Investigation of Chronic Diarrhoea in the Adult Horse

Michael Hewston BSc BVSc Dipl.ECEIM
Department of equine and small animal medicine, Faculty of Veterinary medicine, University of Helsinki, Finland

I. Introduction

Diarrhoea in the horse can be defined as an increase in the frequency, fluidity and volume of bowel movements, and is considered to be chronic when it has persisted for at least one month. The investigation of chronic diarrhoea in the adult horse is a challenging undertaking and the veterinarian should make owners aware of the outset that in many cases a definitive diagnosis is not possible despite investment of substantial time, effort and cost. In a retrospective study of 51 referred cases of chronic diarrhea seen at the University of Glasgow in 1992, a diagnosis was only reached in 37 cases (72%), and of these cases, only 15 (30%) were made ante mortem. This underscores the difficulties faced by the veterinarian when trying to determine the cause of chronic diarrhoea, and although this study was done some years ago, it is unlikely that the picture has changed significantly today.

II. Classification of Chronic Diarrhoea

Chronic diarrhoea in the adult horse can be classified as infectious, noninfectious or idiopathic.

- **Infectious**: cyathostomiasis, proliferative enteropathy (*Lawsonia intracellularis*), chronic salmonellosis, intestinal tuberculosis (*M avium* ssp. *paratuberculosis*; *M avium* ssp. *Avium; M. intracellular*), peritonitis, abdominal abscessation and strongylosis (*S vulgaris; S edentatus, S equinus*). There are also isolated reports of *Giardia* spp., *Campylobacter* spp., *Brachyspira pilosicoli* and aspergillosis causing chronic diarrhoea in the horse.  

- **Non-infectious**: sand enteropathy, NSAID-induced right dorsal colitis, gastrointestinal neoplasia (e.g. alimentary lymphoma), inflammatory bowel disease (granulomatous, lymphocytic-plasmacytic or eosinophilic enterocolitis; multisystemic eosinophil epithelioidtropic disease), extensive large colon resection, chronic liver disease and hyperlipemia.

- **Idiopathic**: horses in which an infectious or noninfectious etiology cannot be established are considered to have abnormal volatile fatty acid synthesis and absorption secondary to an altered diet or bacterial fermentation, and are arbitrarily classified as having idiopathic colon dysfunction.

III. Diagnostic Approach

When investigating a horse with chronic diarrhoea, it is important to remember that diarrhoea is a manifestation of large intestinal disease in the adult horse. Adult horses with small intestinal disease and normal colon function will not present with diarrhoea. This is due to the fact that the colon is the primary source of water absorption in the gastrointestinal tract, and is thus able to compensate for excessive amounts of fluid presented to it as a result of small intestinal disease. It is only when the absorptive capacity of the colon is compromised that diarrhoea will occur. The clinical manifestations of chronic diarrhea depend upon the underlying disease process, but by definition, all horses will have diarrhea which has persisted for at least one month. The faecal consistency can range from watery to soft ‘cow pat’ in appearance and may change in consistency from day to day. Unlike acute diarrhea, horses with chronic diarrhea are usually bright, alert and have a good appetite. Other clinical signs may also be apparent and in some cases can be used to guide the veterinarian towards a preliminary diagnosis. The initial assessment should be aimed at obtaining a minimum database of information that can be used to generate a list of differential diagnoses and an appropriate diagnostic plan.

