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# THE DANGERS

*Of Non-steroidal Anti-Inflammatory Medications*



THE ELITE ATHLETE

PRIMUM NON NOCERE  
FIRST, DO NO HARM

Keeping your horse at his or her best is important to you. Are the medications you use putting him at risk of serious illness?

BY KARIE VANDER WERF, DVM

**N**on-steroidal Anti-inflammatory Drugs (NSAIDs) are the most common drugs used in the veterinary world today. They are used for a multitude of conditions, from musculoskeletal injuries to control of post-operative pain. Unfortunately, a condition collectively known as **NSAID toxicity**, which includes right dorsal ulcerative colitis, gastric and oral ulceration, and kidney failure, can have an impact on performance and, in some cases, is potentially fatal.

NSAID toxicity can occur with the administration of any non-steroidal anti-inflammatory drug; however, the most common causes include

overdosage, stacking (use of more than one NSAID together), and chronic administration. In this newsletter, we'll discuss strategies to prevent this deadly disease.

Kansas State University Veterinary Medical Teaching Hospital is committed to the health and well-being of your horse. Please call us if you have any questions regarding the use of non-steroidal anti-inflammatory drugs.



## Common NSAIDs

### Bute®



#### Phenylbutazone

Bute® is the most common NSAID used for musculoskeletal pain. It is provided in injectable, oral tablet, and oral paste formulations.

### Banamine®

#### Flunixin meglumine

This is the second most commonly used NSAID and is often prescribed for colic or abdominal pain. It is available in injectable and oral paste formulations.

### Equioxx®



#### Firocoxib

This is one of the more recent NSAIDs available. It is reported to be selective for COX-2, making it safer to use in some situations, such as chronic administration. Firocoxib is available in oral paste formulation only.

### Ketofen®

#### Ketoprofen

Also a selective COX-2 inhibitor, ketoprofen is reportedly safer for chronic use, such as in chronic laminitis or lameness cases. It is available by injection only.

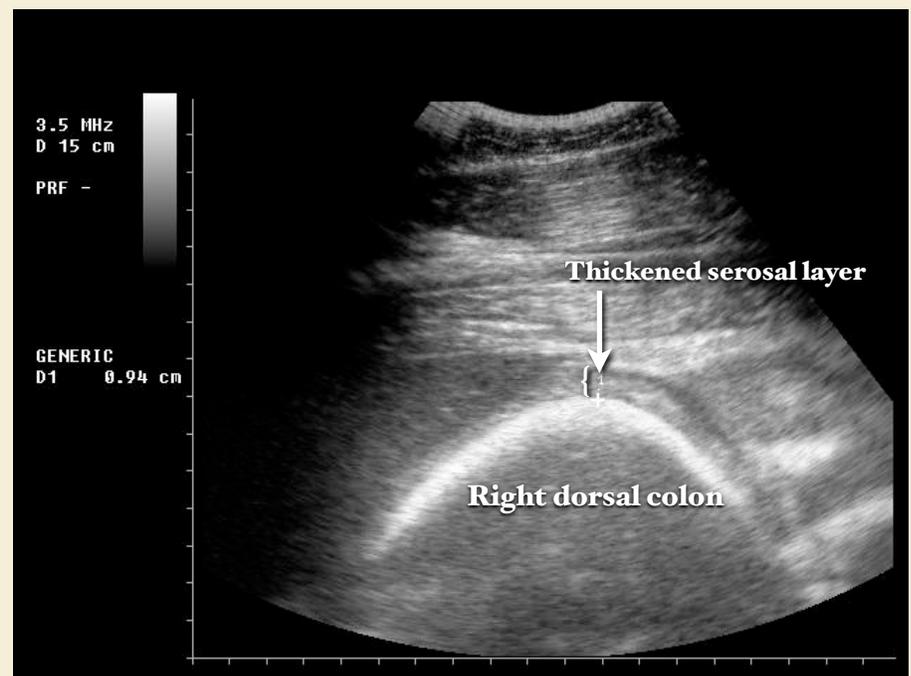
# Right Dorsal Ulcerative Colitis: A Potentially Deadly Disease

The principal mechanism of action for NSAIDs results from the inhibition of two forms of an enzyme known as cyclooxygenase (COX). One form, COX-1, is present in all tissues at all times and is needed for tissue health and healing. COX-2 is an enzyme that is present only during times of inflammation and is the main target of the new types of NSAIDs such as firocoxib and ketoprofen. Medications such as Bute® and Banamine® are non-selective, meaning they target both forms of the COX enzyme. Inhibition of COX-1 increases the risk of gastric and oral ulcerations, renal or kidney damage, and can lead to right dorsal ulcerative colitis.



