

Stomach ulcers in horses

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Studies in England, Ireland, Hong Kong and the United States report that 80-90% of racehorses in training, 84% of yearlings and 51% of foals have stomach ulcers. In racehorses spelled for a month, the incidence of ulcers is around 50%. In horses trained out of the paddock and eating a fully steam-extruded concentrate, the incidence was 10%. Other research found that 50% of ponies on concentrates had ulcers, whereas ponies on hay diets did not.

In foals, 30% of deaths between 1 and 4 months of age, are related to stomach ulcers. The period of highest risk for developing ulcers is from 2 days to 8 weeks after birth - especially in foals with diarrhoea.

The increased risk of disease at around 2 months of age is because the immunity the foal received in the colostrum is beginning to wane. If the fall off in colostral immunity is not closely matched by an increase in the maturity and activity of the foals own immune system, then the foal is at risk. We do not fully understand why there is a lag or delay in some foals immune development, but many foals are at increased risk during this period.

The most common symptoms are previous or current diarrhoea, low-grade colic, poor appetite, gradual loss of condition and a 'pot belly' appearance. Other signs may include salivation, froth around the lips, teeth grinding and lying on their back for prolonged periods.

Not all horses with ulcers show clinical signs. For many, the effects are 'sub-clinical' - vague, difficult to diagnose syndromes of slower growth rate, failure to reach genetic potential, failure to thrive and poor performance.

Prompt veterinary examination and treatment are required to reduce the risk of perforation, obstruction and constriction.

Two major causes of gastric ulceration have been identified. The first is a reduced ability of the stomach to defend itself against gastric acid and digestive enzymes. Stress reduces normal protective mechanisms within the stomach and as in adult horses, the incidence and severity of stomach ulcers in foals is higher in animals that are under stress. Horses and foals suffering from diarrhoea are at increased risk.

The second major cause of gastric ulceration is prolonged exposure of the stomach to high acid levels. High acid levels result from modern feeding practices. Both fasting and high grain diets predispose to gastric ulceration. Horses and ponies in stables and those on high raw grain diets have more ulcers than those at pasture or on hay diets.

It has been suggested that high protein, high lucerne, high grain and pelleted diets result in a higher incidence of ulcers. There is little evidence for the role of lucerne or protein, but both high grain and pelleted feeds have been associated with increased risk. High grain diets favour bacterial growth and fermentation in the stomach. There is an increase in the number of bacteria that produce lactic acid and gas - increasing the risk of stomach distension and even rupture.

In foals, gastric acidity and risk of ulcers increases from birth until at least 8 weeks of age. The major risk period is between 1 and 3 months of age - that is, before foals have begun eating sufficient solid food for saliva production to buffer stomach acid production.

Studies on pellets suggest acid secretion increases in response to pelleted feed, because pellets are eaten rapidly. Both yearling and adult horses consume pellets faster than they eat traditional grain diets.

Less saliva is produced when feed is eaten quickly and the sudden flow of a large volume of feed into the stomach causes a rapid increase in acid secretion.

These studies also found that steam-extruded nuts are eaten more slowly and require greater chewing than both traditional and pelleted feed. The incidence of choke and gastric rupture was reduced when weanlings were changed from a pelleted to a steam-extruded feed. The chart shows the amount of time taken to consume pellets, unprocessed feed or steam-extruded nuts.



Adult horses secrete up to 30 litres of gastric acid per day - this is continuous, independent of feed intake and here in lies the reason for stomach ulcers. The major cause of gastric ulcers in horses is prolonged exposure of the stomach to high acid levels. The equine stomach is designed for, and functions to deal with, constant feed intake.

For 50 million years the horse has evolved as a continuous grazer. Wild horses spend 16 hours a day grazing, travelling over 20km searching for food and browsing. The stomach has adapted to a constant intake of grass by constantly secreting acid.

The acid is buffered by the saliva which has a very high bicarbonate and mucus content. Horses produce up to 12 litres of saliva per day which lubricates the food, helping prevent 'choke' and buffering the stomach acid.

