# Post-Mortem Findings of Gastric Ulcers in Swedish Horses up to One Year of Age: A Retrospective Study 1924-1996

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Sandin A, Skidell J, Häggström J, Girma K, Nilsson G: Post-mortem findings of gastric ulcers in Swedish horses up to one year of age: A retrospective study 1924-1996. Acta vet. scand. 1999, 40, 109-120. – Necropsy records from 702 horses, less than one year old, that were subjected to necropsy between 1924 and 1996 were used to estimate the prevalence of gastric ulceration in younger horses and to evaluate some potential risk factors that may contribute to the development of gastric ulceration.

Information concerning breed, gender, age, season of death, clinical signs of colic, medical treatment, parasitism and documentation of diseases in different organs were recorded, as well as size, number and anatomical distribution of ulcers.

Gastric ulcers were found in 96 of 702 young horses (14%) and gastritis in another 64 animals (9%). The cutaneous region adjacent to *margo plicatus* (51%), and the corpus region were commonly affected (46%). The investigation clearly demonstrates that gastric ulceration has affected young Swedish horses to a similar degree during most of the 20th century. A significant ( $p \le 0.05$ ) association between gastric ulcers and the signs of colic, parasitism and a concomitant intestinal, liver, and oesophageal involvement was found. No breed or sex predilection with gastric ulcers was obtained. The risk of gastric ulcers was highest during the fall (odds ratio 3.52) and lowest during the summer (odds ratio 0.45). The seasonal variation could not be explained by concomitant findings of *Gasterophilus* larvae. By using a multivariate logistic regression analysis, only season significantly influenced the risk of gastric ulceration.

foals; gastrointestinal tract; young horses; necropsy, risk factors.

## Introduction

Gastric ulceration is recognised as a disorder of clinical importance that affects both adult horses and foals. The clinical signs are often rather diffuse and nonspecific, and the diagnosis is often presumptive. Gastroscopy has become an excellent tool to verify the diagnosis, but until now this rather expensive equipment has seldom been available to veterinary practitioners.

The prevalence of the disease in foals has been reported in some epidemiological studies from

different countries. In Ireland and Great Britain, the prevalence of ulcers according to a questionnaire study was reported to be less than 1% (*Sweeney* 1992). The corresponding figures for Kentucky and Florida obtained by necropsy were 15% (*Dwyer & Powell* 1989) and 25% (*Wilson* 1985), respectively. In gastroscopical studies performed in Virginia and Maryland (*Murray* 1989) and in Ireland and Great Britain (*Murray et al.* 1990) 51% of the foals had gastric ulcers.

The mechanisms behind the development of gastric ulceration in foals and young horses are unknown. At present, administration of nonsteroidal anti-inflammatory drugs is the only documented cause of gastric ulceration in foals (Traub-Dargatz et al. 1988). Other possible etiological factors include environmental stress (Wilson 1985, Rebhun et al. 1982, Acland et al. 1983, Furr et al. 1992), dietary factors (Hammond et al. 1986, Nadeau et al. 1998) and infectious agents (Rebhun et al. 1982, Lee Gross & Mayhew 1983). In foals with certain clinical disorders, the frequency of gastric ulceration in the glandular region of the stomach has been found to be greater than that in foals without a clinical disorder (Murray 1989a). A strong association has also been suggested between gastric ulceration and colic disturbances in horses (Murray 1989b, Murray 1992).

Currently, there is no reported information concerning the extent of gastric ulcer disease in equids from the Scandinavian countries. The purpose of this report is to describe the prevalence of gastric ulceration in young Swedish horses necropsied during the years 1924 to 1996 and to identify potential risk factors for gastric ulceration.

