

# Prevalence of gastric lesions (ulcers and/or erosions) and their relationship to possible stressful factors in asymptomatic Quarter Horse foals: endoscopic survey

## Prevalência de lesões gástricas (úlceras e/ou erosões) e sua relação com possíveis fatores estressantes em potros assintomáticos da raça Quarto de Milha: estudo endoscópico

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### SUMMARY

Gastric ulcer accounts for one of the most important causes of abdominal discomfort in young horses. With the aim of studying the prevalence of lesions (ulcers and/or erosions) and their relationship to factors such as stress, age and sex, sixty quarter horse foals without signs of gastric disease underwent gastroscopy. Foals were divided into four age groups of 15 animals as follows: 1 to 30 days, 31 to 60 days, 61 to 90 days and 91 to 120 days. The prevalence of gastric lesions was 43.3%. Foals aged 61 to ninety days were the most affected (nine of 15). There were no significant differences between ages. Squamous epithelial exfoliation was observed in nine foals (60%) less than thirty days, in six (40%) between 31 to sixty days and only in two foals (6.6%) older than sixty days. Factors regarded as stressful such as high tick infestation (29), respiratory problems (3), skin diseases (3), babesiosis (2), umbilical thickening (1), diarrhea (1), orthopedic problems (1) and laceration with fly larvae (1) had no relationship with lesions. No difference in prevalence by sex was noted.

**UNITERMS:** Stomach ulcer; Stress; Stomach; Gastroscopy; Horse.

### INTRODUCTION

Gastrointestinal ulcer, a long time known disease of indubitable value in human medicine<sup>10,22</sup>, presents itself as one of the most important cause of abdominal discomfort in horses with a great emphasis in foals. Just as the term colic, which meaning expresses a non specific clinical manifestation of several gastrointestinal disturbances, under the term gastric ulcer, many clinical conditions from the upper gastrointestinal tract involving either the presence or absence of clinical signs, gastritis, focal or multifocal ulceration of the squamous or glandular mucosal linings of the stomach, gastric emptying disorders, duodenitis, duodenal ulceration and complications resulting from these disorders are included<sup>14,16,17</sup>.

Conceptually, ulcers are mucosal defects deep enough to reach the muscular mucosa, otherwise, erosions, less deep, are mucosal defects that do not reach the muscular mucosa<sup>22</sup>.

As far as the diagnosis is concerned, this concept has great importance since the macroscopic differentiation of both lesions is frequently difficult to be done<sup>13,19</sup>.

Gastrointestinal ulceration mainly occur in suckling foals up to 4 to 5 years old<sup>20,23,28,29</sup>.

Even though its aetiology is poorly understood, several factors are believed to be important in its genesis<sup>6,12,26,29</sup>. Just as it occurs in human beings, stress is likely to play an important role in

the development of lesions due to their occurrence associated with stressful conditions such as concurrent illness, diarrhea, surgery, transportation, feeding and management disturbances etc<sup>1,9,19,22,24,27,30</sup>. However, no definitive relationship between both factors could be established so far because not always this relationship is present<sup>18</sup>.

Traditionally clinical signs associated with gastric ulcers in foals include bruxism, excessive salivation, anorexia, dorsal recumbence etc, however a minority of foals with ulcers present such signs<sup>15,17</sup>. The majority of foals with gastric ulceration do not present clinical signs<sup>14,15,17,18,20,23</sup>.

Concerning either the presence or absence of clinical signs and their variations, the lesions location in the gastric mucosa and complications resulting from ulcerative lesions, four clinical syndromes have been described in foals: 1) Asymptomatic or silent ulcers; 2) Symptomatic or active ulcers; 3) Perforated ulcers and 4) Gastric or duodenal obstruction<sup>3,4,11,15,17</sup>.

Regarding the importance of gastric ulcer in its clinical context and aiming to find out the behavior of one of its clinical syndromes in horses bred under Brazilian conditions, this work has the purpose of establishing the prevalence of gastric lesions (ulcers and/or erosions) in asymptomatic Quarter Horse foals up to 120 days old, as well as their relationship to possible stressful factors, age, and sex.

