Insights on Equine Gastric Ulcer Syndrome, by Dr Olin Balch

… this is a subject that I extensively investigated in the last year and wrote about with Truman Prevatt for the EN. Frankly, in the process of co-writing that article, I learned a great deal. I learned even more when I asked internal medicine specialists Gary Magdesian, Todd Holbrook, Hal Schott, Trisha Dowling, and others to review the article for scientific accuracy specifically about the competing endurance horse.

I am happy to share and discuss what we know and what we don't know. While it will be obvious that I don't have all the answers, it will hopefully be clear that there is simply a lot that science does not know about clinical nature of gastric ulcers/erosions in adult horses.

Despite their being three investigations in competing endurance horses (the last recent FEI horses in 2009), there has been **no** correlation of the ulcers/erosions seen with endoscopy with completion or finish placement. While gastric endoscopy is the gold diagnostic standard, the ability to judge the depth of an erosion/ulcer is quite limited in practicality and the presence of erosions/ulcers may not be related to clinical disease. Bottom line, we really don't know the "natural history" of equine gastric epithelium turnover in presumably healthy horses (or zebras) because simply the use of endoscope requires significant fasting and increases the acidity of the stomach.

A couple of weeks ago, a writer representing Equus magazine interviewed Truman and me for an article she was writing on gastric ulcers, slanted largely toward endurance horses competing in the AERC. That writer was kind enough to let Truman and me review her first draft, and, in turn, I showed our combined suggestions to Trish Dowling, an internist, pharmacologist, and endurance rider at Western College of Veterinary Medicine in Saskatoon. Trish wrote the following paragraph about what our message to endurance riders should be:

Gastric ulceration is ubiquitous in horses and appears part of their normal physiology. At times, they may be exacerbated and cause clinically significant dis-ease (deliberately spelled that way), but the endoscope cannot determine this. If a veterinarian feels that clinical signs are related to endoscopically seen gastric ulceration, then there is an effective and expensive treatment. But this treatment may have unintended consequences that have not been elucidated fully in horses. As our horses compete in an extreme sport, we strive to "do no harm" and

believe that horses with clinically significant ulcers should not be competing and do not support treating nonclinically significant ulcers with a drug that may affect bone density and absorption of calcium and magnesium until we have better scientific proof. Otherwise, let your horse be a horse as much as possible.

In addition to the excellent questions that Cheryl suggests below, the following may be useful to stimulate thoughtful discussion.

- Is some level of gastric ulceration normal, and is it reasonable to expect that the ulceration will resolve under good management conditions? The status of EGUS in the population of equids in their normal state is uninvestigated. Does a herd of zebras in the Serengeti show EGUS at similar levels as domesticated horses? Is EGUS a product of domestication or is it normally present at similar levels in all equids, even those in the wild? For domestic horses, it is important to remember that the presence of gastric ulceration (even when identified with endoscopy) does not necessarily equate to clinic disease. Looking at horses not in active training and presumably showing no clinical illness, EGUS was identified in both pregnant (66.6% prevalence) and non-pregnant (75.9% prevalence) mares under similar pasture management. In fact, one prominent researcher stated: "Ulcers develop, to one degree or another, in all horses. However, in most cases, healing processes begin simultaneously with damage to the gastric mucosa, such that lesions heal quickly and do not progress to a clinical problem. *How do we then decide which gastric ulcers merit treatment?*

- Is the competing endurance horse uniquely susceptible to clinical disease and to ride-site metabolic disease as a consequence of gastric ulcers? Long trailer rides, decreased grazing, absence of normal companions, and other stressful events are part and parcel of the life of competing endurance horses. Unlike in humans and foals, gastric ulcers in adult horses very rarely cause life-threatening perforations. However, gastric ulcers, as anything else that decreases food and water intake before or during an endurance ride, could inhibit drinking and eating – both of which are precursors of metabolic disease such as colics resulting from the stresses of the ride.

- Can electrolyte supplementation during endurance competition worsen

gastric ulcers? A 14-horse study suggests that electrolyte supplementation may worsen gastric ulcers in non-exercising horses. If this is equally true in horses actually competing in endurance rides, then that finding would have very significant management implications. The possibility of over supplementation with electrolytes was also addressed in a 2007 study at Tevis Cup. Contrary to what was found in other studies, plasma bicarbonate concentration decreased in successful horses completing that ride. Authors of this study suggest that this discrepancy may be due to "increasing patterns of oral electrolyte supplementation." Looking at the larger issue of what constitutes appropriate (not too much but enough) electrolyte supplementation, electrolytes are still administered largely on just the intuition of the rider despite 50 years plus of endurance competitions. Simply, we do not know enough about electrolyte supplementation in endurance horses to give the best science-based advice.

- Is the gastric ulcer in your horse only due to stress and training? It is easy to forget that gastric ulcers are not only the consequence of stress and exercise, but also can develop as secondary complications to other serious medical conditions requiring extensive veterinary treatment.

- Can non-pharmaceutical management of clinically significant EGUS be more aggressively pursued during the actual endurance event? The importance of the horse being able to graze periodically during the ride and subsequent coat the stomach with protective alkaline saliva and the protective effects of feeding alfalfa hay are well known. Should ride managers be encouraged to think specifically about providing alfalfa at their rides? Should rides mandate at least 1 or 2 holds that are at least one-hour long to ensure horses have ample opportunities to fill their stomachs with roughage actually during the event? For the individual rider, what is best advice for electrolyte supplementation when commercially recommended dosing schedules have actually exacerbated gastric ulcers in non-exercising horses?

- Long-term effects of omeprazole? FDA safety evaluations of Merial's omeprazole formulations were quite short-term. No one really knows about the effects of long-term use (months or years) of omeprazole in horses. While extrapolation of risk factors from humans to horses is very problematic, it is frankly concerning that there is an increased tendency for human fractures and decreased GI absorption of calcium and other nutrients when PPIs are used for years. On the other hand, when examining fatalities associated

with the nearly 200,000 AERC-sanctioned starts over nearly a decade, there are very, very few long bone fractures identified.

- How quickly can clinically significant ulcers develop in healthy horses? Ulcers developed in one study**.** in as little as 8 days after initiation of light to heavy training and in a second study in five days after shipping and stall confinement, and light exercise. If a horse has a truly ulcer-free stomach, will a single episode of competition even as long as 24 hours for 100 milers initiate clinical disease when omeprazole can be legitimately be given up to 24 hours before the competition and immediately afterwards?

- Is a horse that requires omeprazole on the day of competition a well or sick horse? If the horse is sick, should it be allowed to compete on that day?

Best,

Olin

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