, namely cutting horses, is common. It is now common to treat those horses with shorter acting preparations such as TA, and save MPA for later in life if needed. The same has been reported for Standardbred racehorses, in which Isoflupredone Acetate is commonly used in young horses in order to prolong an effective career. It is also becoming common in sport horses to treat with relatively short acting preparations, but in combination with hyaluronic acid. In addition, with the clinical benefits of autologous conditioned serum being realized, therapies can be staged in order to best control pain in performance horses. Although general guidelines can be given, the use and staging of these various medications is best based on clinical experience.

NSAIDs are used most commonly to control inflammation and pain for musculoskeletal pain. Medications in this classification are very effective for controlling Prostaglandin E_2, a major factor in the progression of synovitis and osteoarthritis. Most NSAIDs also inhibit cyclooxygenase at varying levels, thus reducing the production of PGE_2. Other biochemical actions may also be at work with some NSAIDs, such as the ability of Ketoprofen to reduce lipoxygenase. Therefore, specific NSAIDs have varying effects on inflammation and pain. It is becoming apparent that effectiveness of the medication can be easily influenced by several factors in addition to dose. For instance, the peak plasma concentration can be delayed if the horse has access to hay. Therefore, effectiveness and withdrawal times should be considered in light of feed schedules. There is also concern that NSAIDs can have a deleterious effect on articular cartilage. The data however are controversial, as both degradative and beneficial effects have been seen in vitro and in vivo when the literature is reviewed. Therefore, the current recommendations are to use NSAIDs as needed for symptomatic control of pain and inflammation.[16]

Hyaluronic acid (HA) is commonly used both systemically and intraarticularly. Systemic use of HA showed strong anti-inflammatory benefits up to 56 days after the start of treatment at 40 mg IV once weekly for 3 weeks. It is also commonly used once or twice

monthly during competition. It is difficult to determine its affect, but some trainers and owners feel that some horses do very well with it regardless of the type of injury or the joint involved. HA is used intraarticularly as well, with variable results. HA can be used alone for cases of synovitis, but in most instances it is used in combination with CS for maximal effect. It appears that the combination of medications can have an additive effect and work towards managing joint pain by 2 different means. The other location where HA alone can be beneficial is in the management of tendon sheath adhesions, and it is commonly used postoperatively in sheaths where adhesions and damage have been found.

Polysulfated glycosaminoglycans (PSGAG) are also used systemically and intraarticularly. Systemic use of PSGAG has shown beneficial effects on articular cartilage and clinical signs of joint disease in several species. The clinical improvement may be a result of anti-inflammatory effects of the medication, which including inhibition of PGE_2, and general cytokine release. There are several forms of PSGAG on the market, but the only form that has been studied extensively is Adequan. Other forms of PSGAG for injectable use are compounded and veterinarians must assume all liability for their use. Doses for Adequan vary, and range from 500 mg IM every 4 days for 8 treatments, to every 5 days for 5 treatments. It can also be used once or twice monthly. Intraarticular treatment using PSGAG is commonly done, but with caution. PSGAG can potentiate infection, so must be administered with 125 mg Amikacin. We commonly use IA PSGAG for joints with severe articular cartilage erosive lesions, and in cases of severe OA it is often used combined with HA.

The use of “Regenerative Therapies” has gained momentum in the last several years based on its availability and an expanding body of objective work. However, its use must be thoughtfully pursued in light of the type of pathologic changes in the tissues, the horse’s intended use and the ability of the therapy to positively impact the prognosis.

IRAP, or Interleukin-1 Receptor Antagonist is commercially known as autologous condition serum, and relies on the production of IRAP from the horse’s own blood. IRAP is known to inhibit the effects of Interleukin-1, which is a critical factor in the inflammatory cascade of joints. Clinically, blood is withdrawn from the horse into special syringes, which must be transported to a specially-equipped laboratory for preparation. The IRAP is then filtered and frozen for intraarticular administration. Currently it is recommended to use IRAP once weekly for 3 treatments, but we have also been using it monthly for horses with chronic, low-grade arthritic conditions. Experimental results show that IRAP decreased clinical lameness and inflammatory changes within synovial membrane. At this time although interleukin-1 receptor antagonist has been found in the IRAP preparation, there is growing evidence that other growth factors are involved as well, such as IL-1ra, IL-10, IGF-1, TGF-beta, TNF-alpha and IL-1beta. The author also uses IRAP post-surgically in horses with lesions that are superficial on the joint surface, such as articular cartilage, meniscal and meniscal ligament lesions. One injection weekly for 3 weeks starting at the time of suture removal (2 weeks post-operatively) is used, then as needed.

Platelet-rich plasma has also come on the market in recent years. The theory for its use is that platelets contain growth factors that can help stimulate repair of tissues. There is some clinical and experimental evidence to suggest that it can help with healing soft tissues such as tendons and ligaments. Currently, I find this treatment to be beneficial for soft tissue lesions, in particular proximal suspensory desmitis lesions. It can be used both intralesionally as well as around the area in order to help facilitate healing.

