Equine Gastric Ulcer Syndrome

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presented in part with:
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The Plan

- Anatomy and physiology of the equine stomach
- What is EGUS?
- Diagnosis of EGUS
- Treatment of EGUS
- Questions and Snacks
- Gastroscopy Demonstration

Anatomy and Physiology of the Equine Stomach

The condensed version

Anatomy of the Equine Stomach

- The stomach of an average-sized horse can hold 10-15L of milk/eat
- Fundus – the upper portion
  - squamous epithelium
  - minimal protection against acid
- Pyloric antrum – the lower portion
  - glandular epithelium
  - well-developed protections against acid
- Divided by the margo plicatus
- Lesser curvature and greater curvature

Physiology of the Equine Stomach

- Horses are monogastric animals
  - One stomach, similar to humans, dogs, cats
- Continuous secretion of acidic digestive juices
  - ~1.5L per hour
- Contains hydrochloric acid, digestive enzymes
- Liquid meal empties in ~30 min
- Hay meal can take up to 24hrs to empty

What is EGUS?

And why do I care?

EGUS: Equine Gastric Ulcer Syndrome

- Syndrome, not a disease
- Multiple causes and presentations
- Ulceration of the gastric mucosa
- Two sub-conditions recognized under the same title:
  - Equine Squamous Gastric Ulcer Syndrome (ESGUS)
  - Equine Glandular Gastric Ulcer Syndrome (EGGUS)

Symptoms of EGUS

- Decreased appetite, particularly for grain
- Recurrent colic episodes
- Poor weight gain, or weight loss
- Anorexia
- Low-grade anemia
- Teeth grinding
- Chewing
- Lack of energy
- Asymptomatic

Causes of EGUS

- Stress
- Non-steroidal anti-inflammatory (bute or banamine) – high doses or long-term use
- High grain, low forage diets
- Chronic pain
- Systemic diseases
- Being a horse

Questions So Far?

Diagnosing EGUS

Picture time!
Diagnosis of EGUS

- **Gastroscopy**
  - Treatment trials
  - Fecal occult blood tests
  - Sucrose permeability testing

Gastroscopy

- 3 meter endoscope
  - Portable options make on-farm diagnosis possible
  - Standing, sedated procedure
  - Endoscope passed via the nose into the esophagus to the stomach

Grading Gastric Ulcers

<table>
<thead>
<tr>
<th>Squamous Epithelium</th>
<th>Glandular Epithelium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 0 (Healthy epithelium)</td>
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</tr>
<tr>
<td>Grade 1 (Hyperkeratinized)</td>
<td>Grade 1 (Hyperemic)</td>
</tr>
<tr>
<td>Grade 2 (&lt;5 small, superficial ulcers)</td>
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</tr>
<tr>
<td>Grade 3 (Large, deep, multiple superficial lesions)</td>
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</tr>
<tr>
<td>Grade 4 (Extensive lesions with areas of opposing deep ulceration)</td>
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</tr>
</tbody>
</table>

Grading Gastric Ulcers

- **Squamous Epithelium**
  - Grade 1 (Hyperkeratinized)

- **Glandular Epithelium**
  - Grade 1 (Hyperemic)

- **Squamous Epithelium**
  - Grade 2 (<5 small, superficial ulcer)

- **Glandular Epithelium**
  - Grade 2 (<5 small, superficial ulcer)
Grading Gastric Ulcers

- **Squamous Epithelium**
  - Grade 3 (Deep ulcers or >5 superficial ulcers)

- **Glandular Epithelium**
  - Grade 3 (Deep ulcers or >5 superficial ulcers)

- **Squamous Epithelium**
  - Grade 4 (Extensive ulcers with deep, possibly bleeding ulcers)

- **Glandular Epithelium**
  - Grade 4 (Extensive ulcers with deep, possibly bleeding ulcers)

Goals of Treatment

- Increase comfort
- Decrease acidity
- Promote healing
- Prevent recurrence

Treatment Options

- **Decreasing Acidity**
  - Diet changes
    - Increased time chewing
    - Alfalfa
    - Decreased grain rations, or smaller volumes per meal
  - Proton pump inhibitors
    - Omeprazole (Gastrogard)
      - Once daily dosing
      - 28 day treatment course recommended
    - H2 histamine receptor antagonists
      - Ranitidine (Zantac)
      - Cimetidine (Tagamet)
      - Three times daily dosing
Omeprazole

You get what you pay for

- Guaranteed concentration of drug
- In buffered paste
- Omeprazole is acid sensitive
- Numerous studies to show efficacy

- Compounded omeprazole
  - Variable concentration of drug
  - Some forms have no buffer
  - May work for some horses, not for others

Case-in-Point

- Teenaged school horse
- Suspect EGUS (no gastroscopy to confirm)
- Long-term treatment with compounded omeprazole
  - 1 month of full treatment dose
  - 14 months maintenance on half treatment dose

- Cost of compounded omeprazole for duration of treatment: ~$1700
- Cost of Gastrogard for 28 day treatment course: ~$1400

Case-in-Point

- Teenaged school horse
- Suspect EGUS (no gastroscopy to confirm)
- Long-term treatment with compounded omeprazole
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Increasing Comfort

- Short-term
  - Sucralfate
  - Antacids (tums, acid fx, etc.)
- Long-term
  - Healing
  - Preventing recurrence
Promote Healing

- Decreasing acidity
- Misoprostol
- Synthetic prostaglandin
- Stimulates protective and regenerative capacity of glandular epithelium
- Corn oil
- Increases mucus production of glandular epithelium

Prevent Recurrence

- Diet changes
- Modifying stress triggers or intense exercise where possible
- Antacids prior to exercise
- Preventative acid suppression
  - ¼ treatment dose of omeprazole

Thank you!

Questions?