Stomach ULCERS a disease of domestication?

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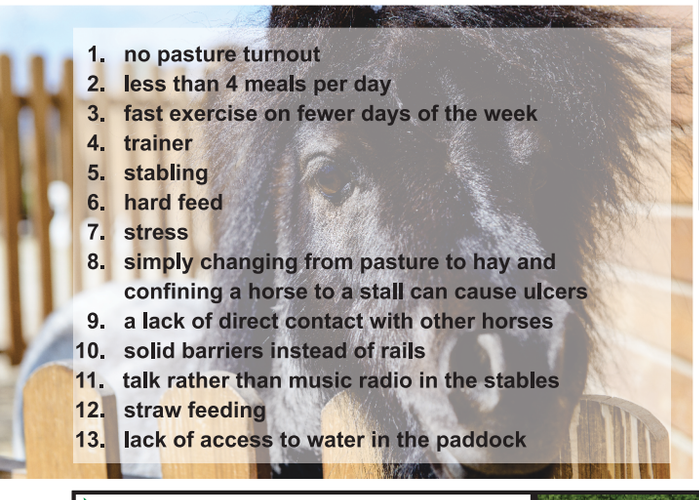
No horse is immune to stomach ulcers - found in 37% of pleasure horses and spelling thoroughbreds, 40% of Western performance horses, 20-51% of foals, 54% of show horses, 64% of sport horses, 93% of race horses in training and in 41% of donkeys. In endurance horses, the prevalence is 16% outside the competition season and up to 93% while competing. In one study, ponies eating only hay had no ulcers, compared to 50% of ponies fed concentrates. The incidence in feral horses is between 2 and 7%.

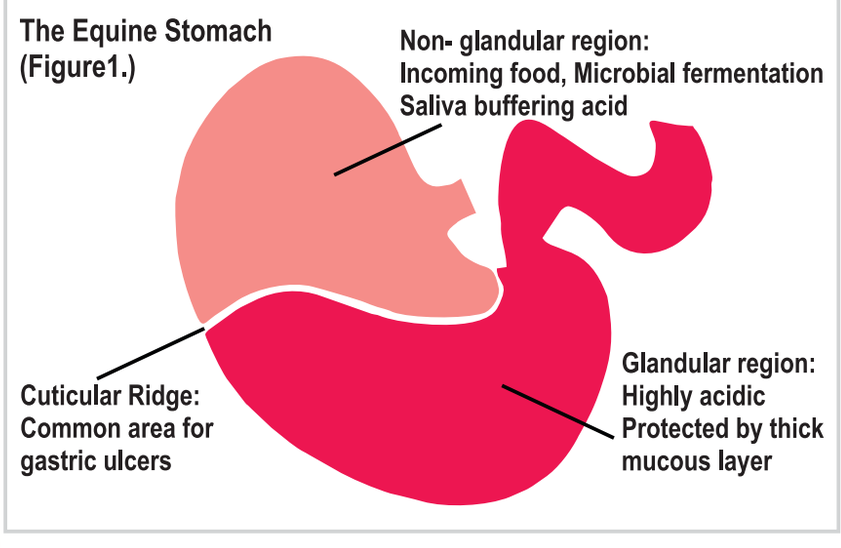
These surveys give us some insight into the risk factors, which include:



1. no pasture turnout
2. less than 4 meals per day
3. fast exercise on fewer days of the week
4. trainer
5. stabling
6. hard feed
7. stress
8. simply changing from pasture to hay and confining a horse to a stall can cause ulcers
9. a lack of direct contact with other horses
10. solid barriers instead of rails
11. talk rather than music radio in the stables
12. straw feeding
13. lack of access to water in the paddock

These factors are particularly associated with the domestication of horses and probably explain the high prevalence of stomach ulcers, compared to feral populations.

The equine stomach is different to the stomach of other animals because only half of it is lined with cells that produce mucus and stomach juices (called the glandular area). The other half (the nonglandular or squamous region) has no protective mucus (Figure 1.).



