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Diarrhoea in the adult horse

Diarrhoea, defined as increased faecal water content, is relatively common in horses and can have a variety of causes. While diarrhoea is often transient, in some cases it may be associated with significant illness or persist for an extended period of time. These cases can present a frustrating diagnostic and management challenge for veterinary surgeons and owners.

Why does diarrhoea occur?

In adult horses, diarrhoea is usually a result of conditions affecting the large intestine (caecum, large colon, and small colon). The large intestine has important functions in the absorption and storage of fluid, and the digestion of food by microbes including bacteria; complex mechanisms are required to regulate these functions. The microbial population of the large intestine is delicately balanced, and is easily disrupted by a number of factors, including diet changes, stress, and antimicrobials. Any disruption to the normal bacterial flora or to the intestinal wall itself can result in diarrhoea.

What are the common causes of diarrhoea?

Diarrhoea can result from a number of causes and is usually classified as acute or chronic (Figure 1). Acute diarrhoea can range from transient diarrhoea caused by a sudden change in diet, to profuse diarrhoea accompanied by severe systemic illness including fever, colic, and laminitis. Chronic diarrhoea develops more gradually, usually over the course of seven days or more, and the horse often has no or only mild signs of systemic disease.

Salmonella and Clostridium species are the most common bacteria that cause diarrhoea in adult horses. Salmonella can cause severe, acute diarrhoea, and horses will often be severely sick with clinical signs of fever, depression, inappetence and colic (Figure 2). Horses may be exposed to Salmonella in the environment, and some horses may also carry Salmonella bacteria within their gastrointestinal tract without having symptoms of disease. Risk factors for Salmonella infection in horses include colic, general anaesthesia, and antimicrobial administration.

Clostridial diarrhoea, due to Clostridium difficile and less commonly Clostridium perfringens, is usually associated with antibiotic therapy and disruption of normal bacterial flora. Clinical signs include acute diarrhoea, fever, depression and inappetence, and the disease can be rapidly fatal in some cases.

Equine Coronavirus (ECoV) has more recently been identified as a cause of gastrointestinal disease in horses. Diarrhoea ranges from mild to severe, however the most common clinical signs are fever and inappetence. This infection often occurs as an outbreak, with clinical signs seen in multiple horses in a herd.

Potomac horse fever (PHF), caused by the bacterium Neorickettsia risticii, is most commonly seen in North America, but has been reported in Europe. PHF causes severe, watery diarrhoea and fever, and affected horses commonly develop laminitis.

Parasitic causes of diarrhoea include the cyathostomins (small strongyles/red worms). These parasites migrate through and encyst in the large colon and caecum wall and damage the intestinal lining when they emerge, known as larval cyathostomiasis. Weight loss may occur first, followed by chronic diarrhoea. Rapid emergence of large numbers of encysted cyathastomins can cause profuse, watery diarrhoea and severe protein loss. There is often a history of recent worming in these cases. Faecal worm egg counts are usually unhelpful for diagnosis in these cases, as the larvae are responsible for disease rather than egg-laying adults.

Non-steroidal anti-inflammatory drugs (NSAIDs) such as phenylbutazone (Bute) and flunixin meglumine (Finadyne) are commonly used to treat a number of conditions. Prolonged or excessive NSAID use, or an adverse reaction, can result in inflammation of the right dorsal colon, known as right dorsal colitis. In these cases, the colon wall becomes thickened and ulcerated, resulting in rapid protein loss and development of either acute or chronic diarrhoea. Horses will often develop swelling of the ventral abdomen and limbs due to low protein levels.

Inflammatory bowel disease (IBD) results from infiltration of the intestinal wall by inflammatory cells, and usually affects the small intestine. Clinical signs include progressive weight loss due to malabsorption, and slow-onset chronic diarrhoea. Intestinal neoplasia (cancer) is the main differential diagnosis for IBD.

Lymphoma is the most common gastrointestinal neoplasia in horses and can result in signs similar to IBD due to infiltration of the intestinal wall by lymphocytes, a type of white blood cell. Ultrasonography and rectal examination may reveal thickened intestinal wall, however definitive diagnosis of IBD or lymphoma requires histopathology of intestinal biopsies. There is also a blood test to measure the tumour marker TK1, which may be useful to differentiate lymphoma from other causes of chronic diarrhoea.

