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A STUDY ON THE SERUMIC LEVELS OF CARDIAC TROPONIN AND SOME ENZYMES IN HORSES WITH STRANGLES

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ABSTRACT

This study was performed to evaluate the effect of strangles in horses on the serum levels of cardiac troponin and some biochemical enzymes. 24 horses confirmed on the basis of clinical and laboratory signs of strangles. Blood samples tacked from jugular vein and separated serum. Sampling performed from 21 healthy horses with similar ages, feed and condition, too. Sera separated in blood samples of all the horses and concentrations of cardiac troponin I (cTnI) were measured with immunometric luminescence assay and serumic levels of alkaline phosphatase (ALP), creatine kinase (CK), aspartate aminotransferase (AST), alanine aminotransferase (ALT) and gammaflutanyl transferase (GGT) were measured by biochemical kits. The mean serumic level of cardiac troponin in control and patient groups was 0.023 ± 0.023 and 0.097 ± 0.018 ng/ml that difference them was significant ($p = 0.004$). The serumic level of CK enzyme in patient group was greater than control group significantly ($p = 0.041$). ALP enzyme had been increased in patient group significantly ($p = 0.000$). The levels of GGT, ALT and AST enzymes had been increased in strangles group, that was significant in GGT and ALT but these was not significant in AST ($p = 0.006$, $p = 0.048$ and $p = 0.684$, respectively). In conclusion that in horses with strangles sera levels of cardiac troponin and CK, ALT, GGT, ALP enzymes increase.

Keywords: Horse, Strangles, Cardiac Troponin, Biochemical Enzymes

INTRODUCTION

Strangles is one of the horses' acute diseases that caused by *Streptococcus Equi* and acute inflammation of upper respiratory tract and infectious lymph node are its clinical signs. This disease spread all over the world but nowadays with reduction of infected horses and progress and success in treatments its importance is less and virulence of the disease among military units or in the stables belonging to the trolleys would be greatly decreased. Nowadays small virulence of it has been seen in polo or sport horses or in riding schools (Davidson *et al.*, 2008; Boyle *et al.*, 2009; Timoney and Kumar 2008; Weese *et al.*, 2009). The increase of cardiac troponin level is as a standard biochemical criterion for identifying myocardial injury and severs myocardial infarctions (Parmacek *et al.*, 2004; Schward *et al.*, 2003). Cardiac troponin serum level increase can be resulted of myocardial injuries. In horses with strangles may be damaged liver and heart that induce some changes in biochemical parameters. Evaluation of the levels of cardiac troponin and CK, ALP, GGT, AST ALT enzymes in serum at the horses with strangles is very important. This study was performed to evaluate the effect of strangles in horses on the serum levels of cardiac troponin and some biochemical enzymes.

MATERIALS AND METHODS

This study was conducted on 24 horses that suffering from strangles in Tabriz area in Iran during May to November of 2012. Patients confirmed on the bases of clinical and laboratory signs of strangles (culturing of nasal discharge and sampling from lymph nodes for confirmation of *Streptococcus equi*). Ten millilitres of blood were collected from the jugular vein of each animal. The blood samples were allowed to clot and were centrifuged for 10 min at 3000g. After centrifugation, the serum was removed and stored at -20°C until ready for test. Sampling performed from 21 healthy horses, too. Sera separated in blood samples of all the horses and concentrations of cardiac troponin I (cTnI) were measured with

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immunometric luminescence assay and serumic levels of alkaline phosphatase (ALP), creatine kinase (CK), aspartate aminotransferase (AST), alanine aminotransferase (ALT) and gammaflutamyl transferase (GGT) were measured by biochemical kits (Zist shimi). SPSS13 statistical analysis software was used for analyzing obtained results. In order to compare the mean of quantitative numbers, T-test statistical method was used.

RESULTS AND DISCUSSION

The mean serumic level of cardiac troponin in control and patient groups 0.023 ± 0.023 and 0.097 ± 0.018 ng/ml that difference them was significant ($p = 0.004$). The serumic level of CK enzyme in patient group was greater than control group significantly ($p = 0.041$). ALP enzyme had been increased in patient group significantly ($p = 0.000$). The levels of GGT, ALT and AST enzymes had been increased in strangles group, that was significant in GGT and ALT but these was not significant in AST ($p = 0.006$, $p = 0.048$ and $p = 0.684$, respectively).

Table 1: Mean of serumic levels of cardiac troponin and some enzymes in horses with strangles and normal horses

Serumic parameter	group	Number	Mean	Standard deviation	P-Value
Cardiac troponin (ng/ml)	control	24	0.023	0.023	0.004
	patient	21	0.097	0.018	
CK (U/L)	control	24	231.40	17.58	0.041
	patient	21	260.48	11.41	
ALP (U/L)	control	24	415.08	12.66	0.000
	patient	21	623.24	21.19	
GGT (U/L)	control	24	21.15	2.87	0.006
	patient	21	39.40	3.07	
ALT (U/L)	control	24	10.37	0.80	0.048
	patient	21	14.24	1.05	
AST (U/L)	control	24	310.85	16.72	0.684
	patient	21	313.70	9.68	

Conclusion

The mean of sera levels of cardiac troponin increased in horses with strangles. Nowadays, the increase of cardiac troponin level is as a standard biochemical criterion for identifying myocardial injury and severs myocardial infarctions (Parmacek *et al.*, 2004; Schward *et al.*, 2003). Cardiac troponin serum level increase can be resulted of long term use of the drugs followed by cardiac myocardial. Cornelisse *et al.*, in a study reported that a horse with arterial rupture and ventricular tachycardia the cTnl serum level was 5.9 mg/ml on referral day and 4.3 mg/ml five days afterwards. Scgwarzwald *et al.*, in 2003 showed the increased level of troponin in a horse with ventricular tachycardia and myocardial necrosis. Phillips *et al.*, in 2003 demonstrated in a study that cTnl serum level in competition horses was not meaningfully different compared with pasture horses. The average level of cTnl in both groups was 0.047 ± 0.085 mg/ml. Begg *et al.*, in 2006 estimated by ADVIA the normal level of cTnl in Thoroughbred horses lower than $0/15 \mu\text{g/ml}$. it was shown in 2007 that in equine piroplasmosis the increase of cTnl serum level was associated with tachycardia and early complexes of ventricular polymorphism. CTnl level was estimated at 0.27 mg/ml in horses suffered from piroplasmosis and at 0.1- 0.03 mg/ml in healthy horses (Diana *et al.*, 2007). In a study showed that the horses had troponin lower than $0.022 \mu\text{g/l}$ but it was decreased 1-2 hours after competition like 10 to 14 hours after that time (Nostell *et al.*, 2011). In a study in the cows with theileriosis the mean of cardiac troponin was 0.028 ng/ml (Fartashvand *et al.*, 2013).

The mean of sera levels of CK, ALP, GGT, ALT and AST increased in this disease. That increasing in CK, ALP, GGT, and ALT was significant. Injuring of lungs and hepatopathy can increase the levels of theses enzymes that explain in other studies (Mozaffari *et al.*, 2010; Morris *et al.*, 1985). In other study GGT sera concentration increased after using phenylbutazone paste (Lees *et al.*, 1987).

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In conclusion that in horses with strangles sera levels of cardiac troponin and CK, ALT, GGT, ALP enzymes increase.

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