A. History

As with the investigation of most clinical problems, the first step in evaluating a horse with chronic diarrhoea is to obtain a good history. If any aspect of the history points to a primary disease, then that particular aspect should be focused on during the physical examination. The breed and type of horse may be important. Granulomatous enteritis has been described in many breeds of horses, but there appears to be a genetic predisposition to development of disease in Standardbreds. The veterinarian should enquire about the age of the horse. Most cases of proliferative enteropathy (PE), strongylosis, granulomatous enteritis and multisystemic eosinophil epithelioidtropic disease involve young horses. PE should be ruled out in any young horse in poor body condition with chronic diarrhoea, particularly if more than one horse on the property is affected. The environment and diet may also provide clues to the cause of the diarrhoea. Horses that are housed in sand paddocks without free access to forage are predisposed to sand enteropathy. Horses that have been allowed to consume excessive quantities of fresh grass can be expected to develop loose watery faces, but this will usually resolve once they are removed from the pasture and fed a regular diet. The veterinarian should enquire about the horse’s deworming history. Cyathostomiasis should be considered in any horse with an inadequate deworming history, particularly if the diarrhoea corresponds with the emergence of hypobiotic larvae in late winter or early spring. Other aspects of the medical history may also prove useful. Horses that have had extensive colon resection may develop chronic diarrhea. Horses that have been treated with high doses of NSAID’s for extended periods of time are predisposed to developing right dorsal colitis. Horses with chronic diarrhoea that have a recently recovered from a bout of severe acute colitis should be screened for chronic active salmonellosis. These horses will often present with a history of low-grade recurrent
colic, and if the temperature and WBC are taken during one of these episodes, a mild fever and/or leukopenia may be found. Chronic diarrhoea and a concurrent history of progressive weight loss and peripheral oedema should alert the clinician to the possibility of a protein losing enteropathy, and conditions such as cyathostomiasis, IBD, right dorsal colitis and PE should be considered.

B. Physical Examination

When performing the physical examination, the main consideration is to determine if there are any other clinical signs apart from chronic diarrhea that may point towards a specific underlying disease process. For example, auscultation of the ventral abdomen immediately behind the xiphoid process may reveal characteristic sand sounds in cases of sand enteropathy. Unfortunately most of the clinical signs associated with chronic diarrhoea in the horse are non-specific and may overlap considerably. Common clinical signs include inappetance, lethargy, intermittent fever, weight loss, recurrent colic and dependant oedema. Perhaps the most useful clinical sign is the absence of clinical signs! Horses with idiopathic colon dysfunction can have diarrhoea for many months but will not have concurrent weight loss or any other clinical signs attributable to an underlying disease process.

C. Clinical Laboratory Tests

Frequently nothing is found in the history or on physical examination to help pinpoint the cause of chronic diarrhoea. If this is the case, then blood should be submitted for a complete haematological and biochemical profile. The results of these tests will help localize the problem to a specific organ system or pathophysiological process, determine whether an inflammatory or infectious condition is present, and dictate whether further laboratory tests or diagnostic procedures are indicated.

Clinicopathologic alterations that may aid in the diagnosis of chronic diarrhoea include:

- Leukocytosis and absolute neutrophilia [with or without a left shift], hyperfibrinogenemia, and anaemia of chronic disease [mild normocytic, normochromic anaemia] in cases of cyathostomiasis, strongylosis, intra-abdominal abscessation, intestinal tuberculosis, PE, chronic salmonellosis and peritonitis.
- Leukopenia in the acute stages of chronic salmonellosis
- Eosinophilia in some cases of strongylosis and multisystemic eosinophilic epitheliotropic disease
- Lymphocytic leukaemia and large numbers of circulating neoplastic lymphocytes may be seen in horses with alimentary lymphoma, but this is rare [usually associated with bone marrow involvement].
- Hypoalbuminemia in cases of cyathostomiasis, IBD, right dorsal colitis, chronic salmonellosis and PE
- Elevations in α and β globulins together with a concurrent hypoalbuminemia in cases of cyathostomiasis and strongylosis. Strongylosis may be distinguished from cyathostomiasis by the fact that serum concentrations of IgG (T) are also elevated.¹⁰
- Elevations in liver enzymes [AST, sorbitol dehydrogenase (SDH), lactate dehydrogenase isoenzyme 5 (LDH 5), gamma-glutamyl transferase (GGT), alkaline phosphatase (ALP) and arginase] and serum concentrations of total bilirubin and bile acids in cases of chronic hepatic disease.
- Hypertriglyceridemia, hypercholesterolemia, hypoglycaemia and elevations in liver enzymes in cases of hyperlipemia.
- Hypernatremia, hypokalemia, hypochloridemia and hypocalcaemia in any horse with profuse chronic diarrhoea. Metabolic acidosis may also be present due to loss of bicarbonate through the inflamed colon wall.
- Plasma fructosamine concentrations have been found to be significantly lower in horses with experimental cyathostomiasis when compared to normal controls, however this test has not been validated in naturally occurring cases and thus the sensitivity and specificity are unknown.¹¹