Ingestion of sand can also result in chronic diarrhoea. This normally occurs in horses eating from the ground, particularly where grass levels are low. Sand accumulation in the large colon causes irritation to the intestinal lining, and large volumes can also cause impactions. Typically, diarrhoea is chronic and intermittent. A sand sedimentation test is an easy test to identify sand in the faeces and involves placing a sample of faeces in a container of water, agitating the sample and then allowing it to settle; the sand will quickly sediment at the base of the container.

Peritonitis is inflammation of the peritoneum, the membrane that lines the abdomen and covers the abdominal organs. Peritonitis typically causes signs of fever, lethargy, and colic, but will sometimes also result in diarrhoea. It can be diagnosed by peritoneal fluid analysis.

Causes of acute diarrhoea	Causes of chronic diarrhoea
Salmonella	Parasites (small strongyles)
Clostridium	Inflammatory bowel disease
Coronavirus	Sand ingestion
Parasites (small strongyles)	NSAID toxicity
NSAID toxicity	Neoplasia
Antimicrobial-related diarrhea	Peritonitis
Potomac horse fever	

Figure 1: *Causes of diarrhoea in adult horses*

Figure 2: *Horses with acute diarrhoea are often depressed and show signs of colic*

Approach to the diagnosis of diarrhoea

While many cases of diarrhoea will resolve before the cause can be identified, some conditions cause more serious disease that requires further diagnostics and treatment. In many cases, it can be difficult to identify the underlying cause of diarrhoea, particularly in acute diarrhoea where a specific pathogen or cause may be identified in less than 50% of cases.

Faecal samples often provide the most useful information. Faecal samples can be collected for a faecal worm egg count, examination for parasitic larvae or sand, and culture or molecular testing for bacterial or viral organisms that cause diarrhoea (e.g. Salmonella, Clostridium, Coronavirus). Blood tests can reveal evidence of dehydration, degree of protein loss, electrolyte abnormalities, and infection; multiple blood abnormalities including severe dehydration and low white blood cell count may be present in acute diarrhoea, whereas chronic diarrhoea may not result in specific changes. Abdominal ultrasound examination can be performed to evaluate for thickening or oedema of the large intestine wall (Figure 3) or changes in volume or appearance of peritoneal fluid.

Rectal examination can also be used to assess intestinal wall thickness, position and size of the large colon and abdominal organs, and abnormalities of lymph nodes. Abdominal radiographs can be obtained to identify sand within the large colon. Abdominocentesis (collection and analysis of abdominal fluid) may reveal bacteria or increased numbers of inflammatory cells.

Rectal biopsies can be performed in the standing, sedated horse, and can give evidence of inflammation of the GI tract, however false negatives are common. Full thickness biopsies of the intestine provide more useful information; however, collection of these biopsies typically requires either general anaesthesia and exploratory abdominal surgery or laparoscopic surgery under standing sedation. In cases of diarrhoea where malabsorption is suspected (e.g. IBD or lymphoma), a glucose absorption test can be performed.

How is diarrhoea treated?

Some cases of mild, acute diarrhoea will resolve quickly without treatment. For those that do not resolve quickly, symptomatic treatment can be started. Initially, this can include limiting access to fresh green grass, and encouraging water intake. Electrolytes can be added to drinking water to help maintain electrolyte balance, however normal drinking water should always be available too as some horses will not drink the supplemented water.

If a horse appears dull, inappetant, has a fever, or has diarrhoea that is profuse, watery, or doesn't resolve within 24 hours, then immediate veterinary intervention should be sought. In cases of acute, severe diarrhoea, medical therapy often needs to be implemented before a diagnosis is found.

The mainstays of treatment of acute diarrhoea include fluid therapy to correct and prevent dehydration, drugs to minimise the release of toxins into the bloodstream, anti-inflammatory and pain-relieving medications, and laminitis prophylaxis in the form of digital cryotherapy (ice boots) or sole supports (Figure 4).

