Age distributions of horses with strangulation of the small intestine by a lipoma or in the epiploic foramen: 46 cases (1994–2000)

David E. Freeman, MVB, PhD, DACVS, and David J. Schaeffer, PhD

Objective—To test the hypothesis that strangulation of the small intestine by a lipoma or in the epiploic foramen is more common in older horses.

Design—Retrospective study.

Animals—46 horses.

Procedure—Ages of horses with strangulation of the small intestine by a lipoma (n = 29) or in the epiploic foramen (17) were compared with ages of 79 horses with miscellaneous small intestinal lesions. Effects of increasing age on risk of the diseases of interest were examined by use of logistic regression and a 1-sided trend test for binomial proportions.

Results—Mean age of the horses with strangulation in the epiploic foramen (9.6 years) was the same as that for the horses with miscellaneous small intestinal lesions (7.7), but mean age of the horses with strangulation by a lipoma (19.2) was significantly greater than that for the other groups. The proportion of horses with lipoma increased significantly with increasing age, but the proportion with strangulation in the epiploic foramen did not.

Conclusions and Clinical Relevance—Results refute the current suggestion that increasing age predisposes horses for strangulation of the small intestine in the epiploic foramen but support the suggestion that the risk of strangulation of the small intestine by a lipoma increases with age. (*J Am Vet Med Assoc* 2001;219:87–89)

Several epidemiologic studies of colic in horses have identified risk factors that could be used to prevent some forms of colic.[1] Information from such studies can also help practitioners recognize horses at risk for certain lesions and provide some guidelines for identifying horses that need surgical treatment.[1] Early recognition of the need for referral has been proposed as an explanation for the apparent improvement in survival rate for horses with strangulating lesions of the small intestine.[2,3] Although a number of factors could account for this trend, information about age, breed, and sex predispositions for various diseases could help veterinarians decide whether to refer horses for additional treatment and which treatments to provide.

Strangulation of the small intestine in the epiploic foramen and by lipomas have both been described as common diseases of older horses that require surgical treatment.[4-9] Previous reports have suggested that between 1.0 and 2.6% of all horses with colic,[4-6] between 0.25 and 7.8% of all horses with colic that undergo surgery,[4,10,11,a] and between 0.5 and 17% of all horses with colic that undergo surgery because of lesions of the small intestine[7,10,11,a] have strangulation or obstruction of the small intestine by a mesenteric lipoma. Similarly, 0.7% of horses with acute abdominal disease,[5] between 2 and 8.4% of all horses with colic that undergo surgery,[10,11-16,a,b] between 6 and 23% of all horses with colic that undergo surgery because of lesions of the small intestine,[7,10-12,a] and 15% of all horses with ileal diseases[17] have strangulation of the small intestine in the epiploic foramen.

The risk of strangulation of the small intestine by a lipoma is significantly increased in older horses, compared with all horses undergoing surgery[6] and compared with all horses hospitalized for any reason.[8] In 3 studies[4,6,7] that collectively examined 104 horses with strangulation of the small intestine by a lipoma, mean age was 14 to 17.6 years, and affected horses ranged from 8 to 30 years old.

In contrast, although many authors have suggested that there is an age predisposition for strangulation of the small intestine in the epiploic foramen in horses,[7-9,18] the evidence for such an association is not as strong, and 1 study[8] that found horses > 8 years old to be at greater risk only examined 6 horses. Atrophy of the right lobe of the liver is common in older horses and results in enlargement of the foramen, which could possibly predispose horses to strangulation of the small intestine in the foramen.[9] However, strangulation of the small intestine in the epiploic foramen has been identified in 4- and 8-month-old foals[19,b] and in horses that were 11 months,[12] 2 years,[13,15] and 3 years old.[14] The purpose of the study reported here, therefore, was to test the hypothesis that strangulation of the small intestine in the epiploic foramen and by lipomas is more common in older horses. Because the preponderance of evidence suggests that strangulation of the small intestine by lipomas is a disease of older horses, we believed it would serve as a suitable comparison for another disease with a similar putative age predisposition.

Criteria for Selection of Cases

Medical records of all horses that were anesthetized for surgery of small intestinal lesions at the University of Illinois between May 1994 and December 2000 were examined. Horses were grouped as those with strangulation of the small intestine by a lipoma, those with strangulation of the small intestine in the epiploic foramen, and those with other small intestinal diseases.

Procedures

For each group, age distribution was examined as the percentages of all horses in that group in selected

From the Department of Veterinary Clinical Medicine (Freeman) and Veterinary Biosciences (Schaeffer), College of Veterinary Medicine, University of Illinois, Urbana, IL 61802.

age categories. Analysis of variance was used to compare mean ages of horses in the 3 groups (ages were log transformed for this analysis). The Bonferroni method was used for post hoc comparisons. To determine the effects of increasing age on risks for the diseases of interest, logistic regression with age as a covariate and a 1-sided Cochran-Armitage trend test for binomial proportions were used. For all analyses, values of $P < 0.05$ were considered significant.

Results

During the study period, 125 horses were anesthetized for surgery of small intestinal lesions; 108 (86%) of these had strangulating lesions. Twenty-nine (23%) horses had strangulation of the small intestine by a lipoma, 17 (14%) had strangulation of the small intestine in the epiploic foramen, and 79 (63%) had miscellaneous small intestinal lesions. The age range was 10 to 34 years (mean, 19.2 years; median, 19 years) for horses with strangulation by a lipoma, 1 to 18 years (mean, 9.6 years; median, 10 years) for horses with strangulation in the epiploic foramen, and 6 days to 25 years (mean, 7.7 years; median, 7 years) for horses with miscellaneous lesions. Mean age of horses with strangulation in the epiploic foramen was not significantly different from that for horses with miscellaneous small intestinal lesions, but mean age of horses with strangulation by a lipoma was significantly ($P < 0.001$) greater than that for horses in the other 2 groups. Logistic regression and the Cochran-Armitage trend test both indicated that number of horses affected increased significantly ($P < 0.001$) with increasing age for horses with a lipoma (**Fig 1**), but number of horses with strangulation in the epiploic foramen did not.

