EQUINE GASTRIC ULCER SYNDROME (EGUS)

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EQUINE GASTRIC ULCER SYNDROME

• Definition
• Anatomy & Physiology
• Pathophysiology
• Risk Factors
• Clinical Signs
• Diagnosis
• Prevalence
• Treatment
• Prevention

“What hurts? Your foot? ... No wait don’t tell me, let me guess.”
WHAT IS EGUS?

• Equine Gastric Ulcer Syndrome
EQUINE STOMACH ANATOMY

• In humans the entire stomach has a lining that protects it from the acid used in digestion.

• The horse’s stomach is divided into two sections. The top portion is covered with squamous epithelium. This is similar to your skin.

• The bottom half is covered by grandular epithelium.
PHYSIOLOGY

• Acid (HCL) is made in the stomach by specialized cells called proton pumps. Three things tell proton pumps to go to work: Histamine, Gastrin and Actetylcholine.

• The amount of acid secreted can vary but some acid secretion occurs 24 hours a day

• Designed to eat now, digest throughout day

• The horse’s stomach makes 16 gallons per day
PROTECTIVE FACTORS

• Squamous Mucosa
  – Feed absorbs acid
  – Saliva

• Glandular Mucosa
  – Mucus
  – Mucosal blood flow
  – Cell turnover
Ulcers happen when the squamous mucosa comes in contact with acid and/or when there is a breakdown of the protective mechanisms of the glandular mucosa.
RISK FACTOR # 1: FEEDING/FEEDING PATTERNS

• Limited Turnout
• Changes in feed routines
• Intermittent water access
• Episodic feeding
  – 6 hours between forage meals increases the risk of EGUS
  – Withdrawal of feed prior to work or competition
  – Imposed feed deprivation
RISK FACTORS
RISK FACTOR # 1: FEEDING/FEEDING PATTERNS

Composition of diet

- **Concentrates**
  - Increased pepsin, HCL
  - Lower stomach pH (more acidic)
  - Less salivary buffering

- **Hay/Grass/Roughage**
  - Higher stomach pH (less acidic)
  - Alfalfa Ca+/Phosphorous = Tums so Feeding ¼ flake before a ride/trailering very beneficial
RISK FACTOR # 1: FEEDING/FEEDING

• TIMING

– Feed hay before concentrates so saliva production higher and PH is stomach has been lowered.
RISK FACTOR # 2
ELECTROLYE SUPPLEMENTATION

• Oral electrolyte pastes

• STUDY by Todd Holbrook
  – 14 horses; 64% of horses had ulcers at start (56% grade 1)
  – Given a dose of a commercial electrolyte supplement q1h for 8 doses
  – Fed alfalfa prior to each treatment
  – Held off feed after last treatment for rescope
  – Results: Oral irritation, avoidance behavior, and increased number and severity of ulcers..

THIS DOES NOT MEAN YOU SHOULDN’T USE ELECTROLYTES YOU SHOULD JUST TAKE WHAT STEPS YOU CAN TO MINIMIZE THEIR POSSIBLE NEGATIVE EFFECTS.
RISK FACTOR # 3: STRESS

• Exercise
  – Training
  – Competition
• Behavior Stress
• Change in routine – illness/injury/layup
• Pain
• Surgery
RISK FACTORS # 3: EXERCISE

• Exercise leads to:
  – increased gastrin secretions which leads to increased acid secretion and
  – if the stomach is empty, at anything above a walk the stomach acid will start to splash (the snow globe effect) and come in contact with the squamous mucosa, especially if there is no food in the stomach
RISK FACTOR # 3: BEHAVIORAL STRESS

– Stall confinement
– Trailering – do it sometime!
– Unfamiliar environment
– Social regrouping
– Weaning (German Study)
  • 7 days prior to weaning 21% of foals had minor ulcers
  • 14 days post weaning 98% had ulcers
RISK FACTOR # 3: BEHAVIORAL STRESS

TRAILERING
20 ulcer free horses

- 10 kept at home
- 10 trailered 4 hours then exercised 30 minutes 2 x day for 4 days (simulated horse show environment), then trailered home. Fed oats + grass/alfalfa
- Out of the 10 kept at home 2 developed ulcers (the caretakers reported that the buddies of these 2 horses were shipped)
- Of the 10 trailered horses, 7 developed ulcers
BUT WHAT ABOUT GLANDULAR ULCERS

• Not as clearly understood. Causes may include
  – Warmbloods as a breed predisposed
  – A pathogenesis that leads to a loss of the mucosal protection
  – Risk factors: NSAIDS – Bute/Banimine (in people this is a known risk factor)
  – Frequency of Exercise: Horses ridden more than 5 days a week at a higher risk.
  – Stress
  – Helicobacter pylori: primary cause of ulcers in people but at this point the evidence is not pointing to this as a cause of ulcers in horses.
CLINICAL SIGNS
(Suggestive but not definitive)