#### Materials and methods

## Criteria for selection of cases

All records from 752 young horses that had been subjected to necropsy at the Department of Pathology at the Royal Veterinary College in Stockholm (1924-1976) and later at the Faculty of Veterinary Medicine, Swedish University of Agricultural Sciences in Uppsala (1976-1996) between 1924 and 1996 were examined in order to estimate the prevalence of gastric ulcers during this period. The young horses in this study were either euthanatised or died during hospitalisation at the veterinary clinics in Stockholm and Uppsala or were referred by field veterinarians. In general, the necropsies were conducted by qualified pathologists. Fetuses that were aborted, foals born dead, horses over one year of age and young horses with insufficient anamnestic and necropsy information were excluded (n = 50).

## Information retrieved

Depending on breed, the young horses were classified as Thoroughbreds (including Arabians, n = 6), Standardbred trotters, cold-blooded horses (including Icelandic horses, n = 7), riding horses (mainly Swedish Warm-blood) or ponies. To limit the number of breed groups and maintain adequate number of cases within each breed group, Arabians and Icelandic horses were grouped into Thoroughbreds and coldblooded horses. Information concerning gender (without regard to the neuter status), age, season of death and whether the young horse had died spontaneously or been euthanatised was also recorded. In addition, anamnestic information concerning clinical signs of colic during the last week of life and documentation of medical treatment were also recorded. From the necropsy examination, the diagnosis of necropsy, together with observations on the affected organ systems, parasitism, whether the young horse was euthanatised or had died spontaneously, coexistence of other involvements in the intestine, liver, oesophagus or pancreas were recorded. In cases of intestinal involvement, lesions were classified as small, large or small and large intestinal lesions.

Information from histological reports, as well as medical records admitted to the veterinary hospital were also used when considered necessary to facilitate interpretation of the necropsy records or in order to provide additional anamnestic information. The information rate for the different parameters obtained from the necropsy records varied and was for medical treatment, 48.4% and for season and year of necropsy, 100%.



Figure 1. Distribution of gastric ulcers ( $\blacksquare$ ) and necropsies ( $\Box$ ) in 702 young horses during the period 1924 to 1996.

## Ulcer diagnosis

The diagnosis of gastric ulceration was established from information in necropsy records on gross identification of the lesions found at necropsy. Gasterophilus-induced gastric lesions identified by the coexistent finding of larvae or by typical lesions made by the parasites were found in 37 young horses and these ulcers were excluded from the study. Ulcer lesions were then identified according to their localisation and size in the cutaneous region, in the cutaneous mucosa along the margo plicatus, in the fundic glandular epithelium, in the antral mucosa, or in the upper duodenum. Multiple distributions of ulcers were also noted. The size of the ulcers was classified as small (<1 cm), medium ( $\geq 1 < 3$  cm), large ( $\geq 3 < 5$  cm) or extensive ( $\geq 5$  cm). The number of ulcers was noted as n = 1, n = 2, a small number (n = 3-5) or multiple lesions (n>5). The diagnosis gastritis was not considered unless histological examinations had been conducted. Differentiation between gastritis and gastric ulcers was only attempted if a histological examination accompanied the gross examination.

#### Statistical analysis

The information from the necropsy records was computerised and all statistical calculations were analysed with the statistical programme JMP 3.0.2. (*SAS Institute Inc.* 1996). Potential confounding risk factors, concurrent involvement of other digestive organs (intestine, liver, pancreas or oesophagus) and other variables such as manifestation of parasites, clinical signs of colic or medical treatment) were screened by using bivariate logistic regression. The multivariate logistic regression model was then used for further examination. Only confounding risk factors such as age, gender, breed, year of necropsy divided into 3 periods; (before 1960, 1960-80 and after 1980), and season were