Ulcers can occur in either the glandular or the non-glandular region. There is no link between the two, they are considered to be different diseases entities - and their causes and treatment, are different. Most ulcers occur in the unprotected non-glandular area and are caused by stomach acids. These include gastric acid and the acid produced by bacterial fermentation. There is a strong link with exercise when, at gaits faster than a walk, increased pressure in the abdomen pushes the acid high up into the non-glandular region and also causes reflux of bile and acid from the small intestine into the stomach. In endurance horses, the severity of ulceration is directly related to the length of the ride. Ulcers in the glandular area are less common (found in 17-33% of endurance horses, 54-64% of leisure/sport horses and 47-65% of thoroughbred racehorses) and the cause is still not clear.

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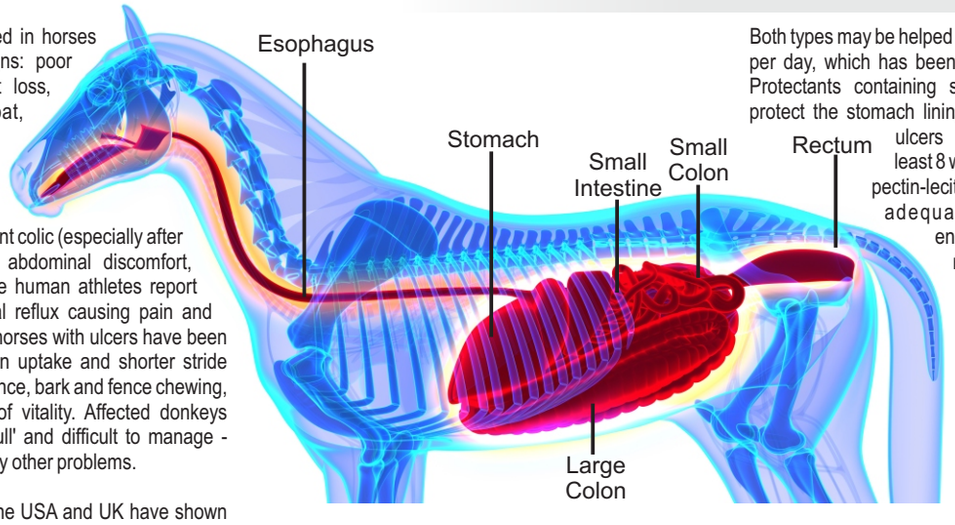
Ulcers are commonly suspected in horses with any of the following signs: poor appetite, picky eating, weight loss, chronic diarrhoea, poor coat, teeth-grinding, belching, behavioural problems (nervousness, aggression, self-mutilation, crib-biting, wind-sucking, weaving), recurrent colic (especially after eating), poor body condition, abdominal discomfort, poor performance (58% of elite human athletes report heart-burn and gastro-intestinal reflux causing pain and decreased time to exhaustion; horses with ulcers have been shown to have reduced oxygen uptake and shorter stride length), reduced exercise tolerance, bark and fence chewing, lying on their back and loss of vitality. Affected donkeys frequently present as being 'dull' and difficult to manage - although these are signs of many other problems.



On the other hand, studies in the USA and UK have shown that 51% of foals and 84% of yearlings with ulcers show no signs at all! And, given that up to 90% of performance horses have stomach ulcers, it's not surprising that a range of symptoms have been recorded - and could easily include watery eyes or whinnying! The most suggestive indicators of ulcers are loss of appetite (especially for grain), signs of pain after eating, teeth grinding and belching. However, the bottom line is that it's very difficult to diagnose a stomach ulcer on symptoms alone - not one of the signs is specific and each could be due to other pain or lameness. Even with endoscopic confirmation of an ulcer, the symptoms should not be blamed on the ulcer unless other problem have been ruled out - and importantly the symptoms must improve with ulcer treatment.

No acid, no ulcer is the mantra in human medicine. Likewise in horses, non-glandular ulcers are treated with acid suppressants - usually omeprazole. The causes of ulcers in the glandular region of the stomach are poorly understood. Ongoing research is shedding more light on their causes and treatment - which likely requires a combination of dietary changes, omeprazole, botanicals, probiotics and protectants.

Photo by: Randlab

Bot fly larvae infestation in the stomach. The owner was adamant that the horse had been wormed. The scope allows vets to see both the ulcers and if there are any other conditions within the stomach.