- 60% of affected horses have a change in behavior and poor or decreased performance
- May see
  - Reluctance to perform: unhappy, refusing leads
  - Girthy
  - Stiffness
  - Lack of response to leg; refusal to bend
  - Back sore
  - Personality change
  - Nervousness, aggression, self mutilation
  - Cribbing
  - Change in eating pattern (refusing grain, picky eater
  - Intermittent mild colic
  - Weight loss/poor body condition
  - Rough hair coat
  - Teeth grinding
**DIAGNOSIS**

- Gold standard is to scope the horse to visually inspect the stomach (Gastroscopy)
- Clinic signs alone are suggestive but not specific enough to lead to a definitive diagnosis.
- Fecal albumin and/or hemoglobin tests are not correlated with true diagnosis
PHYSIOLOGICAL EFFECTS

• Took a group of horses with ulcers & treated 1/2 with omeprazole & left the other ½ untreated.
• Each group did the same treadmill work for two months
• The untreated group got tired faster, did not use oxygen efficiently, and did not lengthen their stride length i.e.. had a shorter stride length (30 feet per mile) . Thought to result from splinting to try to reduce pain.
GASTROSCOPY

• Gastroscopy is the ONLY way to determine for sure if your horse has ulcers. Fecal tests DO NOT WORK! There are 100 feet of intestine beyond the stomach so bacteria breakdown anything that leaves the stomach (including blood).

• Why scope: Need to scope to know if your horse even has ulcers. It is way cheaper to scope ($300-$500) than to treat a horse without ulcers ($1200-$2400 or higher)

• Need to know the type and severity of ulcers to know the best way and how long to treat. Treatment can vary from a few weeks to 2 months or longer.
Gastroscopy

- Withhold feed for minimum 12 hours
- Remove water 2 hours prior
- Standing sedation
- Requires >3 meter endoscope
Grading of Squamous Ulcers

Grade 0: Healthy, nonulcerated stomach lining

Grade 1: Mild ulcers, small lesions (damaged tissue)

Grade 2: Moderate ulcers, large lesions

Grade 3: Extensive lesions, deep ulceration & bleeding
GLANDULAR ULCERS – NOT GRADED
Described by appearance and location
PREVALENCE

- EGUS is very prevalent in horses regardless of breed, discipline or age.
  - 90% of racehorses had ulcers after 2-3 months of training
  - 63% hunter jumpers & dressage horses
  - 60% show horses
  - 60% heavy use & Western Pleasure horses
  - 37-59% pleasure horses
- 11% nontraveling, noncompetition pasture ponies
PREVALANCE IN ENDURANCE HORSES
UC David Study 2011 & 2012

• Immediately after a 50 or 80 km ride
  – 67% overall
    • 57% squamous
    • 27% glandular

• Followed 30 horses who competed in 90-160km races
  – Off season
    • 48% had squamous ulcers
    • 16% had glandular ulcers
  – Competitive season
    • 93% had squamous ulcers
    • 33% glandular
    • Increase in both prevalence and severity shown in the competitive season
GOAL OF TREATMENT

• Studies show that if the Ph of the stomach can be maintained at more than 4.0 (remember the lower the Ph the more acidic) for at least 16 hours a day while still allowing normal digestion, the horse’s stomach can heal itself.
CURRENT TREATMENT OPTIONS TO MANAGE THE PH OF THE STOMACH

1. Antacids (Maalox, Mylanta, Neigh Lox)
2. Histamine H2 receptor antagonists (Cimetidine (Tagamet), Ranitidine (Zantac))
3. Proton pump inhibitors (Omeprazole)
Antacids

- Neutralize stomach acid already in the stomach (binds to existing acid)
- No effect on acid secretion
- Short acting (the horse’s stomach totally empties in 15 -20 minutes so antacids don’t stay around very long. This means that if your horse responds to something like Neigh lox may be a good indication they have ulcers but all you are doing is addressing the symptoms not addressing the underlying problem)
- Need large volume
- Multiple treatments per day
- Do not heal gastric ulcers
RANITIDINE

- Competitive binding at histamine receptor. Incomplete blocking of acid production because it doesn’t impact gastrin and acetylcholine which can trigger acid production.
- Dose-dependent inhibition of gastric acid secretion
- Short duration of action - 6 - 8 hours maximum
- Variable response in horses
- Requires management changes
- Compliance can be difficult since it requires administering 3 times a day
OMEPRAZOLE

