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Short Communication

LACTATE DEHYDROGENASE PROFILE IN FEMALE BUFFALO CALVES FROM BIRTH TO PUBERTY

S. S. RATHEE, S. L. GARG[1] and M. K. ROSE
Department of Veterinary Physiology, College of Veterinary Sciences
CCS Haryana Agricultural University, Hisar- 125 004

SUMMARY

Forty two female Murrah buffalo calves of various age groups were used to study for correlating peripheral concentrations of lactate dehydrogenase (LDH) with various developmental stages from birth to puberty. The calves were evenly distributed into 7 groups (6 in each) depending upon their age, viz. 1-3 day old (neonatal calves), 4-30 days (perinatal calves), 3-6 months (young calves), 7-12 months (growing calves), 18-24 months (prepubertal heifers), 25-30 months (peripubertal heifers) and 31-36 months (pubertal heifers). The results revealed non existence of age associated variation in peripheral concentration of LDH except significantly lower values in perinatal calves as compared to other physiological stages.

Key words: Lactate dehydrogenase, buffalo calves

The activity of lactate dehydrogenase (LDH) is of clinical interest in diagnosis and prognosis of diseases (Deger *et al.,* 2002). The serum enzyme levels obtained in clinical cases are required to be contrasted with the normal values of corresponding age groups. Therefore, it is very important to establish normal level of LDH in particular breed of animal at different developmental stages, since age of animal also affects the peripheral concentration of the enzymes. Some work on this aspect has been done in camel (Kataria and Bhatia, 1991) and cattle (Puri, 1998). The present study describes serum levels of LDH in female buffaloes of different age groups, which may serve as reference tools for clinicians.

Forty two female Murrah buffalo calves of various age groups maintained at the Central Institute for Research on Buffaloes (CIRB), Hisar, were evenly divided into 7 groups, viz. 1-3 and 4-30 days, and 3-6, 7-12, 18-24, 25-30 and 31-36 months constituting as neonatal calves, perinatal calves, young calves, growing calves, prepubertal heifers, peripubertal heifers and pubertal heifers, respectively. The peripubertal heifers were kept under vigilance for expression of oestrus behaviour and those buffaloes showing signs of first oestrus were grouped as pubertal heifers. The LDH levels were determined by using single step reagent kit using semi-autobiochemical analyzer.

The mean values along with the standard error in respect of serum enzyme LDH have been presented in Table 1. The peripheral concentration of serum LDH observed in female buffalo calves in the present study is higher as compared to the values reported in goat (Chiofalo, *et al.*, 1985, Visha, *et al.,* 2002), camel (Kataria and Bhatia,1991, Khadjesh, 2002), buffalo (Jindal and Rattan, 1992), cattle (Sharma and Bisoi, 1995, Puri, 1998) and pig (Prasad and Kumar, 2002).

The data revealed that various values did

Table 1

Serum enzyme lactate dehydrogenase (LDH) concentration (IU/L) during various developmental stages from birth to puberty in female buffaloes (mean ± S.E.)

Age group	Stage	LDH(IU/L)
1-3 D	Neonatal calves	1100.76 ± 105.42[a]
4-30 D	Perinatal calves	0836.20 ±16.15[b]
3-6 M	Young calves	1060.11 ± 38.80[ac]
7-12 M	Growing calves	1143.83 ± 30.27[ac]
18-24 M	Prepubertal heifers	1060.23 ± 65.17[ac]
25-30 M	Peripubertal heifers	1112.55 ± 56.57[ac]
31-36 M	Pubertal heifers	1071.76 ± 70.13[ac]

Values with the common superscripts do not differ significantly, D - days, M - months.

[1] Corresponding author

not differ among themselves except the values obtained in perinatal calves of 4-30 days of age was significantly lower as compared to concentration observed in remaining intervals. The declining trend in peripheral concentration of LDH immediately after birth in female buffalo calves observed in the present study is in accordance with the reported decline in serum LDH activity after birth in pig and sheep (Sharon *et al.,* 1982), cattle (Sharma and Bisoi, 1995, Puri, 1998) and camel (Kataria and Bhatia, 1991). However, contrary to our findings, a positive age associated trend in serum LDH activity was reported in cattle (Bogins *et al.,* 1978), whereas no variation in peripheral concentration was found with advancement of age in farm animals (Castro *et al.*, 1977, Behera *et al.,* 1993). Recently, Atak *et al.,* (2000) also failed to establish any clear-cut relationship between serum LDH values and advancing age of both Gir and crossbred calves.