Nominal Variables	Information rate (%)		Gastric ulcer			
		)	(n) Total	(n)	%	P-value
Season	100					0.01
Winter			47	5	10.6	
Spring			314	44	14.0	
Summer			194	17	8.6	
Fall			144	30	20.8	
Year of necropsy	100					0.03
<1960			239	24	10.0	
1960-80			230	29	12.6	
>1980			233	43	18.5	
Gender	96.3					0.42
Male			346	44	12.7	
Female			330	49	14.8	
Breed	92.7					0.29
Standardbred			395	55	13.9	
Thoroughbred			62	10	16.1	
Riding horse			53	11	20.8	
Cold-blood			101	12	11.9	
Pony			40	2	5	
Continuous variable	Information rate (%)	Ulcer		No Ulcer		
		Mean	SEM	Mean	SEM	r-value
Age (weeks)	99.4	15.2	1.49	11.8	0.59	0.0192

Table 1. Bivariate analysis of potential risk factors treated as qualitive or quantitative data for development of gastric ulcers in young horses.

taken into consideration when applying the final multivariate logistic regression model. The calculations were performed in a forward stepwise manner using the log likelihood test value to determine if the variable would be retained in the statistical model until the final multivariate model was determined. All bi- and multivariate modelling processes were based on guidelines from Hosmer & Lemeshow (1989). If necessary, information on disease and other variables was dichotomised (e.g. intestinal involvement: yes or no) before statistical evaluation. The odds ratio and confidence intervals were calculated from the estimates and standard errors in the multivariate regression analysis. The minimum level of significance was set at  $p \le 0.05$ .

## Results

#### Gastric ulcers

During the period studied, horses less than one year of age comprised 16% (702 of 4300) of all equine necropsy records at the Department of Pathology. In all, the necropsy records of 702 young horses were examined. The majority of these animals (68%) died spontaneously and there was no significant association between gastric ulcers and whether the young horses died spontaneously or were euthanatised (p =0.63). Gastric ulceration was present in 96 young horses (14%). The cutaneous mucosa along the *margo plicatus* was most commonly affected (51%), followed by the fundic glandular region (46%), the cutaneous region in the



Figure 2. Distribution of gastric ulcers ( $\blacksquare$ ) and necropsies ( $\square$ ) in different breeds during the period 1924 to 1996.

upper part of the stomach (12%) and the antral region (7%). Multiple lesions were seen in the fundus and in the margo plicatus regions in 6 young horses. Three young horses also had additional ulcers in the antral region. Concurrent ulcers in the oesophagus were seen in 6 young horses (6%). In only one case was a duodenal ulcer, not associated with gastric ulceration, found. The gastric lesions varied in size from small circumscribed ulcers of a few mm in diameter to irregularly shaped ulcers affecting the most of the mucosa. The majority of the ulcers (59%) was classified as small. In the necropsy records, information about ulcer distribution, number of ulcers and size of the ulcers were reported for 82%, 96% and 85% of the necropsies, respectively.

Gastritis in the glandular portion was verified histologically in 64 of the 702 young horses (9%). Another 51 lesions (7%) were diagnosed, including gastric rupture (n = 4), parakeratosis (n = 4), dilatation (n = 4) and cyathostomiasis (n = 39).

## Influence of year of necropsy and season

The annual number of necropsies conducted was relatively constant throughout the 73 year period, with somewhat fewer cases during the first 2 decades (Fig. 1). The prevalence of gastric ulceration increased significantly ( $p\leq0.05$ ) during the last 15 years (Table 1). Young horses with gastric ulceration were found in every month of the year except January. Most of the ulcers were recorded during the spring period (April and May), which is also the main foaling season in Sweden. However, a significantly ( $p\leq0.01$ ) higher prevalence of gastric ulcers was found in the autumn using the bivariate analysis (Table 1, Fig. 4).

#### Influence of breed, gender, and age

The majority of gastric ulcers were found in Standardbred trotters (14%), and this was also the largest proportion of young horses presented at necropsy (n = 395). The prevalence of ulcers was similar in Thoroughbreds (16%) but



Figure 3. Proportion of young horses with gastric ulcers in relation to age during the period 1924 to 1996.

higher in riding horses (21%). Results are illustrated in Fig. 2.

