How to Use Intra-Articular Corticosteroids Appropriately

Peter Clegg, MA, VetMB, PhD, Diplomate ECVS, CertEO, MRCVS

1. Introduction
The action of corticosteroids is exerted through steroid-specific receptors in the cytoplasm of steroid-responsive tissues. This interaction results in the altered transcription of genes, leading to a wide variety of anti-inflammatory effects as well as other effects on the biology of articular cells that are of variable benefit. Corticosteroids are able to suppress inflammation at virtually all levels. The humeral effects of corticosteroids are due to the inhibition of phospholipase A and the decrease in production of proinflammatory mediators by both the cyclooxygenase and lipoxygenase pathways. They also inhibit many of the other inflammatory effects such as capillary dilation, migration of inflammatory cells, and the production and release of degradative enzymes.1–3

2. Materials and Methods
There are numerous corticosteroids that can be used for intra-articular therapy. Betamethasone, as a combination of 12 mg betamethasone acetate and 3.9 mg betamethasone sodium phosphate per milliliter, is rarely used for this purpose in the United Kingdom, although it has been argued that it may be an appropriate drug at a dose of 3 to 18 mg per joint, due to its short duration of action. Triamcinolone acetonide (at a dose of 6 to 18 mg per joint) is a commonly used moderate- to long-acting corticosteroid. Experimental data have indicated that this corticosteroid both improved lameness and improved articular cartilage morphological parameters in comparison to control animals in a relatively aggressive model of osteoarthritis (OA) in horses. This study concluded that intra-articular administration of triamcinolone acetonide improved lameness and had some chondroprotective effects and no substantial detrimental effect on the joint. This corticosteroid is widely used in the therapy of joint disease, especially in the management of diseases affecting high motion joints, such as the carpus, fetlock, and distal interphalangeal joints. We would normally advise such treatment as a one-off therapy in most cases. As always with such treatments, it is important to treat the primary cause of the joint disease.

Probably the most common indication for corticosteroids is in the therapy of synovitis, especially in competition horses, in which there is a requirement for rapid resolution of symptoms and return to training. In recent years, there has been a demand by many owners and trainers for “routine maintenance” (or prophylactic) injection of corticosteroids.
into joints of apparently sound horses. This practice, while becoming increasingly prevalent in the United States, is almost unheard of in Europe. The rationale for this is uncertain, and it is difficult to support such practice in which corticosteroids may have both detrimental as well as positive actions. Currently, there is no evidence that such practice has any effect on improving future soundness or working longevity in horses. Methylprednisolone acetate (20 to 40 mg/joint) is commonly used in the United Kingdom and is longer-acting compared with triamcinolone acetonide. Clinically, this drug has been shown to improve the microscopic appearance of the synovial membrane and the synovial fluid parameters. However, in experimental models of OA, clinical improvement is not as marked and it may have a more detrimental effect on the articular cartilage. As such, we predominantly use this drug as a treatment for OA of low-movement joints such as the small tarsal joints and the proximal interphalangeal joints (generally at a dose of 20 mg/joint). In some cases, treatment would be repeated in 4 to 8 weeks if only a partial response is observed, or even several months later if lameness returns.

The decision of when to return horses to exercise after corticosteroid therapy is currently unclear, with some clinicians recommending a conservative approach because these drugs can affect cartilage metabolism in both normal and abnormal joints for periods of between 4 and 8 weeks. Thus, a total period of rest and slow return to exercise may be recommended for approximately 14 days, although others have returned horses more quickly to work without detrimental effects (personal recommendation). Frequently, owner/trainer demands require a much more rapid return to work than what is probably most beneficial for the longevity of the horse. There is currently no quality data relating to the influence of rest and exercise in the post-treatment period on steroid efficacy and joint health. It has been suggested, though, that restricted joint movement may be beneficial subsequent to treatment and may lead to reduced clearance of the drug and enhanced penetration of intra-articular tissues.

It must be remembered that many racing and competition jurisdictions consider intra-articular corticosteroids as banned substances in competition (http://rules.britishhorseracing.com/Orders-and-rules&staticID=126863&depth=3). The situation is complicated because the drug detection time and drug withdrawal time for corticosteroids (such as triamcinolone acetonide) are undoubtedly variable and often longer than the commonly stated period of time of 10 days historically used by veterinarians. Many racing jurisdictions are putting effort into testing to identify medicated horses.

3. Results

The use of corticosteroids as a treatment of joint disease has been controversial because of concerns of side effects associated with accelerated joint degeneration caused by possible negative effects on cartilage matrix. However, experimental data and widespread clinical use of corticosteroids over the last few decades now indicate intra-articular therapy with corticosteroids can be most beneficial in cases of joint pain in which there is significant synovitis. There is no evidence that regular maintenance therapy with corticosteroids has any benefit for a horse’s future soundness; moreover the potential role of corticosteroids in causing negative effects on cartilage implies that this practice carries a significant risk of detriment.

Side effects of corticosteroid use include iatrogenic synovial sepsis and laminitis, both of which can be extremely serious and possibly fatal. To decrease the possibility of sepsis, some veterinarians inject an intra-articular antibiotic, for instance, gentamicin (150 mg) or amikacin sulphate (125 mg), at the time of corticosteroid administration. This is something that I have never done, and I advise that it is not necessary when using proper antiseptic technique.

No scientific studies have proven a causal link between the use of intra-articular corticosteroids and laminitis, although there have been anecdotal reports to the contrary. These reports suggest a narrower therapeutic index with triamcinolone acetonide with respect to laminitis as a complication. I would not recommend exceeding a total dose of 35 to 40 mg triamcinolone acetonide or 80 to 100 mg methylprednisolone acetate. Certainly, in the United Kingdom, it is probably now normal veterinary practice to warn an owner of the risk of corticosteroid-induced laminitis when treating a horse with corticosteroids. The risk is probably greatest in heavyweight or overweight horses that may be predisposed to equine metabolic syndrome. Furthermore, unsurprisingly, the risk is probably greatest in horses that are receiving high doses of corticosteroid in which multiple joints are being treated (personal experience).

4. Conclusions

Corticosteroids are among the most commonly used drugs for articular medication in the horse, and certainly, when used in the correct manner, are an extremely useful therapy. However, it also has to be considered that these drugs do have powerful side effects, and their use must be balanced and appropriate. Understanding their pharmacology and mode of action in joint diseases is key to their appropriate use.
References


