

A Survey on Risk Factors for Gastric Ulceration in the Caspian Horses in Iran

¹Gholamali Moghaddam, ²A. Hasanpour, ³M.G. Nadalian and ³M.R. Mokhberdezhli

¹Department of Clinical Science, Faculty of Veterinary Medicine, University of Tabriz, Iran

²Department of Clinical Science, Veterinary Faculty of Tabriz Islamic Azad University, Iran

³Department of Clinical Science, Faculty of Veterinary Medicine, University of Tehran, Iran

Abstract: This study was carried out on detection of risk factors for gastric ulcer in the Caspian horses in Iran. Gastric endoscope was performed on 23 Caspian horses to detect of gastric ulcer. Gastric ulcer was observed in 47.8% of horses. In Caspian horses 81.8% of ulcers were in non-glandular region of the stomach and 18.2% were in glandular region. There was a significant difference between glandular and non-glandular stomach regions with regard to ulcer ($p < 0.01$), but no difference was observed in both sexes. There was a low prevalence of gastric lesion in horses that were received antihelminthic drugs. In present study it was noticed that horses with long term treatment with NSAID had significantly higher prevalence of gastric ulcer in glandular region ($p < 0.05$). Prevalence of gastric ulcer increased with increasing of exercise ($p < 0.05$). There was no difference between serum Na, K, P, Mg, Ca and total protein levels in horses with and without ulcer, but horses with gastric ulcer had a high level of serum fibrinogen ($p < 0.05$).

Key words: Risk factor, endoscope, caspian horse, gastric ulcer

INTRODUCTION

Equine gastric ulcer syndrome is a complicated and multifactor problem and is characterized by inappetence, loss of body weight, melina, soft feces, evidence of mild to moderate abdominal pain and decrease of performance in race horses (McClure *et al.*, 2005; Otto *et al.*, 2000; Patrick *et al.*, 1999; Tim, 2002).

Gastric ulcer in horses is due to an imbalance between mucosal aggressive factors (hydrochloric acid, pepsin, bile acids and organic acids) and mucosal protective factors (bicarbonate and mucus) (Patrick *et al.*, 1999). Several risk factors have been identified such as parasites, tumors, gastric phytobezoars, stress, excessive work, more use of NSAID (Otto *et al.*, 2000).

With the availability in recent years of endoscopes of adequate length, gastric ulceration is now commonly diagnosed in horses (Andrews *et al.*, 2002; Josie *et al.*, 1997; Nieto *et al.*, 2004). Studies in thoroughbred race horse and show horses in active training have demonstrated a prevalence of gastric ulceration from 60-80% (McClure *et al.*, 2005; Murray *et al.*, 1990; Vatistas *et al.*, 1999).

This survey was accomplished on Caspian horses in Iran. The purpose of present study was to determine the presence of gastric ulcer in Caspian horse, region of ulcer in stomach and its extension and determination the

relation between gastric ulcers with the kind of the work, antihelminthic treatment program, use of NSAIDs and laboratory values.

MATERIALS AND METHODS

This study was conducted on 23 Caspian horses. One day prior to the competition owners or riders filled out a form with specific questions about housing, performance of horse, age, sex, use of NSAIDs, antiparasite treatment program, disposition, appetite, colic and lameness. Horse food intake was restricted for 6-8 h. Before endoscopic examination blood samples were taken for CBC and serum biochemical profile.

According to horse's behavior, sedation with xylazine hydrochloride ($0.3-0.5 \text{ mg kg}^{-1}$) and twitch was used to restrain horses for endoscopic examination. A video endoscope fiber with 3 m length (VFS300) was passed through the nostrils into stomach. The stomach was visualized and insufflated with air and a water jet pump was used to remove food materials adhered to wall of the stomach. Then a systematic examination of the stomach including greater curvature, lesser curvature, marginal groove and dorsal fundus (glandular and non-glandular regions) was performed. The ulcers in stomach graded from 0-4 grades.

- 0 : Normal mucosa of stomach.
- 1 : Hyperemia in gastric mucosa.
- 2 : Small erosion in gastric mucosa.
- 3 : Extensive erosion in mucosa (mild ulceration).
- 4 : Deep and extensive ulcer in gastric mucosa.