Young male (n = 346, including 3 geldings) and female (n = 330) horses were equally represented in this material. No significant association between gender and gastric ulcers was found (males 13% and females 15%) in the bivariate analysis.

Horses were divided into age groups by weeks if they were less than 9 weeks old, or by months if the animals were 2 months old or older. The mean age of the young female horses was 12.6 weeks and in males 12.1 weeks. The prevalence of gastric ulceration increased ( $p \le 0.05$ ) with increasing age. The ulcer prevalence in horses greater than 5 months of age (26%) was higher when compared with horses less than or equal to 5 months of age (14%) (Fig. 3).

# Influence of parasitism, signs of colic and medical treatment

Parasites were found in the stomach in 59

young horses (8.4%). Fifty-one horses had Gasterophilus *spp.* and 8 horses had *Parascaris equorum* in the stomach. A significant association ( $p \le 0.05$ ) was found between the parasitism in the stomach and the presence of gastric ulceration (Table 2). Indeed, 14 of 59 young horses (24%) with parasite infections had concomitant gastric ulcers. Signs of colic were reported in 82 out of 361 young horses (23%) and 26% of those animals had gastric ulcers (Table 2). Only 340 of 702 (48%) of the necropsy records listed medical treatments. No significant association was found between gastric ulceration and medical treatment in these animals (p = 0.63).

Influence of diseases in different organ systems When the necropsy diagnoses were tabulated by association to the major organ system involved, the respiratory system was the most affected organ, followed by the digestive organs, the skeletal apparatus, the cardiovascular sys-



Figure 4. Distribution of gastric ulcers ( $\blacksquare$ ) and necropsies ( $\Box$ ) each month in 702 young horses during the period 1924 to 1996.

	Information rate (%)	(n) total	Gastric ulcer		
Variables			(n)	%	- P-value
Necropsy findings					
Intestinal involvement	100				< 0.001
Yes		353	69	19.5	
No		349	27	7.7	
Oesophageal involvemen	it 100				0.005
Yes		19	7	36.8	
No		683	89	13.0	
Liver involvement	100				0.042
Yes		149	28	18.8	
No		553	68	12.3	
Case data					
Signs of colic	51.4				< 0.001
Yes		82	21	25.6	
No		279	31	11.1	
Parasite manifestation	100				0.021
Yes		59	14	23.7	
No		643	82	12.7	
Medical treatment	48.4				0.63
Yes		228	35	15.3	
No		112	15	13.4	

Table 2. Bivariate analysis of different factors and gastric ulcers in young horses.

Logion	(m) Total	Gastr	Gastric ulcer	
	(n) lotal (n		%	
Abscess	21	4	19	
Congenital defects	8	2	25	
Coprostasis	9	0	0	
Parasitic damage	20	3	15	
Dilatation	4	1	25	
Inflammatory, enteritis	188	36	19	
Invagination	14	1	7	
Meconium	6	2	33	
Necrosis, oedema	9	2	22	
Rupture	8	1	13	
Torsion, volvulus	11	0	0	
Ulceration	38	17	45	
Total	353	69	20	

 
 Table 3. Association between gastric ulcers and intestinal involvements in young horses.

Table 4. Final multivariate logistic regession model for risk factors associated with gastric ulcers in young horses.

Variables	Category	P value*	Odds ratio	95% CI
Season	Winter Autumn Summer Spring	0.01	NA 3.53 0.45 1.35	NA 1.51-8.21 0.18-1.16 0.63-2.92

\* = P-value for likelihood ratio after the variable was added to the model.