Figure 1: Chronic diarrhoea in a horse with larval cyathostomiasis.
D. Standard Diagnostic Aids

If the information obtained from the history, physical examination or laboratory tests helps to localize the disease process, then further investigation that focuses on that process should be pursued. The veterinarian should be able to formulate a list of differential diagnoses and then select appropriate diagnostic tests and imaging modalities with which to make a definitive diagnosis. Standard diagnostic procedures that are commonly used to investigate chronic diarrhea in the horse include:

1. Rectal Examination

A thorough and systematic rectal palpation should be performed in all cases. Common abnormalities that may aid in the diagnosis of chronic diarrhea might include:
   - Enlargement of cranial mesenteric root. Any evidence of arteriopathy is compatible with S. vulgaris larval migrans. Mesenteric lymph nodes are normally not palpable and their enlargement is compatible with IBD and alimentary lymphoma.
   - Intraabdominal masses. This refers primarily to enlarged node chains along the teniae of the large colon consistent with IBD or lymphoma, but discreet masses may also be palpable in cases of intraabdominal abscessation or neoplasia.
   - Thickened intestinal wall.
   - Roughened [gritty] peritoneal surfaces in cases of peritonitis

![Figure 2: A thorough and systematic rectal palpation should be performed in all cases of chronic diarrhea](image)

2. Abdominocentesis

Analysis of the peritoneal fluid may be useful for identifying peritonitis, intra-abdominal abscessation, and intra-abdominal neoplasia. Samples can be obtained by needle abdominocentesis or with a teat cannula and should be submitted in an EDTA tube for cytology and determination of total red blood cells, total and differential nucleated cells and total protein. Samples should also be submitted for bacterial culture.

3. Abdominal ultrasonography

Transcutaneous abdominal ultrasonography is a valuable diagnostic aid in the investigation of chronic diarrhea in the horse, as it enables the veterinarian to image regions of the abdomen that are inaccessible to rectal palpation and in many cases, provides further information. Ultrasonography abnormalities that may aid in the diagnosis of chronic diarrhea might include:
   - Thickened intestinal wall in cases of cyathostomiasis, IBD, right dorsal colitis, PE and alimentary lymphoma.
   - Discrete masses of variable echogenicity [solid heterogeneous tissue to encapsulated fluid] in cases of intra-abdominal abscessation or neoplasia.
   - Anechoic peritoneal fluid in the abdominal cavity in cases of peritonitis and intra-abdominal neoplasia [not a consistent finding]. Images are best obtained by placing the transducer on the ventral abdomen.
   - Hyperechoic bands in the ventral abdomen in cases of sand enteropathy
   - Hepatomegaly; mixed echogenicity of the liver parenchyma; dilated intrahepatic bile ducts; and multiple variably echogenic calculi casting acoustic shadows in cases of chronic liver disease.

E. Ancillary Diagnostic Aids

1. Faecal examination and culture

Faecal samples should be obtained and submitted for:
   - Salmonellae culture: Sensitivity of faecal cultures for detecting Salmonella infection may be as low as 20%. Culture of five consecutive daily faecal samples is recommended to increase sensitivity of test. Can also increase sensitivity of test by up to 50% by culturing rectal scrapings or rectal biopsy (Salmonella are intracellular organisms). Currently the most sensitive and rapid test to detect Salmonella is the faecal polymerase chain reaction (PCR)
   - Presence of sand: Check for sand by placing faeces in water and swirling in bucket or hanging in a rectal sleeve and waiting for few minutes for sand to settle. A negative finding does not rule out sand and if there is a high index of suspicion for sand, abdominal x-rays are recommended.
   - Presence of strongylo eggs: > 200 eggs/gram is considered significant. It is important not to rely on the presence of strongylo eggs alone to make a diagnosis of cyathostomiasis or strongylasis, as clinical disease is caused by nonpatent larval stages and thus severe disease may be present in the absence of significant faecal egg counts
   - Giardia oocysts: Faecal sedimentation is used to detect Giardia but be careful with interpretation. Giardia has been isolated in the faeces of normal foals and adults. Giardia is usually not a cause of diarrhea in horses per se, but may be implicated as part of generalized gastrointestinal flora disturbances in cases of chronic diarrhea.
Presence or absence of normal gastrointestinal flora:
The majority of protozoa should be ciliates. The absence of all protozoa or the predominance of flagellates (Trichomonas equi) is not normal and represents a disturbance in normal colonic microflora. Evaluation needs to be done on fresh faecal material.

