EFFECT OF DRAFT LOAD ON LACTATE DEHYDROGENASE AND CREATINE KINASE ACTIVITIES IN MULES.(*Equusasinus x Equuscaballus*)

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Received 21-04-2016 ***Accepted 23-05-2016***

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ABSTRACT

This study was carried out to assess the effects of draft load on serum creatine kinase and lactated ehydorgenase activities in mule. Five adult mules of 5 to 6 years of age were subjected to loading exercise (i.e. 10% draft load for 1 to 5 days and 20% draft load from 6th to 10th day). A highly significant ($P \leq 0.01$) increase in serum LDH activities in response to 10% and 20% draft load exercise was observed while significant ($P \leq 0.05$) increase at 10% draft load and highly significant ($P \leq 0.01$) increase at 20% draft load was observed in CK activities.

KEY WORDS: Draft Load, Mules, Equines, Serum Enzymes (LDH and CK)

INTRODUCTION

The mule (*Equusasinus xcaballus*) is a domestic animal and is an offspring of a male donkey (*Equusasinus*) to a female horse (*Equuscaballus*). This important draught breed has strong muscle power, stamina and is more sure-footed than horse and resistant to disease. It resembles a horse in size and strength. The mule has exceptional ability to work hard in an unfavorable environment. Mule is considered as draught and pack animal. Mule is used for pulling carts in plains and for carrying man and luggage in difficult hilly terrains, where motorized vehicles cannot reach. Little work on performance of mule has been done in India. Equids particularly donkeys are being used by man for a long time, but very little efforts have been made to study various physiological and biochemical aspects during different draft conditions. Recently reduction in glucose and lactate level was noted after exercise with 20 % draft load in donkeys (Moolchandani and Sareen, 2016). In continuation with the draft studies the present work was planned with the objective to study the effect of draft loading on serum enzymes CK and LDH activities.

MATERIALS AND METHODS

Five apparently healthy adult mules of 5-6 years of age (320 to 380 kg BW) were selected for the present study. A loading car obtained from Central Institute of Agricultural Engineering (CIAE) was used to set the desired draft load as a proportion of body weight for the study. The Mules were procured from National Research Centre on Equine, Jorbeer, Bikaner. The entire experiment was conducted in two phases. In the first phase the animals were subjected to exercise with 10 per cent draft load as a proportion of body weight. Now, during first phase from day 1st to 5th blood sample were collected from each animal before work which was treated as control sample. Than the animals were subjected to exercise with 10 per cent draft load as a proportion of body weight for 2 hours or till fatigue symptoms appeared or whichever was earlier , and the blood samples were collected accordingly from each animal. Now the animals were allowed to rest for 2 hrs. and 5 ml. blood was collected for obtaining serum for the third stage after rest. In the second phase from day 6th to 10th the draft load was doubled ie. the animals were subjected to exercise with 20 per cent draft load and blood samples were collected as earlier in the 1st phase and serum was collected as usual and was stored immediately at -20°C till further analysis.

Lactate dehydrogenase (LDH) was estimated (IU/litre) by UV Kinetic DGKC method as described in diagnostic reagent kit manufactured by Spinreact at 340 nm. Creatinine Kinase (CK) was estimated (IU/litre) by UV Kinetic NAC method as described in diagnostic reagent kit manufactured by Spinreact at 340 nm.

RESULTS AND DISCUSSION

The data presented in table reveals that there was highly significant ($p \leq 0.01$) increase in LDH activity at both the draft load exercise for two hours whereas there was significant ($p \leq 0.05$) increase in CK activities at 10 % draft load and highly significant ($p \leq 0.01$)increase at 20% draft load for two hours. It was observed that after two hours rest the enhanced enzyme activities decreased but could not berestored at par with control values in case of LDH whereas CK values reached approximately normal values.

Table 1: Effect of draft load on lactate dehydrogenase and creatine kinase activities in mules.

Phases / stages	Lactate Dehydrogenase (IU/L)		Creatine kinase (IU/L)	
	10 % draft load**	20 % draft load**	10 % draft load*	20 % draft load**
	(First phase)	(Second phase)	(First phase)	(Second phase)
Pre Exercise (Control stage)	$206.586^{a} \pm 6.7195$	$261.320^{a} \pm 13.9923$	$58.259^{a} \pm 3.8141$	$56.550^{a} \pm 3.4180$
After 2 hrs. (post exercise stage)	$305.534^{c} \pm 16.084$ (47.90% increase)	$394.116^{b} \pm 37.0283$ (50.81% increase)	$79.470^{b} \pm 8.4584$ (36.40% increase)	$97.167^{b} \pm 7.4829$ (71.82% increase)
2 hour after rest	$251.086^{b} \pm 15.8719$ (21.54% increase)	$333.853^{b} \pm 24.8012$ (27.75% increase)	$63.016^{ab} \pm 5.0295$ (08.16% increase)	$64.537^{a} \pm 2.3365$ (14.12% increase)

*Note: superscript with different letters differ significantly from each other.Fig in parenthesis represent per cent changes in the activities * significant ($p \leq 0.05$) ** highly significant ($p \leq 0.01$)*

The observed increasing trend of LDH and CK with the effect of exercise at 10% and 20% draft load is well in agreement with the earlier studies documented by Stull and Rodiek (2000); Lindner *et al.,* (2006) and Adamu *et al.,* (2012) in horses after various degree of transportation and exercise. Serum muscle enzyme activities change with exercise, probably as a consequence of increased muscle metabolism and transient changes in muscle permeability without significant fibrillar disruption (Munoz *et al.,* 2002).

ACKNOWLEDGEMENT

The authors are highly thankful to the Dean, College of Veterinary and Animal Sciences, Rajasthan University of Veterinary and Animal Sciences, Bikaner, for providing necessary facilities to execute

the research.

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Moolchandani,A. and M.Sareen (2016) , Indian J.Vet Sci. Biotech. 11(3), 77-78

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