NA = Not applicable, CI = Confidence intervals.

tem, the muscular apparatus, the urogenital tract and the central nervous system. An additional multifactorial category was used, when the necropsy diagnosis clearly included more than one organ system. In 26 necropsies (7%) no diagnosis could be established. A significant lower ulcer prevalence was seen when the respiratory tract (7%) was involved compared with when the gastrointestinal tract was affected (Table 3). Different involvements of the gastrointestinal tract were tabulated (Table 2) and compared with the occurrence of concomitant gastric ulceration. In all, 422 lesions were

recorded in the gastrointestinal tract (60%). In the necropsy record, 353 cases of intestinal (50%), 150 cases of liver (21%), 19 cases of oesophageal (3%) and three cases of pancreatic (0.4%) involvements were recorded. Intestinal  $(p \le 0.001)$ , liver  $(p \le 0.05)$  and oesophageal (p≤0.01) involvements were associated with gastric ulcers (Table 2). Lesions in the intestines, liver, oesophagus or pancreas were seen in 77 of 96 young horses (80%) with gastric ulcers. The relationship between gastric ulceration and different intestinal lesions is presented in Table 3. There was no significant association between the localisation of the intestinal lesions and gastric ulceration. In the young horses with gastric ulcers, 23% had lesions in the large intestine and 16% in the small intestine.

## Multivariate analysis

Season of the year, age, year of necropsy and parasitism influenced the prevalence of gastric ulcers in the bivariate analysis (Table 1 and 2). In the multivariate logistic regression model, only season of the year remained significant (Table 4). The year of necropsy did not remain significant in the model, probably because the animals were older during the latest years of this study.

#### Discussion

Gastric ulcer disease was an unknown condition until 1964 when *Rooney* (1964) described 8 cases of perforated gastric ulceration in foals. He also reported several cases of non-perforated ulcers at necropsy. After the report by *Rooney*, at least 15 years passed before substantial new information about ulcer disease in horses was reported. Today, knowledge of the disease is more widespread among clinicians. This retrospective study shows that gastric ulceration in young horses is not a new disease in Sweden. Indeed, gastric ulceration was found in the necropsy records almost every year from 1924 to 1996.

In all, 96 of 702 young horses (13.7%) had gastric ulcers. In addition to gastric ulceration, 62 young horses (9%) were affected by gastritis, as verified by microscopic examination. Thus, in all, gastric mucosa was affected in 22.7% of the young horses. These results agree with previous studies (25% Wilson 1985, 24% Collobert-Laugier et al. 1988, and 27% Yoshihara et al. 1986). However, both higher (51% Murray 1989a, Murray et al. 1990), and lower (1% Sweeney 1992 and 15% Dwyer & Powell 1989) prevalences have been reported. The results from previous studies are based on observation periods that are shorter than 5 years, while the present study reports data from 73 years.

Gastric infections by Gasterophilus spp. have traditionally been claimed to be one of the main causes of gastric ulceration in horses (Waddell 1972) but more recently it was concluded that bot larvae are not important in the aetiopathogenesis of gastric ulceration or erosion (Sweeney 1990). In our material 51 young horses were infected with Gasterophilus spp. However, only 12 of these animals had concurrent gastric ulceration. During the middle of the eighties, treatment with the antiparasitic avermectine drugs was started. After that, infections with Gasterophilus spp. seem to be rather uncommon in Swedish horses. Despite that, the number of cases with gastric ulceration has not diminished, but rather increased, among Swedish horses up to one year of age. However, the tendency toward higher prevalence rates of gastric ulcers in recent years could not be verified in the multivariate logistic regression model, because the mean age of young horses subjected to necropsy after 1980 was higher than for the animals studied before that year. The reasons for the discrepancy in age between the different groups are not clear. However, a more careful management of the neonatal foal,

together with better intensive care during the neonatal period in recent years may have affected the mean age.