Faecal PCR for Lawsonia intracellularare may be useful in some cases, however false negatives are common. Culture of the organism from faeces requires specialized cell culture techniques and is not widely available.

2. Rectal mucosal biopsy

A rectal biopsy can be obtained under standing sedation using a uterine biopsy instrument. Samples should be submitted for histopathology and bacterial culture and may be useful for identifying horses with IBD, alimentary lymphoma and cyathostomiasis. Acid fast bacilli may be found in rectal biopsies stained with Ziehl-Neelsen in cases of intestinal tuberculosis. A portion of the rectal biopsy should also be submitted for bacterial culture in an attempt to identify Salmonella. Culture of rectal biopsies is reported to increase the likelihood of identifying salmonellosis when compared with serial faecal cultures.

3. Oral glucose absorption test

Useful for identifying horses with small intestinal malabsorption. Diseases that may cause malabsorption include IBD, alimentary lymphoma, cyathostomiasis, intestinal tuberculosis and chronic salmonellosis. Horses should be fasted for 12-24 hours and then 1 g/kg of glucose is administered as a 20% solution via nasogastric intubation. Serial blood samples are then collected in sodium fluoride tubes at 0, 30, 60, 90, 120, 150, 180, 210 and 240 minutes after administration. It is important not to sedate horses with α2 agonists during the test as it will cause hyperglycemia and will also affect gastrointestinal transit time. A normal oral glucose absorption test should have a peak between 90 and 120 minutes, and this peak should be greater than 85% above the resting glucose value. COMPLETE malabsorption is defined as a peak less than 15% above the resting levels, and PARTIAL malabsorption is defined as a peak between 15% and 85% above the resting level. Malabsorption of carbohydrates is attributed to severe villous atrophy throughout the small intestine.

4. Intradermal skin testing

Intradermal skin testing using mammalian and avium tuberculin can be used in an attempt to identify horses with intestinal tuberculosis; however the test may be positive in up to 70% normal horses and is thus not very specific.

5. Serology

Serologic analysis using an indirect immunofluorescent antibody test may be the most useful single antemortem diagnostic test for Lawsonia intracellularare (PE).

6. Laparoscopy

Laparoscopy can be used to examine the abdominal organs and intestine in situ, characterize intraabdominal masses, and obtain biopsies when indicated. The equipment is expensive however and may not always be available to the average practitioner.

7. Exploratory laparotomy

Exploratory celiotomy can be used for diagnostic purposes (e.g. obtaining full thickness intestinal biopsies), but this is usually reserved for those horses in which a definitive diagnosis has not been identified despite extensive investigation. Performing an exploratory celiotomy is expensive, requires specialized skills, and is usually the remit of veterinarians based at referral centers or academic. Causes of chronic diarrhoea that could be ruled out using this technique include cyathostomiasis, strongylosis, IBD, intraabdominal abscessesation, right dorsal colitis, and alimentary lymphoma.

IV. Conclusion

An accurate diagnosis is dependent upon a systematic approach when investigating the cause of chronic diarrhea in the horse. Information assimilated from the history, physical
examination and clinical laboratory tests enables the veterinarian to formulate a list of differential diagnoses. Further investigation can then be aimed at definitive diagnosis by selecting the most appropriate diagnostic tests and imaging modalities. Owners should be warned that it is not always possible to make a definitive diagnosis.

V. Selected References

1. Jones, S.L. Mechanical disorders of the large intestine. In Smith, B.P., Large animal internal medicine, ed 4, Mosby, St Louis, 2009, pp 749