Some pictures from stomach mucosa were obtained and were stored.

Sample size was assumed that proportion would be around 85% with a confidence coefficient of 0.9. The calculation gave a result of 20 Caspian horses. Presence of ulcers was analyzed as percent. The difference of means of laboratory values between horses with gastric ulcer and without ulcer was compared with student T test. The relation between gastric ulcers and sex, use of antiparasite drugs and NSAIDS and the kind of work in horses was analyzed using χ^2 test. A P value of 0.05 was considered significant.

RESULTS AND DISCUSSION

Gastric endoscopy was performed in 23 Caspian horses in order to detect gastric ulcers. Horses were in 4-19 years old (Fig. 1 and 2). Ten horses were male and 13 horses female. Gastric ulceration was observed in 11 Caspian horses (47.8%) (Fig. 3). Of which 81.8% (9 horses) of ulcers were in non-glandular region of stomach and 18.2% (2 horses) were in the glandular region (Fig. 4). 36.6% of horses with gastric ulcer were male and 63.4% were female (Fig. 5). One of horses had grade 1, six of horses had grade 2, 3 of horses had grade 3 and one of them had grade 4 of ulceration (Fig. 6). At seven of 12 horses had been received antihelmitic drugs observed

gastric ulcer (Fig. 7). Ten horses had been received NSAIDS (phenylbutazone) in last 2 months that 5 horses of them had gastric ulcer (Fig. 8). All cases with ulcer in glandular region of stomach, had been used NSAIDS (Fig. 9). Horses with gastric ulcer were distinguished according to kind of exercise in (Fig. 10).



Fig. 1: Normal mucosa of gastric (4 years old Caspian horse)



Fig. 2: Grade 4 of gastric ulcer in non-glandular region (10 years old Caspian horse)

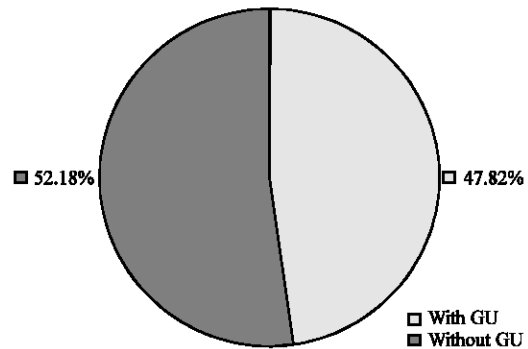


Fig. 3: Occurrence of gastric ulcers in Caspian horses

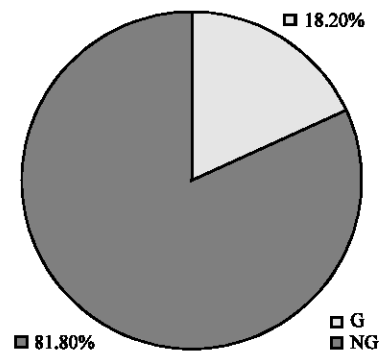


Fig. 4: Comparison of gastric ulcer occurrence in glandular and non-glandular regions of stomach