Both types may be helped by feeding 150-250ml of corn oil per day, which has been shown to reduce acid output. Protectants containing sulcrafate create a barrier to protect the stomach lining and can help with glandular ulcers if treatment continues for at least 8 weeks. Other protectants include pectin-lecithin complexes which may be adequate in low–moderate risk environments. It increases the mucus in gastric juice, and although this doesn't seem to help if the ulcers result from lack of feed for several hours, when combined with an antacid (such as magnesium or aluminium hydroxide) + live yeast, the outcome is better for both types of ulcers. Aluminium is a double-edged sword - although it triggers release of protective mucus and stimulates cell growth, long term use in humans is associated with intestinal complications (mineral deposits along the intestine, loss of bone density and other effects on the immune, digestive system and nervous systems) and chronic toxicity occurs in horses. Before using, check the body aluminum status first with a hair mineral analysis.

Other feed supplements to promote a healthy stomach and prevent destruction of the stomach lining include dried apple pectin pulp and other fruit products, soy lecithin, sodium bicarbonate, calcium bicarbonate, lucerne meal, insoluble oat fiber (ß-glucan), polar lipids, natural antioxidants and antacids such as calcium carbonate and sodium bicarbonate. Several ingredients in these feed supplements have been shown in other species to support and protect the stomach lining, support normal digestive function, bind bile acids, and protect the stomach against the generation of damaging oxygen free radicals.

In addition, antacids like calcium carbonate have been shown to protect the nonglandular region from the damaging effects of gastric acids.

Specific guidelines for the prevention of glandular ulcers have not been developed, but recently there has been an increased interest in the use of botanicals (herbs and berries). Berries and pulp from the sea buck- thorn plant (Hippophae rhamnoides) are rich in nutrients and compounds such as vitamins, carotene, flavonoids, essential oil, carbohydrates, organic acids, amino acids, and minerals. Although the berries haven't been found to have a significant effect on the number or severity of non-glandular ulcers, they may help with glandular ulcers. Glandular ulceration has been shown to reduce the numbers of "good" bacteria on the stomach lining, allowing opportunistic pathogens to colonise the ulcers - and this is thought to play a role in glandular ulceration. Certain probiotics found in fermented soy and marine-derived algae combinations are showing promise to help recolonise the stomach.

There are also several management strategies that can be useful for both the prevention and management of ulcers. Even one hour with an empty stomach may already be a source of discomfort and continuous access to grass is the ideal. Free choice, or at least frequent feedings (4–6 meals/day) of hay at a minimum of 1.5 kg/100 kg bodyweight – use mature, low energy hay for overweight horses and ponies. If low energy hay isn't available, you can mix higher quality hay with straw. Straw can cause impaction if too much is fed, so only feed a maximum of 250g/100kg body weight. Sweet feeds should be avoided as they ferment to acid in the stomach. And, avoid electrolyte pastes which increase the risk of non-glandular ulcers - instead mix the electrolytes into the feed.

The prevalence of non-glandular ulcers mirrors exercise intensity, increasing as the intensity of work increases - in some horses they can develop within 7 days! Unlike humans who secrete digestive juices on demand, horses continuously secrete stomach acids from the glandular tissue at the bottom of the stomach, even on an empty stomach. Hard work can slosh some of the stronger acids up onto the less-protected upper lining of the stomach and erode the tissues there. Feeding a small meal of lucerne 30-60 minutes before work will provide a buffer against this - horses should never be worked on an empty stomach.

Photo by: Randlab

Feed Ball: This horse was not fasted and fed feed prior to exercise. The feed obstructs the view but does prevent the amount of acid splashing around during exercise. For a horse to be properly diagnosed they need to be fasted for at least 8 hours prior.

Preventing the onset of gastrointestinal ulcers should be a priority, and this can usually be achieved by keeping horses at pasture. But as this is not possible for all horses, other steps often need to be taken. Options to consider include:

- feeding concentrates in small amounts (1-2kg per meal) and with added lucerne. Allow at least 6 hours between concentrate meals.
- high fibre diet to encourage chewing and stimulate salivation - chewing 1kg of grain produces 1.8 litres of saliva, whereas 1kg of roughage produces up to 4.8 litres of saliva - which beautifully buffers stomach acid naturally.
- minimise stress of travel, changing environments and stable confinement.
- feed 150-250ml of oil for 500kg horse.
- access to a paddock lowers the risk and if other horses are also in the paddock the risk drops even further.
- look at calcium and magnesium antacids in a coating oil with base protectants kaolin, cellulose or gelatin; chlorophyll has a long history in alternative medicine as a gastrointestinal treatment because of its anti-inflammatory, antioxidant and healing effects; gamma oryzanol from rice bran extracts has been shown experimentally to have a protective effect on ulcer formation, particularly ulcers induced by stress, and betaine and glutamic acid help some horses.
- regular worming keeps overall gut function healthy.
- ensure the diet contains enough calcium and magnesium (which act as buffers).
- incorporate gastro-protective feedstuffs such as flaxseed, linseed, larch arabinogalactan, guar gum, pectin and psyllium.