Season appeared to be the only predisposing factor for gastric ulcers that influenced our multivariate regression model. In total, we found most number of cases during the spring (40%), suggesting an association with the foaling season in Sweden (March to June). However, in the fall 21% (14% in Sept, 17% in Oct, and 35% in Nov) of the young horses presented for necropsy had gastric ulcers, whereas only 9% of the animals were affected during the summer months. In the study by Wilson (1985), the highest frequency of gastric ulcers (61%) was observed in August and it was ascribed to stress evoked by the very hot weather in Florida during this month. Hot weather was not considered an important factor causing the gastric ulcers in these young Swedish horses. June and July are the hottest months in Sweden (Anon. 1996), but the frequency of gastric ulcers during these months was only 11% and 2%, respectively. Neither can the lower frequency of ulcers in the summer be explained by a very low number of necropsies during the summer months. The higher frequency of gastric ulcer disease during the fall in our study is difficult to explain. A factor that might influence the prevalence of ulcer disease is the time the horse spends feeding. During the summer, the animals are suckling and somewhat grazing continuously. The feed within the stomach, together with saliva, will contribute to a decreased intragastric acidity (Hammond et al. 1986). In the weaning period during the fall and the winter, horses spend a lot of time indoors and are fed intermittently and with no opportunity for continuous suckling or grazing. This may result in the stomach being more or less empty for various periods of time and the gastric mucosa may be less well protected. Other possible causes of the ulcers may be stress evoked by increased handling of the

young horses in association with weaning and stabling. During the summer, most of the young horses are outdoors together with their mares and have few human contacts. In association with stabling during the fall, the young horses will be handled more and the stress from restrainment can possibly give rise to gastric ulceration. In a study by *Murray & Eichorn* (1996), stall confinement appeared to be an important factor in the development of gastric ulcers in horses compared with being turned out to pasture.

According to the bivariate analysis a higher frequency of gastric ulcers was observed when the horses became older. When the multivariate analysis was applied the age factor was not retained, most likely since the foals were born during the spring period. The season and age factors therefore seemed to act as covariates. The prevalence of gastric ulcers has previously been reported to be higher in young foals (Murray et al. 1987, Murray 1989a), emphasizing the importance of correct management during the neonatal period. A reason for the previously claimed higher prevalence in younger foals can be that most of these studies have been conducted in younger animals and the disease in older foals may therefore have been overlooked. Our results, on the other hand, suggest that horse owners and veterinarians should consider gastric ulcer disease as a problem in older foals.

Young male and female horses were about equally represented with gastric ulcers in the bivariate analysis. Unlike the majority of previous studies (*Wilson* 1985, *Murray et al.* 1990), in which the Thoroughbred was the most common breed, the Standardbred trotters dominated in our material. However, the riding horse appeared to be the group of young horses most affected with gastric ulcers. The majority of these ulcers were seen in relatively young animals, with a slight decrease in frequency when the horses became older. In another study of ours, in adult horses, (Sandin et al. 1999), we found that the prevalence of gastric ulcers remains fairly stable at about 8% in cold-blooded horses, whereas the prevalence in Standardbred trotters decreases from over 20% in yearlings to less than 10% in older horses. Interestingly enough, there seemed to be no difference between the young horses of the Standardbred trotters and the cold-blooded horses which were both subject to a similar risk in our model. In both breeds, the prevalence of ulcers increased with age, but the importance of age was more pronounced ( $p \le 0.05$ ) in the cold-blooded breed where the prevalence increased from about 10% in noonatal foals to over 30% in horses over 9 moi ths of age. The different distribution of breeds in this study and the higher frequency of ulcers in riding horses call for further investigations.

Because the prevalence of asymptomatic ulcers has been claimed to be high (Murray et al. 1987) and the clinical signs are often fairly vague, it would be of considerable help to find an association between gastric ulcers and various clinical parameters. Today, such information is very limited and even if some suggestions have been made, there are many questions that remain to be answered. In a previous study by Murray (1989a), the prevalence of glandular gastric ulcers was reported to be higher in foals with a concomitant clinical disorder than in those without such a disorder, which has been taken as evidence that a neonatal disease may be stressful for the foal. Also in other studies, gastric ulcers have been reported in foals with other pathological conditions, such as congenital heart defects (Traub-Dagartz et al. 1985), toxico-infectious botulism (Swerczek 1980) and white muscle disease (Hamir 1982). However, these particular conditions were rare in the present study.

