

Feeding Alfalfa Hay to Exercising Horses Reduces the Severity of Gastric Squamous Mucosal Ulceration

Travis Lybbert, BS; Pete Gibbs, PhD; Noah Cohen, VMD, MPH, PhD*;
Brett Scott, PhD; Dennis Sigler, PhD

Relative to a diet of grass hay and concentrate, feeding alfalfa hay along with concentrate significantly reduced the severity of gastric squamous mucosal ulceration in young horses in training. Feeding alfalfa hay may be an effective way to ameliorate or prevent gastric ulceration in horses. Authors' addresses: Department of Animal Science, College of Agriculture (Lybbert, Gibbs, Scott, Sigler), and Department of Large Animal Clinical Sciences, College of Veterinary Medicine (Cohen), Texas A&M University, College Station, TX 77843-4475; e-mail: NCohen@cvm.tamu.edu. © 2007 AAEP. *Presenting author.

1. Introduction

Equine gastric ulceration is highly prevalent among horses, primarily among horses used for competitive performance and recreational use.¹⁻⁴ Factors associated with the development of equine gastric ulcer syndrome (EGUS) include feed deprivation, stall confinement, increased intraluminal pressure with dorsal displacement of acid during exercise, intensive exercise, retention of gastric acid resulting from functional or mechanical gastric outflow obstruction, and diet.⁴ Regarding diet, a previous report using 6 horses with gastric cannulae indicated that feeding alfalfa hay and concentrate increased the pH of gastric secretions and volatile fatty acid concentrations and reduced the number and severity of squamous mucosal ulceration relative to feeding a diet of brom grass hay.⁵ The authors of that report speculated that the alfalfa hay had a buffering effect that reduced gastric ulceration. To our knowledge,

however, this finding has not been substantiated by replication, nor has the influence of feeding alfalfa hay with concentrate on gastric ulcer severity been examined among horses in athletic training or relative to horses concurrently fed grass hay and concentrate.

2. Materials and Methods

The methods used in this study were approved by the University Laboratory Animal Care Committee, Texas A&M University. Twenty-four Quarter Horse yearlings, 12–16 months of age and owned by Texas A&M University, were included in a crossover design conducted over a 77-day period consisting of two 28-day periods separated by a 21-day wash-out period. Gastric endoscopy was performed at the beginning of the study, and each horse was assigned an ulcer severity score, using a reported grading system ranging from 0 (intact gastric epithelium with no hyperemia or hyperkeratosis) to 4

NOTES

MEDICINE—G.I.

(extensive ulcerations with areas of deep submucosal penetration).⁴ Horses were assigned to one of 2 treatment groups, using a randomized block method to ensure equivalent ulcer severity scores in the two treatment groups. Group 1 horses were fed a diet consisting of coastal hay and a pelleted concentrate (15% protein) in a weight:weight ratio of 1:1; group 2 horses were fed a diet consisting of alfalfa hay and the same concentrate in a weight:weight ratio of 1:1. Body weights were determined the day before initiating the study and the last day of the wash-out period, and horses were fed 2.25% of their body weight. Horses were allowed 3.5 h/meal, and residual pellets and hay were collected and weighed. The horses were housed in small dry lots and subjected to an exercise regimen 3 days/week, using a mechanical horse-exerciser. After the end of the first 28-day period, gastroscopy was repeated, and horses were turned out to pasture, with no forced exercise and fed a diet comprised of grazing and 1.8 kg/horse of the same pellet. After 21 days in pasture, gastric endoscopy was repeated, and diet regimens were switched (i.e., group 1 horses were switched to group 2 and vice versa). The endoscopist was blinded to the diet of the horses. The ulcer severity scores were compared between groups using generalized estimating equations (GEEs) to account for the correlation resulting from repeated observations of study horses; effects of period, diet, and their interaction were examined.

3. Results

There was no significant effect of period, nor was there a significant interaction of period and diet. Accounting for period and repeated measures, the ulcer severity scores were significantly ($p < 0.001$) lower for horses in the alfalfa hay group than horses fed coastal Bermuda grass hay. One horse initially in the coastal Bermuda grass diet was eliminated from the study before being fed alfalfa hay for reasons other than intestinal disorders. Among horses fed alfalfa, 12 had no ulcers at baseline and 11 had ulcer scores of 2 ($N = 6$) or 3 ($N = 5$). Of the 11 horses with ulcer scores >0 , all improved by at least 2 ulcer grades while on the alfalfa diet; 1 of the 12 horses without ulceration developed gastric ulceration during the time it was fed alfalfa. In contrast, of the 12 horses fed coastal Bermuda grass hay that had ulcer scores >0 , 5 horses scores were improved, and only 2 were improved by at least 2 grades; of the 12 horses with initial ulcer scores of 0 fed coastal Bermuda, only 3 remained free of ulcers and 7 developed ulcer scores ≥ 2 . Among horses fed coastal Bermuda grass during period 1, ulcer scores did not change significantly between the end of period 1 and the end of the wash-out period; however, the ulcer severity scores of horses fed al-

falfa during period 1 were significantly ($p = 0.007$) higher after the wash-out period ended than at the end of period 1.

4. Discussion

Currently, a Food and Drug Administration (FDA)-approved product^a is available for treating and preventing gastric ulceration. For some owners, the cost of this treatment precludes its use, particularly for purposes of preventing ulceration. Given the frequency with which gastric ulceration occurs among horses used for various activities, there is great need for alternative or adjunctive strategies for managing this condition. A previous study indicated that feeding alfalfa hay reduced the severity of gastric ulceration in mature, resting horses with gastric cannulae.⁵ In this study, we corroborated and extended the results of that study. Relative to feeding coastal Bermuda grass hay, feeding alfalfa hay reduced ulcer severity scores in horses with gastric ulceration and prevented ulcer development in 11 of 12 (92%) horses fed alfalfa hay that did not have ulcers, whereas only 25% (3/12) of the horses without evidence of ulceration fed coastal Bermuda grass hay did not appear to develop ulcerations. Moreover, horses that were initially fed alfalfa hay had a significant worsening of ulcer severity scores during the wash-out period. Unlike the study by Nadeau et al.,⁵ horses in both groups were fed concentrates, thereby indicating that the dietary effect was likely attributable to alfalfa (or its interaction with concentrate). Finally, the horses in this study were in light training, indicating that alfalfa can be effective for ameliorating or preventing gastric ulceration in young, exercising horses. The extent to which these results apply to older horses or horses undergoing more strenuous exercise merits further study. Nevertheless, feeding alfalfa hay may represent a useful adjunct to antiulcer treatment for the control and prevention of EGUS.

References and Footnote

1. Vastias NJ, Snyder JR, Carlson G, et al. Cross-sectional study of gastric ulcers of the squamous mucosa in Thoroughbred racehorses. *Equine Vet J* 1999;29(Suppl):34-39.
2. Murray MJ, Schusser GF, Pipers FS, et al. Factors associated with gastric lesions in Thoroughbred racehorses. *Equine Vet J* 1996;28:368-374.
3. McClure SR, Glickman LT, Glickman NW. Prevalence of gastric ulcers in show horses. *J Am Vet Med Assoc* 1999; 215:1130-1133.
4. Merritt AM. The equine stomach: a personal perspective (1963-2003), in *Proceedings*. Am Assoc Equine Pract 2003; 49:75-102.
5. Nadeau JA, Andrews FM, Matthew AG. Evaluation of diet as a cause of gastric ulcers in horses. *Am J Vet Res* 2000; 61:784-790.

^aGastrogard, MERIAL Limited, Duluth, GA 30096.