## MATERIAL AND METHOD

### 1) Equipment

Gastroscopic examination was performed with a fiberoptic endoscope, 1.75 m long and with a 9.5 mm outer diameter\*, light source with air/water pump (250W/24V)\* and suction unit\*. Gastroscopic findings were recorded through a photographic camera\*.

### 2) Animals

Sixty Quarter Horse foals aged one to 120 days were used, of both sexes, from four breeding farms located in different towns of the São Paulo State - Brazil.

Foals were divided into four age groups of 15 animals as follows: 1 to 30 days, 31 to 60 days, 61 to 90 days and 91 to 120 days.

The animals were not randomly selected but rather by obeying either the veterinarians or farm manager indications according to the foals availability and in agreement with the following criteria: do not have presented until the time of examination, clinical signs compatible with gastric ulcer (bruxism, excessive salivation, dorsal recumbence etc.), do not have been submitted to antiulcerogenic therapies (antacids, acid secretion inhibitors etc.) and do not be older than 120 days.

Information such as identification (name or number, sex, age, breed and weight), history of either current or previous illness, deworming, tick infestation, vaccination, feeding and management practices, transportation, surgeries etc, which were considered stressing factors, were recorded in a protocol.

### 3) Procedure

By means of muzzling, animals were submitted to 12 or 16 to 18 hours of fasting before examination, except foals in exclusively milk feeding, which were submitted to four hours of fasting.

Four persons were employed to perform the examination, in which two of them physically restrained the foal, one passed the endoscope through the foal's nostril and one was the endoscopist. Chemical restraint were carried out by an intravenous injection of Romifidine# (0.04 to 0.08 mg/kg), after a routine antisepsis of the jugular vein, five minutes before commencing the examination. Gastroscopic techniques were performed according to Brown *et al.*<sup>4</sup>, Adamson; Murray<sup>2</sup>, Cudd; Wilson<sup>7</sup> and White<sup>25</sup>.

### 4) Classification of gastroscopic findings

The gastroscopic findings were classified into two types: Lesions from the gastric mucosa (ulcers and/or erosions), and scaling off from the non-glandular epithelium (squamous mucosa).

### 5) Statistical Analysis

The difference of prevalences among age groups was analysed by a chi-square test.

The difference between stressed and non-stressed affected foals was analysed by a chi-square test.

The difference between male and female affected foals was analysed by a chi-square test.

## RESULTS

The majority of foals stood well the examination. Due to sedation, they showed little reluctance to the passage of the endoscope through the nasal cavity.

None of them showed any sign of abdominal discomfort to gastric insufflation. Fasting time was insufficient in 18 examined foals. About 10 to 40% of glandular mucosa couldn't be inspected in 14 (47%), 3 (25%) and 1 (5%) foals submitted to 12, 4 and 16 to 18 hours of fasting respectively.

Of the 60 examined foals, 26 (43.3%) showed lesions (ulcers and/or erosions) in the gastric mucosa. Animals between 61 to 90 days were the most affected (60%) while those between 1 to 30 days were the least affected (26.7%). There was no significant difference in the occurrence of lesions among the four studied age groups ( $0.25 < p < 0.5$ ) (Tab. 1).

Exfoliations were found in 17 foals (28.3%) mainly in those aged 1 to 30 (60%) and 31 to 60 days (40%). Just two foals older than 60 days showed exfoliations. They were noted in an animal as young as 1 day. They consisted of fragments of epithelium resembling a white yellow sheet with a flaky appearance that after detaching from the squamous mucosa allowed the sight of the tender vascular submucosa architecture. There was a significant difference in occurrence of exfoliations among the four studied age groups, with greater rates in lower age groups ( $p < 0.001$ ) (Tab. 1).

Factors regarded stressful were high tick infestation (29), respiratory problems (3), skin diseases (3), babesiosis (2), umbilical thickening (1), diarrhea (1), orthopedic problems (1) and laceration with fly larvae (1).