Discussion

In the present study, the proportion of horses with strangulation of the small intestine by a lipoma increased significantly with increasing age, which is in agreement with results of previous studies.[4,6] However, the absence of an effect of age for horses with strangulation of the small intestine in the epiploic foramen was different from the accepted age distribution for this disease.[5,7-9] It is possible that these findings are unique to this clinic, but close examination of data from other studies would suggest that our findings are consistent with results from several clinics. In the current study, for instance, mean age of horses with strangulation of the small intestine in the epiploic foramen was 9.6 years, which is similar to mean ages of horses in previous studies[12-15,b] involving a total of 245 horses. For these studies, 47,[13] 73,[14] 63,[15] and 71.3%[b] of the horses were between 0 and 10 years old, which is similar to the 65% in the present study. Thus, we believe that findings of the present study can be generalized to all horses with strangulation of the small intestine in the epiploic foramen and suggest that there is no predilection for this disease in older horses.

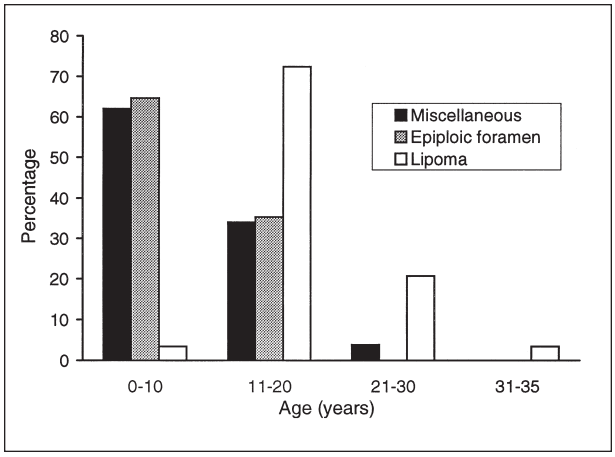

Figure 1—Age distributions of horses with strangulation of the small intestine in the epiploic foramen (n = 17), strangulation of the small intestine by a lipoma (29), or miscellaneous lesions of the small intestine requiring surgery (79). Bars represent percentage of horses in each age category for each disease group.

In a study[b] of 143 horses with strangulation of the small intestine in the epiploic foramen, the age distribution of affected horses was similar to that for all horses examined because of colic at that clinic, and the author concluded that this was mainly a disease of horses ≤ 8 years old. In another study,[12] the mean age of horses with strangulation of the small intestine in the epiploic foramen was similar to that for the control population of horses undergoing surgery because of colic. In the present study, horses with miscellaneous small intestinal lesions that required surgery were used as the control group, because any information of diagnostic value to be gained from this study would be relevant only to horses with small intestinal lesions, rather than to all horses with intestinal lesions. For example, if age were to be used as a factor for diagnosis of strangulation of the small intestine in the epiploic foramen, it would only be applicable for horses in which a preoperative diagnosis of a small intestinal lesion were possible.[20]

The argument that an age predisposition for strangulation of the small intestine in the epiploic foramen is favored by age-related atrophy of the right liver lobe and concurrent enlargement of the epiploic foramen[9] is not supported by recent studies.[21,c] In 1 study,[c] the right lobe of the liver was not found to atrophy with age, and in another,[21] atrophy of the right liver lobe was discovered in 17 horses representing a wide age range (5 to 30 years; mean age, 12.6 years). Although 15 of these 17 horses were examined because of colic and were found to have a variety of gastrointestinal tract lesions, none had strangulation of the small intestine in the epiploic foramen.

Mean age of horses with strangulation of the small intestine by a lipoma in the present study was 19.2 years (range, 10 to 34 years), which was similar to mean ages of horses in previous studies.[4,6,7] The fact that 21% of horses with a lipoma in the present study were between 21 and 30 years old, whereas only 7.5% of horses in the general population are ≥ 20 years old,[22] would suggest a true age predisposition for this disease. Therefore, horses with strangulation by lipoma served as a suitable comparison group to test the putative age predisposition for strangulation in the epiploic foramen.

Although most decisions on whether to perform surgery on horses with small intestinal lesions are not

predicated on a precise preoperative diagnosis, information from newer diagnostic modalities[12,23] and epidemiologic studies[1] can improve diagnostic capabilities. Recognition of horses at risk for certain lesions can lead to more specific treatment. Results of the present study suggest that older horses have an increased risk of strangulation of the small intestine by a lipoma and refute the current suggestion that increasing age predisposes horses for strangulation of the small intestine in the epiploic foramen.

[a]Siebke A-U. *Statistiche Erhebung über Kurzund Langzeitergebnisse von 718 Operativ Behandelten Kolikpatienten*. DMV thesis, Department of Equine Medicine and Surgery, General Surgery and Radiology, University of Berlin, Berlin, Germany, 1995.

[b]Scheidemann W. *Beitrag zur Diagnostik und Therapie der Kolik des Pferdes. Die Hernia Foraminis omentalis*. DMV thesis, Department of Equine and Small Animal Medicine and Department of Jurisprudence, Ludwig-Maximilian University, Munich, Germany, 1989.

[c]Schmid A, Freeman DE, Baker GJ. Anatomy of the epiploic foramen and the effect of age and body weight on its size (abstr), in *Proceedings*. Colic Res Symp 1998;54.

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