- PROTON PUMP INHIBITORS
- Inhibits the final step in acid production - Suppresses acid production regardless of stimulus
- Suppresses acid production for 16 hours
- Give one dose every 24 hour
- Allows the pH of the stomach to increase which allows the stomach to heal on its own
- Formulation is the key to successful treatment
OMEPRAZOLE AND CALCIUM ABSORPTION

• When Omeprazole is given to humans, reduced gastric acid production is associated with a decline in the digestibility of several nutrients, including protein, fat, calcium, iron, and vitamin B12.
• Kentucky Equine Institute recently conducted a study to see if Omeprazole has the same effect in horses.
• KER found that omeprazole did not affect the digestibility of any nutrients.
• Omeprazole did not change the digestibility of any mineral except calcium. Calcium digestibility decreased by as much as 20% in horses given omeprazole.
• What should you do?
  Take a close look at your horse’s total diet. If the horse is being fed a fortified feed at the rate recommended by the manufacturer and good-quality hay or pasture, especially if there is alfalfa or clover in the mix, the amount of calcium consumed is likely adequate and no changes in diet is necessary.
WHY THE FORMULATION OF GASTROGARD IS UNIQUE AND NECESSARY

• The active ingredient in omeprazole degrades very rapidly in acidic solutions. Thus, to be effective it must make it thru the stomach to the small intestine where it can be absorbed into the blood stream. That is why in humans and dogs it is given in an enteric-coated acid-resistant coated pill with instructions that it should not be chewed or crushed.

• Horses are not very compliant when it comes to not chewing a pill.

• GASTROGARD® has the only acid stable vehicle to take the medication thru the stomach without being effected. This is why it is so darn expensive. (NOTE: Has been off patent for several years and no one has been able to find a cheaper way to make it).

• Only FDA approved treatment for ulcers
A recent study analyzed compounded omeprazole from numerous compounding pharmacies.

Most of the doses had less than the minimum concentration required for the drug to be effective and all the doses degraded significantly over time; at 90 days the amount of the active ingredients ranged from 85% to 5% of what is required to be effective.

Take home – a waste of money
WHAT ABOUT GRANDULAR ULCERS?

• Gastrogard: >4 weeks duration of treatment
• Sucralfate/Carafate: Does not stop acid production. Adheres to ulcerated mucosa and stimulates mucous and bicarbonate secretion all of which help healing. NOTE: It also binds to other drugs so can not be given at the same time as Omeprazole or the Omeprazole won’t work. Must be separated by at least an hour.
GASTROGARD VS ULCER GUARD

• The same medicine. The syringes just contain different doses. GastroGard is for the healing of ulcers, Ulcer Guard is for prevention of ulcers.
USE OF ULCERGUARD

• One dose daily
• Begin 48 hours prior to and daily during stressful events such as traveling, changing facilities, stall confinement, hard training, competition, social regrouping, weaning, hospitalization.
MANAGEMENT STRATEGIES TO PREVENT ULCERS

• Even if you treat your horse’s ulcers they will come back if you don’t change the management of the horse.

• Things you can do:
  – Use Ulcerguard appropriately
  – Increase turnout/grazing
  – Use slow feeders
  – Feed from the ground
  – Decrease the overall amount of grain fed
  – Feed multiple smaller grain meals after feeding hay
  – Feed small amounts of alfalfa hay prior to stressful events such as trailer and exercise
MANAGEMENT STRATEGIES TO PREVENT

• Oil supplementation - Corn oil or rapeseed oil ½ -1 cup a day reduces gastric acid production and increased bicarbonate output

• No one has studied any other types of oils but most assume flax oil would have the same effect.
OTHER NUTRACEUTICALS

• Nothing besides Omeprazole has been found to heal ulcers.

• Only a few other things have been found to be protective. If using a supplement that claims to promote gastric health look for:
  – Lecithin and Pectin: Reinforces mucous
  – Sea buckthorn berries: Shown to treat mucosal injury in man and rats but limited work in horses

• No evidence aloe vera juice or probiotics have any effect in preventing ulcers.
PURINA GASTRIC OUTLAST

• Gastric Support Supplement
• Contains a proprietary mineral complex made from a renewable marine-derived source of Ca and Mg
• 1 cup has been shown to raise the gastric Ph to 4 for 4-6 hours after intake.
• Can be fed as top dressing multiple times a day during a competition.
• Found in Purina Gastric Care Feed
KEY POINTS

• Gastric ulcers are common
• Ulcers can develop quickly
• No correlation between ulcer severity and symptoms
• Ulcers have performance effects
• Many treatment options available but very few with evidence - buyer beware!
• Treatment alone may not be effective – may require management changes for long-term success.