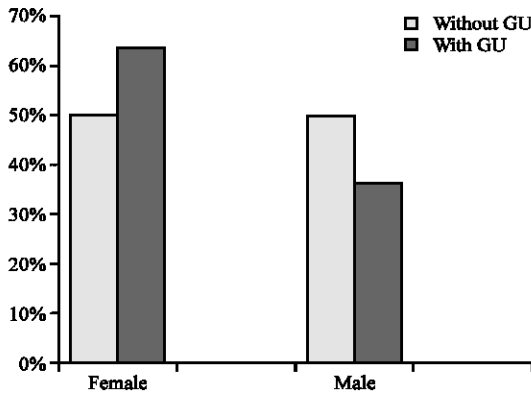


Fig. 5: Occurrence of gastric ulcers in two sexes of horses

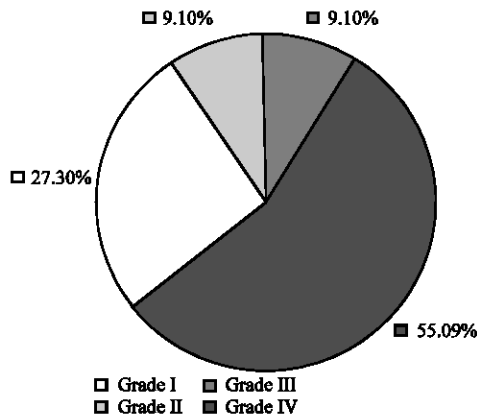


Fig. 6: Comparison of gastric ulcers according to grade them

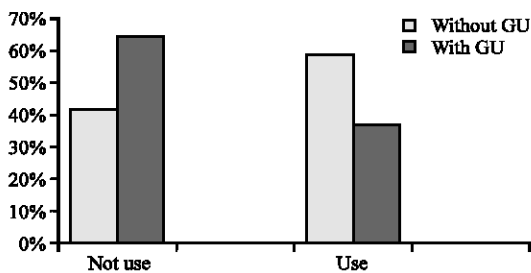


Fig. 7: Occurrence of gastric ulcers in horse with antiparasite treatment program and horses without it

In this study the prevalence of gastric ulceration in Caspian horses was 47.8%. The presence of gastric ulcers in horses was not with clinical signs. In a survey on thoroughbred horses the prevalence of gastric ulceration was 67% (Hammond *et al.*, 1986). The prevalence of gastric ulcer in non-glandular mucosa in Caspian horses

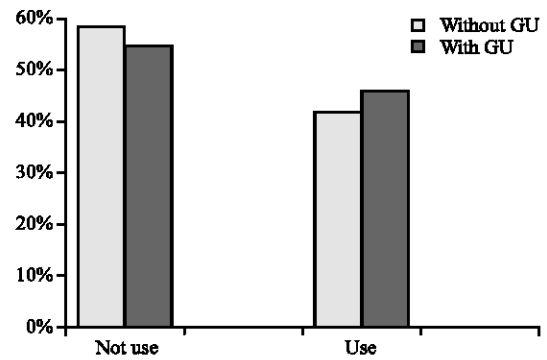


Fig. 8: Occurrence of gastric ulcers in horse with record of NSAIDS for a long time and horses without it

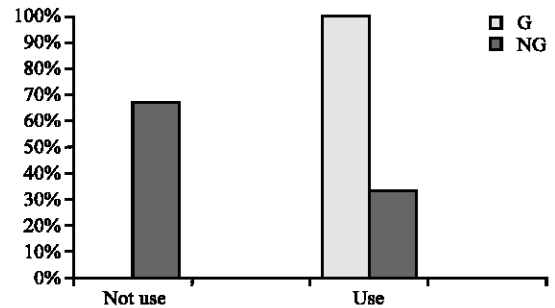


Fig. 9: Comparison of occurrence of gastric ulcers in glandular and non-glandular regions according to using of NSAIDS

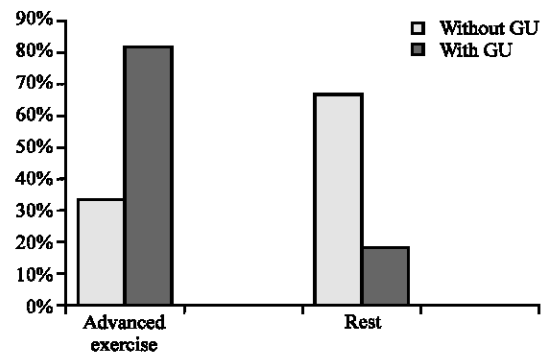


Fig. 10: Occurrence gastric ulcers in horses according to kind of exercise

was higher than glandular mucosa significantly ($p < 0.01$) (81.8 and 18.2%, respectively). An imbalance between mucosal aggressive factors and mucosal protective factors induce gastric ulceration in horses (Patrick *et al.*, 1999). The glandular region of stomach has been elaborate mechanisms including the mucus-bicarbonate barrier, prostaglandins, mucosal blood flow and cellular restriction on protect itself from peptic injury. But, non-

