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Best Practices for Choosing an NSAID

One of the most important tools in an equine practitioner's kit is his or her collection of anti-inflammatory medications to reduce pain, swelling, fever, and lameness. Non-steroidal anti-inflammatory drugs (NSAIDs) come in many forms, but usually as intravenous or oral (paste, powder, tablet) formulations. These medications are relatively inexpensive and can be very effective within hours of administration.

Alastair Cribb, DVM, PhD, dean and professor of Pharmacology at the University of Calgary, in Alberta, reviewed NSAID options for use in horses at the 2015 American Association of Equine Practitioner's Convention, held Dec. 5-9 in Las Vegas.

He reviewed with veterinarians how NSAIDs work primarily through blocking cyclooxygenase (COX) enzymes—in a nutshell, the process responsible for inflammatory response. There are two forms of NSAIDs:

- Those that are nonselective and inhibit production of all prostaglandins (hormone-like products the body produces), including COX-1, which is important for maintaining health of the intestinal lining and blood flow through the kidneys; and

The newer selective inhibitors, including firocoxib and meloxicam, which only target inflammation-causing COX-2 prostaglandins.

General Effects of NSAIDs

Cribb listed the NSAIDs currently approved for use in horses: flunixin meglumine (Banamine), phenylbutazone (PBZ, Bute), ketoprofen, firocoxib, aspirin, and topical diclofenac cream. He added meloxicam to his discussion because while it is currently not labeled for use in horses in North America, doctors use meloxicam to treat rheumatoid arthritis and osteoarthritis in people, and veterinarians have access for off-label use "only for cases in which there is insufficient response from other approved NSAID choices," he said.

Firocoxib is quite COX-2 selective, and meloxicam has some COX-2 selectivity, whereas the other products are nonselective. When an NSAID affects both COX-1 and COX-2 pathways, it can lead to significant adverse effects: renal papillary necrosis (death of kidney tissue), gastrointestinal toxicity (causing oral ulcers, gastric ulcer syndrome, and right dorsal colitis), and potential blood-clotting problems. Even the COX-2 selective medications can exert toxic effects on the kidneys.

NSAIDs for Musculoskeletal Pain

One of the primary reasons veterinarians reach for NSAIDs is to treat musculoskeletal disorders. Cribb reported that Bute was more effective than ketoprofen and Banamine in reducing inflammatory pain related to elevated joint temperature, lameness, synovial effusion (fluid swelling of the joint), and PGE2 (a type of prostaglandin) concentrations in experimental synovitis (inflammation of the synovial membrane) cases. Meloxicam and Bute were similarly effective in reducing joint temperature, but meloxicam improved both objective and subjective lameness scores better than Bute.

In one study, when researchers induced mechanical pain in horses using a specially designed heart-bar shoe, flunixin, Bute, and a relatively high dose of firocoxib decreased heart rate (an indicator of pain level) and lameness similarly, whereas low-dose firocoxib was ineffective; in fact, researchers found that a loading dose of three times the label dose was necessary, as firocoxib takes four to five days to reach steady state and maximum efficacy. And, in a study of naturally occurring osteoarthritis, firocoxib and Bute had comparable effects.

"For laminitis, because neuropathic pain (which arises when damaged, dysfunctional, or injured nerve fibers send incorrect signals to pain centers) is part of the syndrome, nonselective NSAIDs may be preferable with acute onset, whereas for longer-term treatment, transition to firocoxib is better at minimizing gastrointestinal side effects," says Cribb.

NSAIDs for Gastrointestinal Disorders and Endotoxemia

Colic is a painful abdominal condition that generally necessitates NSAID use. With this and other gastrointestinal disorders flunixin was shown to impair healing of the colon, whereas firocoxib and meloxicam don't impair healing of the intestinal lining following an event (e.g., colic surgery) that resulted in reduced blood flow to the intestinal tract.

A horse suffering from endotoxemia-associated laminitis—which has its roots in the gut—might benefit from aspirin therapy early on, because it inhibits thromboxane (a substance that causes blood vessel constriction). When treating horses with colic, veterinarians typically prefer Banamine over Bute because it decreases thromboxane production and blood lactate without masking certain signs that could interfere with clinical monitoring when used at a lower dose.

Foals

Veterinarians should avoid using NSAID in foals, particularly those that are dehydrated, premature, or less than 30 days old. Foals have different pharmacokinetics than adult horses and appear to be more susceptible to NSAID toxicity.

Take-Home Message

There are a plethora of non-steroidal anti-inflammatory drug choices to use in the horse. One important point that Cribb stressed is that a horse's disease state affects his NSAID response, and it is worth trying a different NSAID if the current one is ineffective. Further, there is not a good correlation between pain-relieving and anti-inflammatory effects.

Before selecting an NSAID, the veterinarian must evaluate the pain and inflammatory syndrome at hand as well as that horse's sensitivity to NSAID medication.