The glycolytic pathway is more developed in newly born ruminants (Phillipsen, 1970, Swenson and Reece, 1996) to metabolize higher blood glucose as the only source of energy in neonates (Sharma, 1996, Puri, 1998). Therefore, the higher peripheral concentration of serum LDH immediately after birth recorded in female buffalo calves in the present study could be ascribed to higher glycolytic activity during this period and subsequent decline may be due to the fact that glycolytic breakdown of glucose does not remain the only source of energy for ruminants.

REFERENCES

Atak, B.V., Talvelkar, B.A., Deshmukh, B.T., Nagvekar, A.S. and Patix, S.P. (2000). Serum enzyme profile during growth in Gir and crossbred calves. *Indian Vet. J.* **7**: 296-299.

Behera, P.C., Bisoi, P.C., Mohapatra, M. and Rao, P.K. (1993). Clinically important serum enzyme in Black Bengal goats. *Indian Vet. J.* **70**: 1042-1045.

Bogins, E., Avidar, K. and Sturman, H. (1978). Blood level of enzymes, protein, metabolite and mineral in healthy bulls. *Vet. Bull.* **48**: 3312.

Castro, A., Dhindsa, D.S., Hoversland, A.S., Mulkus, H., Rosenthiel, C. and Met Calfe, J. (1977). *Am. J. Vet. Res.* **38**: 2085.

Chiofalo, L., Magistri, C., Puliese, A., Domina, F. and Catarsini, O. (1985). Metabolic profile of goats. III. Some enzymes (GMD, LD, MD, ALP, ACP, ALT, AST, Cholinesterase). *Vet. Bull.* **55**: 1152.

Deger, Y., Dede, S. and Deger, S. (2002). Enzyme activity changes in the sera of chickens treated with coccidiostatic agents. *Indian Vet. J.* **79**: 912-916.

Jindal, A. and Rattan, P.J.S. (1992). Plasma enzyme activity during synchronized estrous cycle in buffaloes. *Indian Vet. J.* **69**: 178-179.

Kataria, N. and Bhatia, J.S. (1991). Activity of some enzymes in the serum of dromedary camels. *Res. Vet. Sci.* **51**: 174-176.

Khadjesh, G.H. (2002). Concentration of serum enzymes in pregnant and non-pregnant Iranian one-humped camels. *Indian J. Anim. Sci.* **72**: 391-392.

Phillipsen, A.T. (1970). Physiology of Digestion and Metabolism in Ruminants. Oriel Press Limited. New Castle, NE1 8LH., U.K.

Prasad, P.E. and Kumar, G.V.(2002). Serum enzyme profile and biochemical constituents of blood in crossbred pigs during growth of blood in cross bred pigs during growth. *Indian Vet. J.* **79**: 1141-1144.

Puri, H. (1998). Studies on some serum enzymes in Rathi cattle. M.V.Sc. thesis, Rajasthan Agricultural University, Bikaner, India.

Sharma, M. and Bisoi, P.C. (1995). Clinically important serum enzymes of indigenous cattle. *Indian Vet. J.* **72**: 21-24.

Sharma, S. (1996). Studies on hormonal and blood biochemical profile of female buffalo calves as a function of age. M.V.Sc. thesis, CCS Haryana Agricultural University, Hisar, India.

Sharon, J.J., Shirley, A.G. and Peggy, A.C. (1982). Clinical chemistry reference values of normal domestic animals in various age groups – as determined on the ABA-100. *Cornell Vet.* **72**: 403-415.

Swenson, M.J. and Reece, W.V. (1996). Dukes Physiology of Domestic Animals. (11th edn.) Panima Publishing, New Delhi, India.

Visha, P., Leela, V. and Vishwanathan, S. (2002). Serum alkaline phosphatase and lactate dehydrogenase activity during pregnancy and parturition in goats. *Indian Vet. J.* **79**: 77-78.