glandular region has not these protective factors, thus, the incidence of gastric ulceration is high in non-glandular mucosa (Otto *et al.*, 2000; Patrick *et al.*, 1999). The prevalence of the gastric ulcers in female Caspian horses was higher than male horses significantly (63.4 and 36.6%, respectively) ($p < 0.05$). In this study the grade 2 of gastric ulcers was most, but there was no significantly difference between incidences of different grades of gastric ulcers. There was a low prevalence of gastric lesions in horses that were received antihelmintic drugs, but this difference was not significant. Parasites are one of the risk factors for gastric ulceration in horses (Nieto *et al.*, 2004; Stephen *et al.*, 2004). It has been reported that the use of some NSAIDS may predispose to gastric ulceration in the horse (Goodrich *et al.*, 1998; Stephen *et al.*, 2004; Traub-Dargatz *et al.*, 1992). At present study it was noticed that horses with history of long term treatment with NSAIDS, had significantly high prevalence of gastric ulcer in glandular mucosa ($p < 0.05$). Hundred percent of gastric ulcer in glandular mucosa were in horses with history of long term using of NSAIDS but gastric ulcer in non-glandular mucosa were 33.3 and 66.7% of ulcers in this mucosa were in horses without this history).

The incidence of gastric ulcer in horses depends on kind of work. The training horses were affected higher than horses in the rest (McClure *et al.*, 1999; Otto *et al.*, 2000; Patrick *et al.*, 1999; Vatistas *et al.*, 1999). In this study the incidence of gastric ulceration increased with degree of exercise ($p < 0.05$). Eighty eight point eight percent gastric ulcers were in horse with advanced work. Secretion of gastrin hormone increase with work and exercise and this hormone induced the production of hydrochloric acid in stomach and injured the mucosa (Furr *et al.*, 1994; Otto *et al.*, 2000; Patrick *et al.*, 1999; Vatistas *et al.*, 1999). In other studies too, has been resulted that the body activity increased incidence of gastric ulceration (Furr *et al.*, 1992; Hammond *et al.*, 1986; McClure *et al.*, 1999; Murray *et al.*, 1989).

The hematological parameters that decreased no significantly in our study included PCV, HB and RBC which were agreement with previous reports (McClure *et al.*, 2005). In this study in horses with gastric ulcer the mean of fibrinogen in serum was higher than normal horses significantly ($p < 0.05$). This conformed to the study of Vatistas *et al.* (1999). The level of fibrinogen increases in serum with inflammation in gastric mucosa (Patrick *et al.*, 1999; Tim *et al.*, 2002) (Table 1).

The difference of the means of biochemical parameters including Ca, Na, P, Mg and total protein in two groups (horses with gastric ulcer and normal horses) were no significant (Table 2).

We conclude from this study that prevalence of gastric ulcer in this breed of horses is high and It is essential to be solved some predisposing and risk factors.

Table 1: Means of hematological parameters in horses with gastric ulcer and normal horses

Hematological parameters	N	Mean	SD	SE
Without GU	12	37.41	4.56	1.31
With GU	11	39.63	2.33	0.70
Without GU	12	12.47	1.51	0.43
With GU	11	13.20	0.77	0.23
Without GU	12	7.33	0.78	0.22
With GU	11	7.55	0.78	0.23
Without GU	12	7.54	0.73	0.21
With GU	11	7.50	0.32	0.98

Table 2: Mmeans of biochemical parameters in horses with gastric ulcer and normal horses

Biochemical parameters	N	Mean	SD	SE
TP				
Without GU	12	7.20	0.366	0.105
With GU	11	7.20	0.364	0.109
Ca				
Without GU	12	10.29	0.307	0.113
With GU	11	10.79	0.370	0.111
k				
Without GU	12	3.99	0.444	0.128
With GU	11	3.78	0.948	0.285
Na				
Without GU	12	136.75	3.441	0.993
With GU	11	135.63	2.873	0.866
Mg				
Without GU	12	1.67	0.256	0.073
With GU	11	1.89	0.258	0.194
P				
Without GU	12	2.84	0.672	0.194
With GU	11	3.02	0.369	0.111
Fib.				
Without GU	12	258.33	116.450	33.616
With GU	11	281.81	75.075	22.636

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