There was no significant difference between foals with gastric lesions regarded stressed and non-stressed ( $p > 0.10$ ) (Tab. 2).

Among the 36 foals regarded stressed just 18 (50%) showed gastric lesions. Even though nine foals (75%) aged 1 to 30 days were classified as stressed, they didn't show any sign of gastric lesions (Tab. 3).

**Table 1**

Number and rate of Quarter Horse foals with gastric lesions (ulcers and/or erosions) and scaling off according to age group.

Age Group (days)	Foals with lesions	Rate	Foals with descamation	Rate	Total
1 - 30	4	0.2667	9	0.6000	15
31 - 60	7	0.4667	6	0.4000	15
61 - 90	9	0.6000	1	0.0666	15
91 - 120	6	0.4000	1	0.0666	15
Total	26	0.4333	17	0.2833	60

$X^2 = 3.529$ ;  $0.25 < p < 0.50$  (lesion);  
 $X^2 = 15.348$ ;  $p < 0.001$  (descamation).

\* H. Ozawa - Import & Export. Co.

# Romifidine (Sedivet) - Boehringer Ingelheim.

Despite that females were more affected by lesions than males there was no significative difference in the prevalence of lesions by sex ( $p>0.10$ ) (Tab. 4).

**Table 2**

Occurrence of gastric lesions (ulcers and/or erosions) in stressed and non-stressed Quarter Horse foals.

	Number of animals with lesions	Rate	Total
Stressed	18	0.5000	36
Non-stressed	8	0.3333	24
Total	26	0.4333	60

( $X^2 = 1.630$ ;  $p>0.10$ ).

**Table 3**

Number of Quarter Horse stressed foals with and without gastric lesions (ulcers and/or erosions) according to age group.

Age group (days)	Number of animals		Total Stressed
	Stressed with lesions	Stressed without lesions	
1 – 30	3	9	12
31 – 60	5	6	11
61 – 90	6	1	7
91 – 120	4	2	6
Total	18	18	36

**Table 4**

Number of Quarter Horse foals with and without gastric lesions (ulcers and/or erosions) according to sex and age group.

Sex	Age group (days)				Total
	1 - 30	31 - 60	61 - 90	91 - 120	
Male with lesions	1	5	4	1	11
Male without lesions	5	8	2	5	20
Female with lesions	3	2	5	5	15
Female without lesions	6	0	4	4	14

( $X^2 = 1.605$ ;  $p>0.10$ ).

## DISCUSSION

Fasting periods indications according to Palmer<sup>21</sup> and Nappert *et al.*<sup>20</sup>, of 12 hours to foals in solid feed and 4 hours to those in milk feed, showed to be insufficient in a great number of animals. Lower fasting periods according to Cudd; Wilson<sup>7</sup> of 2 to 8 hours and Adamson; Murray<sup>2</sup> of 6 to 10 hours to young suckling foals on solids will result in incomplete gastric emptying and partial inspection of gastric mucosa. Fasting periods insufficiency perhaps may be attributed to the means by which it was carried out inasmuch as muzzling could delay gastric emptying<sup>2</sup>.

Incomplete gastric inspection of the glandular mucosa in these animals must be faced as a limiting factor in the evaluation of

the prevalence of gastric lesions in this region, as eventual lesions presented, couldn't be detected by gastroscopic examination.

The results of this survey showed a great percentage of Quarter Horse foals that presented lesions, even when free of clinical signs attributable to gastric ulcers such as bruxism, excessive salivation, dorsal recumbence etc. In general, these results appear similar to that related by Murray *et al.*<sup>18,19</sup>. The prevalence of 43.3% established in this study showed to be higher than that related by Wilson<sup>28</sup> of 25.2% in a retrospective study with necropsied foals, nevertheless, getting closer to that reported by Murray *et al.*<sup>18,19</sup>, both of 51%, mainly when the author referred to the isolated prevalence in foals from Ireland<sup>19</sup>.