## The right dorsal colon is unique.

Right Dorsal Ulcerative Colitis (RDUC) occurs when administration of NSAIDs leads to an ulcerative lesion on the terminal portion of the large colon of horses. This ulcer results in leakage of protein into the gut and a breakdown of the barrier to bacteria, potentially resulting in sepsis. The clinical signs of acute, mild RDUC can



**Fig. 1. Ultrasound image of the right dorsal colon. The serosa is thickened to 0.94 cm. Normal thickness is less than 0.3 cm. This horse had a serum albumin concentration of 1.7 mg/dL (normal: 2.7-3.7 mg/dL) and had clinical signs of RDUC.**

include mild to moderate colic, depression, and variable dehydration. More severe cases can present to the veterinarian with severe diarrhea, dehydration, and shock, and these cases can be fatal even if treated appropriately. There are no clear-cut

signals that can lead to the diagnosis; however, previous history of any NSAID administration, coupled with low protein levels in the blood, and thickening of the right dorsal colon on ultrasound (Fig. 1) can lead to a suspicion of RDUC. *Continued on pg 3.*



**Miniature horses** are sometimes at greater risk of an accidental overdose of NSAIDs. They are often thought of as “half-horses” but, in reality, are closer to 1/4 to 1/5 of the size of an average sized horse. Miniature horses usually weigh anywhere between 200 to 300 pounds and should be dosed accordingly.

## Stacking: Tempting, but ineffective.

**Stacking** refers to the use of two or more NSAIDs in the thought that better pain control will be achieved. However, researchers from the University of Missouri\* have shown that giving Bute® and Banamine® together does not increase the effectiveness of the medications but rather increases

the risk of adverse events such as gastric ulceration and right dorsal ulcerative colitis. Also, doubling the dose of the NSAIDs also did not result in greater efficacy. In a study using approximately 4 grams of phenylbutazone per day for only 5 days resulted in significant gastric ulceration and bloodwork changes consistent with damage to the right dorsal colon but changes in lameness were not seen. (\*Keegan KG, Messer NT, Reed Sk, et al., AJVR 2008;69:167-173)



# Right Dorsal Ulcerative Colitis: Under the Radar

**R**ight dorsal ulcerative colitis is an insidious disease that may not become evident until it is too late. Horses may have received an appropriate dose of NSAIDs but may react in different ways, especially if dehydrated or on the medications for a long period of time. If your horse is on NSAIDs for a chronic lameness, periodic monitoring of blood protein values and kidney function may help to avoid surprising and devastating news.

**Prevention** of RDUC can be achieved by reducing stress, ensuring adequate water intake at all times, and judicious use of NSAIDs. If your horse is on a long-term dose of Bute®, researchers have suggested that, since the drug tends to accumulate in the body, skipping one day every week may allow the drug levels to reduce and

ease the burden on the kidneys and colon. Additionally, the use of alternative NSAIDs, such as the selective COX inhibitors like Equioxx® and Ketofen® may, in some horses, be safer. Consult your veterinarian for the best choice for your horse.

**If your horse develops RDUC** or other gastrointestinal or kidney complications secondary to NSAID use, your horse should not receive these drugs until it has healed. Unfortunately, although NSAIDs are effective at reducing inflammation, they also delay healing, especially of ulcerative conditions. Treatment for RDUC can be intense and should be managed by your veterinarian or a referral institution such as Kansas State University's Veterinary Medical Teaching Hospital.



Correct diagnosis of the cause of the lameness is essential to treatment and follow-up. An improper diagnosis can result in unnecessary drug administration.



“Our goal at Kansas State University is to provide accurate information to you, the horse owner, and to provide optimal care for your horse.”

Jose Bras, DVM  
Assistant Professor, Equine Surgery and  
Emergency Care  
KSU Veterinary Medical Teaching Hospital

## THE VETERINARY-PATIENT RELATIONSHIP

### A RECIPE FOR SUCCESS

#### Pain Control

**Accurate diagnosis**

**Early and proper therapy**

**Alternative pain management**

**Regular examinations and bloodwork**

**Early recognition of problems**

Combining all of these ingredients can enable you to enjoy your horse for as long as possible. Working closely with your veterinarian is



important to your horse's long-term health and well-being. Talk to your veterinarian today!