Antimicrobials may be prescribed if a specific bacterium is identified, such as metronidazole for Clostridial diarrhoea or oxytetracycline for PHF. However, given their effects on the normal gut flora, antimicrobials are generally not otherwise warranted unless a horse is severely immunocompromised. Some horses will require intravenous plasma or synthetic protein solutions if their blood protein levels are severely decreased. Binding agents such as Biosponge® (di-tri-octohedral smectite) can be administered to absorb toxins within the intestinal tract. Misoprostal, a synthetic prostaglandin analogue, can help heal and protect the damaged colon in cases of NSAID-induced diarrhoea.

In comparison to acute diarrhoea, in cases of chronic diarrhoea it may ››

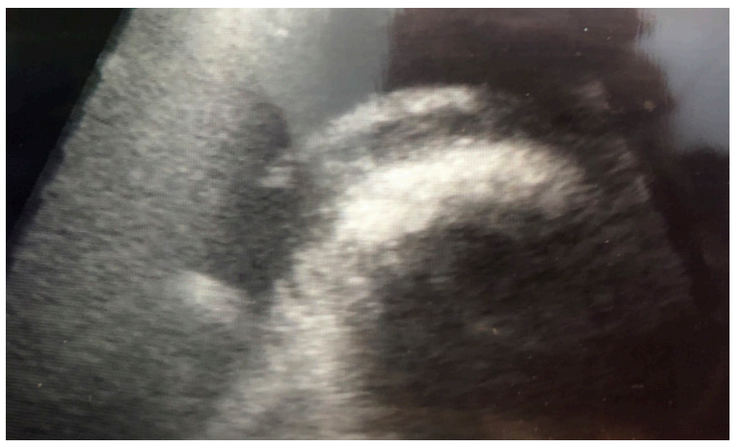

Figure 3: *An ultrasound image showing an abnormally thickened large colon wall*

be possible to complete some or all diagnostic investigations prior to developing a treatment plan. If inflammatory bowel disease is diagnosed, then corticosteroid therapy with prednisolone or dexamethasone may be recommended to reduce inflammation, however the prognosis can be guarded in these cases

Management of sand ingestion includes limiting further ingestion by feeding using haynets or raised feeders, and the administration of psyllium via stomach tube or in feed to bind the sand and facilitate its exit from the large intestine. Where parasitic infection is suspected, the horse should receive an appropriate anthelmintic. Moxidectin is the only wormer that reliably kills the encysted, larval stages of small strongyles.

Antimicrobials are rarely indicated in cases of chronic diarrhoea and may worsen imbalances in the normal bacterial flora of the intestines. Transfaunation, where fresh faeces from a normal horse are administered via stomach tube, has been shown to be effective in some diarrhoea cases. Codeine phosphate,

Figure 4: *Intravenous fluid therapy and digital cryotherapy (ice boots) are mainstays of treatment of acute diarrhoea*

a drug that reduces gut motility, can be used but may result in constipation so faecal output should be monitored carefully.

Probiotics, containing so-called 'good' bacteria to help restore the normal bacterial flora of the intestine, have also been suggested to help prevent and treat diarrhoea. However, there is very little evidence as to the effectiveness of probiotic products. Many probiotic products have been shown to contain only low levels of bacteria, and there are also questions over the ability of probiotic products to deliver these bacteria alive to the large colon.

Summary

Diarrhoea in adult horses can be due to a number of underlying causes, with disease severity ranging from mild to severe. Mild cases of diarrhoea may resolve without intervention or require only diet adjustment and symptomatic treatment at home, however severe, acute diarrhoea is a true veterinary emergency that requires intensive medical therapy.

In acute diarrhoea the horse is frequently sick with clinical signs including fever, depression, inappetence and colic. Chronic diarrhoea cases in comparison may be bright with a good appetite, with weight loss the most common associated clinical sign.

A number of diagnostic modalities are available, however in many cases of diarrhoea a specific diagnosis may not be found. Symptomatic treatment is therefore the mainstay of treatment of both acute and chronic diarrhoea.