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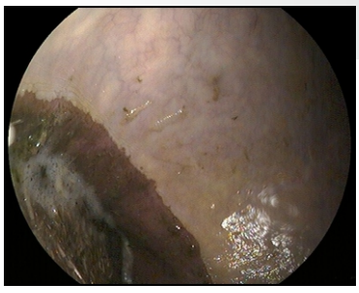
The options should be discussed with your veterinarian. Not all horses with ulcers require expensive treatments - those with endoscopic evidence but no symptoms probably do not require any treatment. Those with severe ulcerations and matching symptoms should be treated. About 20% of horses do not respond to treatment - the magic time period for healing is 21-28 days. Horses which have not improved need either a change of treatment or to be turned out to pasture.

Veterinary examination is also important to rule out colonic ulcers - which produce similar signs to stomach ulcers. These include low-grade anaemia from bleeding ulcers, irritability and poor absorption of nutrients and there is a test being developed which helps differentiate stomach and colonic ulcers. Although the stomach just happens to be the part that we can now see easily in a living animal, ulcers in the colon can go undetected. Hindgut aberrations are by their nature difficult to diagnose and are likely to be underestimated, so simple, non-invasive tools that allow veterinarians to piece together some of the symptomatic puzzle should be welcomed. A large-scale autopsy study was conducted in the UK to discover the incidence of stomach and colonic ulcers. Out of 545 horses examined (365 mixed breed leisure horses + 180 performance horses), 97% had some form of ulceration and 60% had colonic ulcers. These findings raise questions about the causes of colonic ulcers, the effect of colonic ulcers on performance, and their role as a primary cause or as a contributing factor in colic. A manure blood test found that horses with a positive result that did not have stomach ulcers, had colonic ulcers, making it a valuable aid for diagnosing colonic ulcers. More research is warranted.

The following images which were kindly supplied by Randlab convey different stages of ulceration in the horses stomach and highlight the absolute need for a Gastroscope to correctly diagnose gastric ulcers.



No ulcers - but there is some hyperkeratosis, yellow acid staining and some early changes to the margo plicatus contour.

A reasonable clean healthy looking stomach with very mild hyper keratosis. Left untreated it could lead into the development of ulcers.

Grade 2-3 ulcerated stomach.
There is a bleeding ulcer on the left hand side.

A grade 3-4 ulcerated stomach. There is a very large thick fullness ulcer.

Grade 4 ulcerated stomach, plenty of lesions.

A grade 4 ulcerated stomach (the highest grade). Evidenced by the bright red lesions which are bleeding ulcers.

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Our ability to recognise stress has increased with recent studies on body language and facial expressions identifying six signs of pain and stress (stiffly backwards ears, tightening around the eyes, tension above eye area, prominent chewing muscles, mouth strained, strained nostrils and flattening of the profile). Other behaviours such as vacuum chewing or yawning may also be indicators of sickness that deserve further investigation.

Prevention is always better than cure and our individual focus should be on promoting management practices to reduce the incidence of disease. This is particularly evident and effective in the field of nutrition where a greater understanding by horse owners on the critical importance of dietary fibre has been achieved. What we do know however, is that better management, detection and prevention strategies are required in the war against a wider range of gut disturbances. Drugs undoubtedly work rapidly and results are often seen almost immediately but dietary adjustment takes longer for the gut to adapt.

About The Author:

Dr. Jennifer Stewart (BSc, BVSc, PhD, MRCVS, Dip BEP AAIM) is an equine veterinarian with over thirty five years experience. She is also a consultant nutritionist and has formulated feeds, custom mixes and supplements for leading international horse feed manufacturers in Australia, India, Ireland, Japan, New Zealand, Philippines, South Africa, Thailand, Turkey and the UAE.

Dr Stewart is passionate about equine nutrition and it's role in the management, treatment and prevention of many equine diseases and she is committed to bringing 'science to the feed bin'.

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