In horses, gastric ulcers seem to be commonly

associated with colic (Murray 1989b, Murray 1992). According to Murray (1992), as many as 82% of horses with colic also had gastric ulcers, and in a considerable number of the foals, the gastric ulceration was considered to be the primary cause of colic. A strong relationship (p≤0.001) between gastric ulcers and colic was also found in the young horses in the present study. However, it was not clear that gastric ulceration is the primary cause of colic or vice versa. Instead, gastric ulceration in these animals may be due to stress and a disturbed activity in the autonomic nervous system. Increased sympathetic tone brought on by stress may disturb motor activity in the intestine which may result in increased exposure of stomach mucosa to acid and development of ulcers (Read 1987). Such concurrent disturbances are not uncommon in man (Fielding 1977).

It has been claimed that treatment with nonsteroidal anti-inflammatory drugs (NSAID:s) causes gastric ulcers in the horse (*Traub-Dargatz et al.* 1988). No significant association with medical treatment was found in our study. However, the young horses had been treated with such a large variety of drugs that no statistical significant associations between any particular medical treatment and ulceration could be established.

A strong statistical association was found between gastric ulcers and intestinal, liver and oesophageal lesions in the bivariate analysis. This relationship may be due to the fact that these animals have a poor appetite and reduced feed intake. Fasting and poor food intake has been associated with gastric ulceration in horses (*Murray & Eichorn* 1996). Intermittent fasting leads to decreased gastric fluid pH and increased acidity which may lead to acid injury.

In summary, the present investigation clearly demonstrates that gastric ulceration has affected young Swedish horses to a similar degree during most of the 20th century and this may be the situation world wide. Season influence the prevalence of ulcer disease, suggesting that gastric ulceration was most likely to be diagnosed during the fall in young horses. An association between gastric ulcers and diseases of the intestine, liver and oesophagus was also obtained.

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#### Sammanfattning

Magsårsprevalensen hos svenska hästar under ett års ålder som obducerats under perioden 1924-1996.

Undersökningen genomfördes för att studera förekomsten av magsår hos obducerade svenska föl yngre än 1 år och för att identifiera riskfaktorer av betydelse för utvecklingen av magsår. Materialet hämtades från obduktionsprotokoll förda vid Institutionen för patologi vid Kungliga Veterinärhögskolan i Stockholm (1924-1976) respektive Veterinärmedicinska fakulteten i Uppsala (1977-1996). Information om ras, kön, ålder, obduktionsår, tid på året då djuret avlidit, koliksymptom, medicinsk behandling och parasitskador noterades och samband mellan magsår och andra patologiska förändringar i tarm, lever, matstrupe och bukspottkörtel undersöktes. Magsårens anatomiska lokalisation, storlek och antal registrerades. Materialet analyserades med användning av bivariat- och multivariatmodeller.

Magsår förekom hos 96 av 702 föl (14%) och gastriter hos ytterligare 64 djur (9%). De flesta såren observerades i magsäckens kutana del nära margo plicatus (51%) och i körteldelen (46%). Undersökningen visar att magsår har förekommit hos svenska föl under större delen av detta århundrade. Förekomsten av magsår var signifikant (p≤0.05) kopplad till koliksymptom, parasitskador och samtidiga patologiska förändringar i tarm, lever eller matstrupe. Inga signifikanta skillnader i magsårsfrekvens kunde urskiljas mellan könen eller olika hästraser. Magsår förekom oftast under hösten (odds ratio 3.52) och var minst vanligt under sommaren (0.45). Variationen i magsårsfrekvens under året var inte relaterad till förekomsten eller frånvaron av gasterophiluslarver hos hästarna.

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