The number of chewing movements and the amount of saliva produced is greater for roughage than for concentrates. When horses go for extended periods (8-10 hours) without feeding, no saliva is produced and there is no buffering of stomach acid. Stomach acid levels are highest during fasting. The amount of bicarbonate in saliva increases as saliva production increases and so the longer the horse takes to eat a feed, the higher the buffering capacity of the saliva. The amount of bicarbonate in saliva increases as saliva production increases.

One kilogram of hay requires over 3000 chewing movements and results in the production of over 4 litres of saliva. One kilogram of grain requires only 1/3 as much chewing and yields only 2 litres of saliva.

Another important benefit of steam extruded feeds is that digestion in the small intestine increases. Digestion in the small intestine releases glucose and amino acids for absorption. For traditional unprocessed feeds, digestion in the small intestine is less than 50% - over half the feed in any single meal is fermented in the caecum. Fermentation converts proteins to ammonia and starch to lactic acid - wasting essential amino acids and favouring the growth of pathogenic bacteria such as Salmonella and Clostridia. Steam-extruded feeds are more 'natural' as they do not upset the balance and acidity of the gut. This is of particular importance to foals that have been sick and are convalescing.

The ability to build and repair the body is increased when nutrient absorption and amino acid availability is improved.

Of equal importance is that steam-extruded feeds reduce the stress on the system by preventing semi and undigested feed from passing into the caecum and entering the fermentation cycle. The caecum functions like a compost heap - a rich, warm and fertile environment for the slow breakdown of grass, hay and roughage. It is not designed to accommodate partly digested grains, protein meals and starch. These change the pH and balance in the caecum, killing beneficial bacteria which ferment fibre and facilitating the over-growth of acid and protein fermenting microorganisms. This increases the risk of colic, diarrhoea and laminitis.

Management, treatment and prevention: Treatment involves -

1. acid-suppressive therapy using drugs to inhibit acid formation. Horses in work respond less favourably than those at rest. Response to drug therapy appears to be best when horses are spelling and have free access to roughage during treatment. To be effective drug therapy must continue for several weeks after clinical improvement. If roughage is constantly available, complete ulcer healing occurs in the majority of horses after 3 weeks of treatment. Relapses are common once drug treatment has finished. Acid-suppressive therapy is expensive. If a lower dose is used for economic reasons, healing may not occur in many horses and it will be more costly in the longer term.
2. antacids which are drugs that neutralise the acid once it has been produced. Antacids are of benefit in alleviating clinical signs of poor appetite and mild colic, but they are relatively ineffective in healing gastric ulcers. Without drug administration, a 4-month spell at pasture will usually result in ulcer healing.

Prevention: Practices, which mimic the natural grazing situation and respect the function of the gut, are important. These include:

- avoid prolonged periods of fasting - ulcers have been shown to develop within 10-12 hours when horses have no access to feed
- roughage available at all times
- feed bins placed on the ground - horses chew and swallow more efficiently when their heads are down and the throat extended - as they have done for many millennia
- feed frequent small meals - optimum is 4 times a day and not more than 2 kg of grain per feed
- use steam-extruded feeds which have been processed in such a way that eating is slower, resulting in more chewing, increased saliva production and higher saliva bicarbonate levels
- because of the cost and the high risk of recurrence once treatment stops and horses resume work, management strategies that assist in preventing ulcers are advisable.

On the horizon are automated feeders where horses receive a given amount of feed at specified times during the day. Some systems have a lever the horse presses to release the feed and others have motorised tracks at ground level, which move the feed bin slowly around the stable. Whilst such mechanisations conjure images of feedlots, battery hens and unnatural environments, horses have always walked slowly while eating as they moved from one patch of grass to the next. Confining horses to stables and imposing our twice-daily eating habits on continuous grazing herbivores is equally 'unnatural'. However, before installing miniature trains in stables, the strategies listed above offer significant opportunity to reduce the incidence of gastric ulceration.

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