

Diarrhea in the Horse: *Salmonella* and Other Infections

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Equine Diarrhea

- Introduction
- Clinical Signs
- Diagnosis:
 - Salmonella
 - Clostridium
 - Potomac Horse Fever
 - Parasites
 - Sand
- Treatment



Introduction

- Colitis (inflammation of the colon) affects thousands of horses across the US each year
- Prognosis varies
- Routine isolation of all horses with diarrhea
- Diagnosis may take days several days.....to never

Clinical Signs

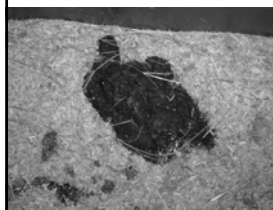


Clinical Signs

- Depression
- Fever
- Endotoxemia - bright red gums, toxic line
- Hypermotile intestinal sounds
- High heart rate
- Dehydration
- +/- Diarrhea



Character of Diarrhea.....



Not helpful for Diagnosis



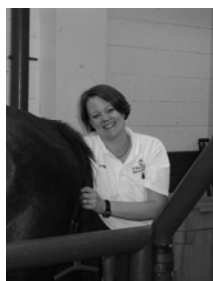
General Diagnostics

- CBC
 - White blood cell count
- Serum Chemistry
 - Protein level
 - Electrolyte derangements
 - Acidosis



General Diagnostics

- Abdominocentesis – also called a “belly tap”
- Rectal Exam

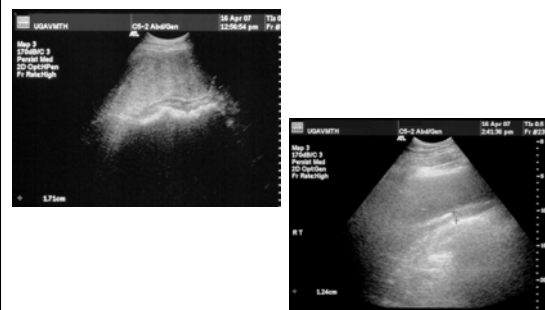


Additional Diagnostics

- Ultrasonography
- X-rays
- Fecal samples



Ultrasonography



Causes of Diarrhea

- Idiopathic
- Salmonella
- Clostridium
- Potomac Horse Fever
- Small strongyles
- Sand Enteropathy
- Right Dorsal Colitis
- Antibiotic Induced



Salmonella

- Gram negative facultative anaerobes
- Group B, including *S typhimurium* and *S agona*, frequently associated with disease
- One of the most common diarrheal diseases in the horse

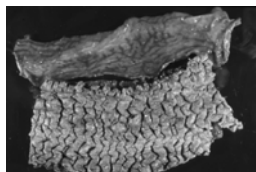
Salmonella

- Prevalence of fecal shedding in the US is estimated to be 0.8%¹, and 1.4-20%² in horses admitted to veterinary teaching hospitals
- Risk factors for shedding^{3,4}:
 - Antibiotics prior to hospitalization
 - Abdominal Surgery
 - Diarrhea
 - Prolonged hospitalization
 - Laminitis, low wbc count, reflux

1 Traub-Dargatzis et al JAVMA 2000; 2 Murray MJ JAVMA 1996; 3 Ernst NS et al JAVMA 2004; 4 Kim LM et al JAVMA 2001

Clinical Syndromes

- No clinical signs
- Depression, fever, low wbc count without diarrhea
- Enterocolitis with diarrhea
- Septicemia +/- diarrhea (primarily neonates)



Diagnosis - Salmonella

- Fecal culture of 5 consecutive fecal samples
- PCR of 3 or more consecutive fecal samples
- Intermittent shedding



Clostridium

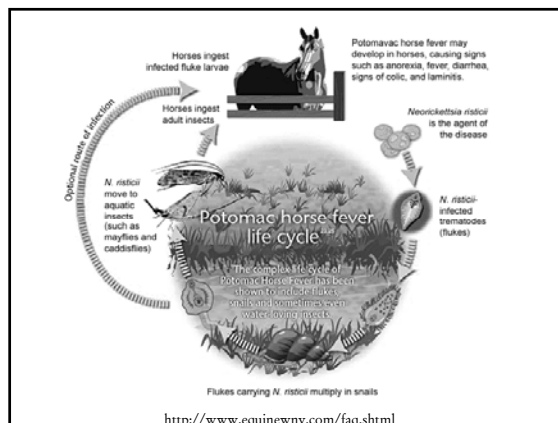
- Obligate anaerobic to aerotolerant spore-forming gram+ rods
 - ubiquitous to environment in spore form
- *C difficile* and *C perfringens* (types A and C) are most commonly reported
- Common antibiotic-associated cause of colitis

