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Effect of duration of dystocia on haematobiochemical alterations in buffaloes

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ABSTRACT

Dystocia leads to death of the dam and the calf especially in delayed cases. The present study was undertaken to assess certain haematobiochemical alterations in thirty three dystocia affected buffaloes, divided into four groups with labour pains less than 12 hours (group A; n=07), 12-24 hours (group B; n=12), 24-36 hours (group C; n=06) or more than 36 hours (group D; n=08). Haemoglobin (8.6-9.93 g/dl) and packed cell volume (30-36%) remained within the normal physiological range in different groups. Glucose, insulin, blood urea nitrogen and creatinine concentrations increased significantly from initial values of 98.77 mg/dl, 8.25 mU/ml, 10.51 mg/dl and 2.21 mg/dl, respectively, in group A to 180.22 mg/dl, 61.03 mU/ml, 20.51 mg/dl and 3.96 mg/dl, respectively, in group D. Total plasma protein (5.72 g/dl) and plasma (4.36%) and blood (6.42%) volumes were significantly lower in group D as compared to other groups. It is concluded that increased concentrations of blood urea nitrogen and creatinine and decreased circulatory volumes over the passage of time in buffaloes following dystocia indicated the progression of dehydration and toxaemia in protracted cases.

Key words : Buffalo, dehydration, dystocia, toxaemia

Normal calving is an important physiological event as the future production and reproduction of the dam and survival of the calf depends upon this single event. Dystocia leading to abnormal parturition constitutes 39.5 per cent of various reproductive disorders in buffaloes (Raman and Bawa, 1977) and is accompanied by serious haematobiochemical alterations in various body systems. The dystocia affected buffaloes have altered blood biochemical indices (Prabhakar *et al* 2000). The dystocia, if not handled judiciously may lead to death of affected animals in a high proportion due to dehydration and toxaemia. Mortality rate remains more than 70 percent in buffaloes with longer duration of dystocia (Verma *et al.*, 1974). Therefore, the present study was undertaken to assess certain haematobiochemical alterations in buffaloes with different duration of dystocia.

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MATERIALS AND METHODS

Thirty three dystocia affected buffaloes presented for treatment at the Veterinary Clinic, Punjab Agricultural University, Ludhiana were divided into four groups with labour pains less than 12 hours (group A; n = 07), 12-24 hours (group B; n = 12), 24-36 hours (group C; n = 06) and more than 36 hours (group D; n = 08). Following 'anamnesis and clinical examination, blood samples were collected through jugular venipuncture. Out of total 20 ml blood sample, 5 ml was kept for haematological studies while of the rest, plasma was separated and stored till analysed for various biochemical parameters. Then Evan's blue dye (0.5% stock solution) was injected @ 0.25 mg/kg b.wt. intravenously in fifteen dystocia affected buffaloes (group A; n=03, group B; n=04, group C; n=05 and group D; n=03) and another blood sample was taken after 10 minutes from opposite side of the neck for estimation of plasma/blood volume. Haemoglobin (Hb) and packed cell volume (PCV) were estimated as per the method described by Schalm *et al.* (1975). Blood glucose, total plasma protein, blood urea nitrogen (BUN) and creatinine were estimated by using

standard diagnostic kits supplied by Bayer Diagnostics India Limited. Insulin was estimated by Radio Immuno Assay technique using diagnostic kits procured from BARC, Mumbai. Plasma and blood volumes were estimated by the method described by Fisher and Dalton (1961). Data in respect of various haematobiochemical parameters was subjected to student's t-test for statistical analysis (Singh *et al.*, 1991).

RESULTS AND DISCUSSION

The results of various haematobiochemical studies are presented in Table 1. Hb and PCV levels in all groups were non-significantly different from each other. However, significantly higher (P<0.05) PCV in group D buffaloes (>36 hours) than in group B buffaloes (12-24 hours) might be due to flow of water from vascular to interstitial spaces in delayed cases (Singh 1991; Prabhakar *et al.*, 2000).

dystocia in the present study, as glucose is most important stimulant for insulin secretion (Trenkle 1972; Pamela and Richard, 1984). Similar positive correlation between insulin and glucose was reported by Schwalm and Schultz (1975) in cattle.

A significant fall in total plasma protein level was observed in prolonged cases of dystocia over 36 hours duration. Lower protein levels could be attributed to stress of dystocia leading to decreased liver function, increased utilization of proteins due to anorexia and inflammation causing increased movement of fluid and proteins into tissues (Little, 1974; McDowell, 1983; Kaur and Singh, 1993; Bugalia *et al.*, 1996; Prabhakar *et al.*, 2000). Injuries, oedema and peritonitis in dystocia cases might also be a cause of decreased plasma protein levels.

BUN and creatinine levels increased significantly with increase in duration of dystocia

Table 1. Effect of duration of dystocia on heamatobiochemical alterations in buffaloes (Mean±SD)

Parameter	Duration of Dystocia (hours)			
	GroupA (0-12)	Group B (12-24)	Group C (24-36)	Group D (>36)
Hb (mg/dl)	8.6±1.01	8.92±1.00	9.93±1.44	9.91±2.01
PCV (%)	30.85±1.24	30.33±2.59	30.00±2.94	36.00±8.51^{b}
Glucose (mg/dl)	98.77±10.02	113.86±8.15^{aa}	158.20±27.30^{aabb}	180.22±48.98^{aabb}
Proteins (g/dl)	6.41±1.03	7.00±0.69	6.65±0.47	5.72±0.42^{bbcc}
BUN (mg/dl)	10.51±3.79	9.74±3.81	17.30±6.84^{abb}	20.51±4.86^{aabb}
Creatinine (mg/dl)	2.21±0.63	2.03±0.57	2.85±0.46^{abb}	3.96±1.42^{aa}
Insulin (mU/ml)	8.25±6.67	15.16±14.85	19.85±14.12	61.03±58.83^{ab}
Plasma volume (%)	4.55±0.15	5.00±0.10^{aa}	4.95±0.53	4.36±0.46^{bbc}
Blood volume (%)	6.85±0.35	7.00±0.10	7.00±0.72	6.42±0.46^{abb}