Stem cells are now being used in joints and soft tissues with the emergence of more objective information to justify its use. Commercially, there are two sources of “stem cells” that are in use. Fat based stem cells have been commercially available for several years, and the method basically extracts the vascular fraction from that tissue. It is unclear whether these are truly mesenchymal cells, although there is some clinical evidence that they can be beneficial for healing of soft tissue injuries such as tendon and ligament disease. Bone marrow derived stem cells are also on the market. Bone marrow is harvested from the horse and then cells are grown in culture for several weeks. These expanded cells are then injected either into the tissue or into the joint to help facilitate healing. Bone marrow derived stem cells have shown mild symptom-modifying effects in an osteochondral fragment model of OA, and has been shown to significantly increase articular cartilage healing in vivo. There is also experimental evidence that meniscal lesions can respond favorably to bone marrow derived stem cells in fibrin glue.

Bone marrow aspirate concentrate can be obtained without the need to delay treatment due to expansion of cells. This technique can be used in the acute stages of injury or during surgery, and has been shown experimentally to enhance articular cartilage healing. This form of therapy can be used similar to stem cells, by being injected into the sight of lesion or the joint.

Although it is rare to have reactions to these medications, there have been occasions where horses have become quite reactive after injection. It is unknown what the cause of this is and it is a good idea to warn the owners prior to treatment that this is likely to happen. In our experience even when a horse flares to these medications they do respond well to conservative therapy with systemic antiinflammatory treatment. It is routine now to premedicate the horse with NSAIDs, and continue administration for 2 more days. If the horse responds negatively, then the NSAID therapy is increased and the horse monitored. Joint lavage is sometimes performed if the reaction remains more than 24 hours.

There have been several surgical procedures developed in the last few years to aid in treating musculoskeletal diseases in horses. Some of these developments have been due to research findings that have demonstrated improvement in healing of musculoskeletal tissues and advancements in surgical equipment and implants. However, still one of the greatest contribution to surgical advancements has been pain and inflammatory management in joints and tendon sheaths. The goal of this discussion is to review current methods for surgically treating common musculoskeletal diseases in horses.

The philosophy of performing joint surgery has been unchanged in recent years. Osteochondral fragments need to be removed and diseased bone and cartilage debrided

adequately. Fractures still need to be repaired and stabilized for horses to have the best prognosis and with some joints arthrodesis is needed in order to stabilize those fractures. Recent advancements in implants have significantly improved the ability to stabilize these repairs. For instance, locking plates are now commonly used for fractures and arthrodesis of joints. In addition to improvement in implants there have been significant improvements in pain management in these horses. Even with severe fractures those that can be adequately stabilized can often times be managed aggressively in order to reduce the chance of laminitis in the contralateral foot. Epidurals using morphine and xylazine and constant rate infusions of lidocaine and ketamine can be used to help manage the pain in those animals. In addition, sling design has been improved in order to help manage those horses.

Today we also better understand how to manage other joint lesions. For instance, we typically debride meniscal lesions and some surgeons justify the use of radiofrequency ablation for stimulating healing in those cases. The same can be said for articular cartilage lesions. Often times we deal with cracked cartilage surfaces or those that have partial thickness erosion. Often times it is best to not fully debride those to subchondral bone and instead those lesions will be lightly debrided or again some surgeons have used radiofrequency probing to enhance healing. The use of radiofrequency probing controversial as it has been shown experimentally to cause chondrocyte necrosis. The justification for its use has been that it shrinks collagen fibers and hence can close some of those smaller cartilage defects. Finally, those horses with osteoarthritis can gain some pain relief through arthroscopic surgery. Joint lavage alone may relieve some pain in those joints and removal of fragments or osteophytes that rise above the joint surface can help.

As important as advancement in surgical techniques have been, advancements in post-operative care have also been helpful. It is common for horses that are operated for joint lesions to go on a protocol of IRAP or Adequan and HA combination post-operatively. Typically we start at the time of suture removal and for both medications usually administer once weekly for three weeks, and then as needed. In addition, we have found that use of stem cells for soft tissue lesions in the joint, such as meniscal lesions, have shown some benefit. We currently recommend the use of bone marrow derived stem cells for this as they have been shown experimentally to have better healing properties than other healing sources.

The navicular bursa has recently become a site of concern in the foot of the horse. Advances in MR imaging have shown that the bursa is commonly a source of pain in the foot and often times it is due to deep flexor tendon fibrillation in that site. Bursoscopy is commonly performed now and can be helpful in debriding those fibrillated fibers and any fibrocartilage damage in the back of the navicular bone.

Tendon and ligament lesions can also be managed surgically. The digital tendon sheath can be scoped if tendon damage has been diagnosed via ultrasound or MRI. Fibrillated fibers can be debrided and core lesions can be decompressed. It is becoming evident that core lesions will often times have a necrotic focus and therefore decompression may

be of benefit. Stem cells and various medications have been used to help facilitate healing in these tissues. It is not uncommon to perform annular ligament desmotomy in some of these cases which helps to relieve pain in the area. Superior check ligament desmotomy is now currently performed with an arthroscope. This has the benefit of being less invasive than previous techniques and the area can be visually examined. In addition the superior check ligament can be cut using this technique.

Lastly, management of proximal suspensory desmitis in the hind limbs has been difficult. Even with stem cells and shockwave therapy the results at times have been poor. Therefore it is not uncommon to perform a neurectomy and fasciotomy in the area of the proximal suspensory ligament in order to help facilitate healing and manage pain in these horses. One down side to this technique is that if there is severe damage to the suspensory ligament or mineralization is apparent the surgeon does run the risk of creating a dropped ankle due to further suspensory ligament damage.

Overall surgical advances have helped in our management of musculoskeletal disease in horses and these procedures are performed routinely.