Clostridium perfringens

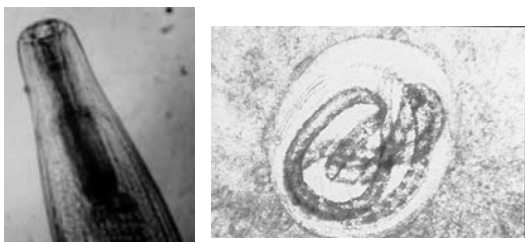
- Widely distributed as spores and vegetative cells in the environment
- Clinical signs are more common in foals than adults
- Differentiated based on toxin production
 - Alpha, beta, epsilon, iota, enterotoxin

Potomac Horse Fever

- Caused by *Neorickettsia risticii*
- Signs include fever, colic, diarrhea, laminitis, and kidney failure
- Diagnosis via blood titers and PCR testing
- NOT widespread in the SE US
- Treatment is with oxytetracycline, supportive care



Small Strongyles - Cyathostomes



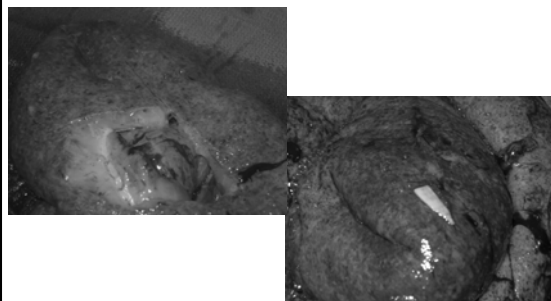
Cyathostomiasis

- Well-recognized cause of chronic diarrhea, however acute colitis may also be seen
- Eggs shed by mature females develop into infective L3 on pasture and are ingested
- L3 migrate across the intestinal wall and become encysted or develop into L4 and excyst

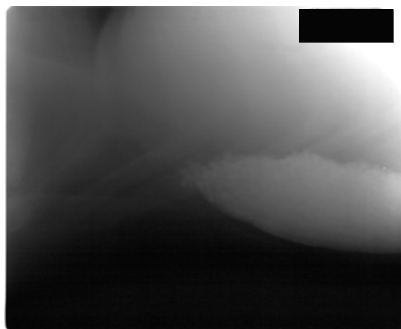
Diagnosis - Cyathostomes

- Definitive diagnosis is challenging because the disease is caused by larval stages, making fecal egg counts not always helpful
- Larvae in manure or on glove after rectal exam
- McMaster technique for fecal egg counts
- Modified Stoll's technique – requires centrifugation

Exploratory Celiotomy



Sand Enteropathy



Sand Enteropathy

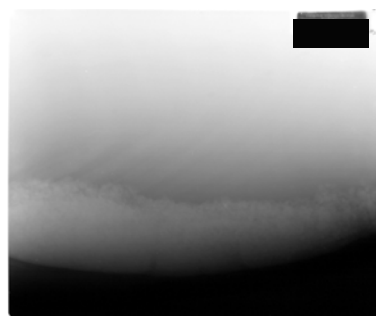
- Present for acute or chronic diarrhea, colic, or weight loss
- May not have any abnormalities on CBC or Serum Chemistry
- Coastal regions of west and southeast over-represented

Diagnosis of Sand

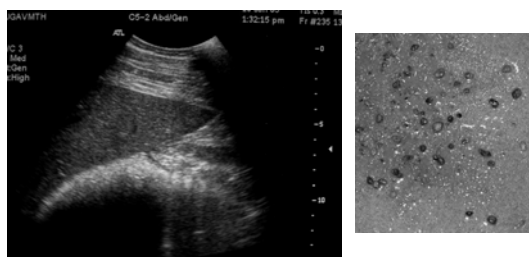
- Auscultation
- Fecal sedimentation
- Abdominal radiographs
- Abdominal ultrasonography



X-Rays



Ultrasonography



Treatment of Diarrhea



Treatment of Diarrhea

- Fluids and supportive care
- Address endotoxemia
- Antimicrobials??
- Probiotics
- Targeted therapy



Antibiotics??

- CONTROVERSIAL
- Metronidazole if Clostridial colitis suspected, Oxytetracycline for Potomac Horse Fever
- Profound neutropenia (low wbc count), sepsis, foals

....What about Probiotics....

- Minimal evidence-based research supporting use
- Probably not harmful



D'TO-smectite

- Biosponge™ (Platinum Performance)
- Binds C difficile toxins A and B, C perfringens enterotoxin, and endotoxin⁸



8 Weese et al. EVJ 2005

Specific Therapy

- Small Strongyles
 - Moxidectin or
 - Fenbendazole (10 mg/kg PO daily for 5 days)
- Sand – further discussion by Dr. Sanchez
 - Psyllium mucilloid (1 g/kg via NGT daily)
 - Environmental management

In Summary

- Not all horses with colitis present with diarrhea
- Isolate affected horses
- Fecal culture, PCR and toxin ELISAs may identify infectious etiologies
- Abdominal radiography and ultrasound can be useful tools for diagnosis and prognosis
- Fluid therapy and supportive care remain the cornerstone of therapy

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Any Questions?