^{a,aa}Significantly different from Group A (P<0.05; P<0.01, respectively)
^{b,bb}Significantly different from Group B (P<0.05; P<0.01, respectively)
^{c,cc}Significantly different from Group C (P<0.05; P<0.01, respectively)

Blood glucose concentration in dystocia affected buffaloes increased with the prolongation of dystocia. The stress of dystocia and its obstetrical treatments lead to higher levels of catecholamines and cortisol resulting into hyperglycemia due to increased gluconeogenesis and glycogenolysis as well as decreased peripheral utilization of glucose (Manju *et al.*, 1985; Verma *et al.*, 1988; Atwal, 1993; Ghuman *et al.*, 1996; Prabhakar *et al.*, 2000). Insulin levels were also higher in delayed cases of (>24hours), which could be due to elevated cortisol levels, increased protein catabolism, higher ADH (Antidiuretic hormone) activity and decreased renal blood flow due to severe pain, thus, causing increased retention of BUN and Creatinine within the body (Manju *et al.*, 1985; Verma *et al.*, 1988; Singh, 1991).

Plasma and blood volumes were lower in group D as compared to other groups. Excessive loss of fluid from the body and exhaustion in delayed cases of dystocia

might had caused decreased circulatory volumes indicating variable degree of dehydration, thus requiring intravenous fluid therapy for rehydration.

Alterations in various haematobiochemical parameters and decreased plasma/ blood volumes, over the passage of time from onset of dystocia in buffaloes were indicative of onset of dehydration and toxaemia in protracted cases of dystocia over 24 hours duration, thus, suggesting institution of immediate and appropriate interventions to decrease the mortality rate in dystocia affected buffaloes.

REFERENCES

Atwal, J.S. (1993). Studies on the stress of dystocia in buffaloes. M.V.Sc. thesis, submitted to Punjab Agricultural University, Ludhiana, India.

Bugalia, N.S., Sharma, D.K., Phogat, J.B., Kuhad, K.S. and Bansal, S.R. (1996). Variation in biochemical constituents in bovine dystocia due to uterine torsion and monstrosities. Indian Vet. J., 73: 839-843.

Fisher, E.W. and Dalton, R.G. (1961). Plasma and blood volumes in Ayreshire cattle. Br. Vet. J., 117: 143-151.

Ghuman, S.P.S., Nanda, A.S., Prabhakar, S. and Sharma, R.D. (1996) Stress related endocrine and metabolic changes in normally calved and torsion affected buffaloes. Indian Vet. J., 73: 1142-1146.

Kaur, T. and Singh, B. (1993). Reproductive disorders in buffaloes : Haematobiochemical studies. Indian J. Vet. Pathol., 17: 118-121.

Little, W. (1974). An effect of the stage of lactation on the concentration of albumin in the serum of dairy cows. Res. Vet. Sci., 17: 193-199.

Manju, T.S., Verma, S.K., Gupta, R.C., Mandakhot, V.M., Krishnaswamy, A. (1985). Profiles of some plasma biochemical constituents associated with uterine torsion and following its correction by laparohysterotomy in buffaloes. Indian J. Anim. Reprod., 6: 57-61.

McDowell, G.H. (1983). Hormonal control of glucose homoeostasis in ruminants. Proc. Nutr. Soc., 42: 149-167.

Pamela, C.C. and Richard, A.H. (1984). *Lippincott's Illustrated Reviews-Biochemistry*. J.B. Lippincott Company, Philadelphia.

Prabhakar, S., Nanda, A.S. and Ghuman, S.P.S. (2000). Variations in certain blood traits associated with dystocia and following obstetrical manoeuvring in buffaloes. Indian J. Anim. Reprod., 21: 121-123.

Raman, S.R.P. and Bawa, S.J.S. (1977). Incidence of pre and post partum reproductive disorders in bovines. Haryana Vet., 16: 99-101.

Schalm, O.W., Jain, N.C. and Corrol, E.J. (1975). *Veterinary Haematology*. 3rd edn., Lea-Febiger, Philadelphia.

Schwalm, J.W. and Schultz, L.H. (1975). Relationship of insulin concentration to various blood metabolites in the dairy cow. J. Dairy Sci., 59: 255-261.

Singh, M. (1991). Studies on changes in blood and ruminal functions in buffaloes with dystocia. M.V.Sc. Thesis submitted to Punjab Agricultural University, Ludhiana, India.

Singh, S., Singh, T.P., Bansal, M.L. and Kumar, R. (1991). *Statistical Methods for Research Workers*. Kalyani Publishers, New Delhi, Ludhiana.

Trenkle, A. (1972). Radio Immuno Assay of plasma hormones. Review of plasma insulin in ruminants. J. Dairy Sci., 55: 1200-1211.

Verma, S.I.T., Tyagi, R.P.S. and Manohar, M. (1974). Caesarean section in bovines - A clinical study. Indian Vet. J., 51: 471-480.

Verma, S.K., Khar, S.K., Gupta, R.C., Bugalia, N.S., Sharma, A.K., Manju, T.S., Khatri, C.K., Malik, J., Phogat, J.B. and Chandolia, R.P. (1988). Uterine torsion in buffaloes : Biochemical, haematological and histopathological studies. *Proc. of II World Buffalo Congress*, held at New Delhi 4 : 185-190.