Lesion prevalence by age groups being higher among foals aged 61 to 90 days (60%), behaved different from that obtained by Murray *et al.*<sup>19</sup> in a survey with thoroughbred horses.

The rates of animals with exfoliations (Tab. 1) even though numerically different from that achieved by Murray<sup>13</sup> and Murray *et al.*<sup>18,19</sup> suggest in conformity with the literature above that the exfoliation process is a common event to young foals prevailing with those up to 30 days and presents a declining behavior as foals get older, occurring occasional findings in foals between 61 to 120 days old. Disagreement concerning the role of stress in occurrence of either ulcers or erosions in foals, didn't permit to establish a cause/effect relationship<sup>18,19</sup>. The great controversy around this issue is based over the huge difficulty to establish scientific methods able to identify, qualify and quantify different types of stress<sup>9</sup>. Even that any association between gastric lesions and factors regarded as stressful haven't been defined in this survey, many of these factors can't be considered non-stressing at all. The results achieved about the relation of sex to the occurrence of gastric lesions, in agreement with other researchers<sup>18,19,28</sup>, suggest no influence of this variable, put against, however, to findings from human beings where the emersion of either gastric or duodenal ulcers is more commonly found in men<sup>10</sup>.

In the scientific investigation, the random distribution of sample units has the purpose to make statistical methods reliable and get the least influence of non-controlled factors on the answering variables<sup>8</sup>. Therefore, the selection of foals studied obeying either farm manager or veterinarians decision in a non-random way, may have affected the results that suggest additional investigations. Despite that a great amount of important information concerning equine gastric ulcer has been found out in the past few years mainly by means of diagnosis methods improvement thanks to the introduction of long fiberoptic endoscopes and videoendoscopes in equine medicine, many issues such as the truthful role of stress in the development of gastric lesions and the real clinical meaning of "silent ulcers" remain to be elucidated.

## CONCLUSIONS

According to the obtained results, some conclusions could be established:

- 1) The prevalence of gastric lesions (ulcers and/or erosions) in asymptomatic quarter horse foals was 43.3%;
- 2) Foals aged 61 to 90 days were the most affected by lesions;
- 3) There was no statistical difference in the prevalence of gastric lesions between age groups;
- 4) Exfoliations are ordinary findings during gastroscopic examination of young foals, mainly in those up to 60 days old;

5) Factors regarded as stressfull didn't influence the occurrence of gastric lesions;

6) There was no influence of sex in the occurrence of gastric lesions.

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## RESUMO

A úlcera gástrica constitui-se numa das mais importantes causas de desconforto abdominal em equinos jovens. Com o objetivo de se verificar a prevalência de lesões gástricas (úlceras e/ou erosões) e sua relação com fatores como estresse, idade, e sexo, sessenta potros da raça Quarto de Milha não portadores de sinais clínicos compatíveis com lesões gástricas foram submetidos à gastroscopia. Os potros foram divididos em quatro faixas etárias de 15 animais cada uma, sendo: 1 a 30 dias, 31 a 60 dias, 61 a 90 dias e 91 a 120 dias de idade. A prevalência de lesões gástricas foi de 43,3%. Animais com idade entre 61 a noventa dias foram os mais acometidos. Não houve diferença significativa entre as faixas etárias. Descamações do epitélio aglandular ocorreram em nove potros (60%) entre um e trinta dias, em seis (40%) entre 31 e sessenta dias e em apenas dois (6,6%) com idade superior a sessenta dias. Fatores considerados estressantes, como infestação intensa por carrapatos (29), problemas respiratórios (3), dermatopatias (3), babesiose (2), onfaloflebite (1), diarreia (1), problemas ortopédicos (1) e ferida lacerante com presença de mífase (1) não influenciaram a ocorrência das lesões. Machos e fêmeas foram igualmente acometidos.

**UNITERMOS:** Úlcera gástrica; Estresse; Estômago; Gastroscopia; Equinos.

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