

EVALUATION OF ORAL AND PARENTRAL THERAPY IN RECENTLY PARTURITED HYPOCALCAEMIC AND HYPOGLYCAEMIC BUFFALOES

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ABSTRACT

The study was undertaken to evaluate the efficacy of oral and parenteral therapies on hypocalcaemia and hypoglycaemia in recently parturited buffaloes. Eighteen recently parturited buffaloes were selected and divided randomly into three equal groups. First group (T₁) was kept as untreated control. Second group (T₂) was treated with oral calcium 100 ml +jaggery 500 g + sodium acid phosphate 60 g, daily for 5 days. Third group (T₃) was treated with calcium borogluconate 300 ml i/v + sodium acid phosphate 10% i/v + glucose 25% 500 ml i/v daily for 2 days. Biochemical studies were carried out in all groups at '0' day, 7th day and 30th day after parturition. The study revealed a decrease in plasma glucose, serum calcium and phosphorus on the day of parturition. Oral and parenteral therapies restored all the biochemical parameters close to normalcy within 30th day of parturition.

Key words: Buffalo, hypoglycaemia, hypocalcaemia, jaggery, parturition

Indian sub-continent is the home tract of the world's dairy buffaloes. Metabolic diseases are important in dairy buffaloes and are now becoming an emerging problem in highly productive buffaloes. Dairy animals usually suffer from metabolic deficits due to high milk yields. Post parturient hypocalcaemia (PPHC) and hypoglycaemia are important disorders in dairy animal causing severe economic losses due to reduced milk production. There are various treatment regimens available for post parturient hypocalcaemia and hypoglycaemia with varying degree of success (Radostits *et al.*, 2000). Most of these regimens are expensive and the information about the oral treatment is scanty. Hence, in this study cheaper oral and parenteral regimens affordable to the animal owners were tried to overcome the hypocalcaemia and hypoglycaemia.

MATERIALS AND METHODS

Selection of Animals: Thirty recently parturited buffaloes in and around Akola district were screened for hypocalcaemia and hypoglycaemia on the basis of serum calcium level (<8 mg/dl) and plasma glucose level (<35 mg/dl). Of these, 18 buffaloes were divided randomly into

three groups (T₁-T₃) with six animals in each group. Group T₁ was kept as a control group without any treatment. Animals in group T₂ were treated with calcium 100 ml +jaggery 500 gm + sodium acid phosphate 60 gm, orally, daily for 5 days, while animals in group T₃ were treated with dextrose 25% @ 500 ml, intravenously (I/V), calcium borogluconate 300 ml I/V + sodium acid phosphate 10% I/V daily for 2 days. Deworming with fenbendazole bolus (3 gm) and oral dose of liquid herbal uterine cleansing product @ 200ml for 2 day was carried out in both treatment groups. Animals in all groups were subjected to biochemical studies immediately on day of parturition, 7th day and 30th day postpartum.

Biochemical Estimations: Plasma glucose concentration was estimated by enzymatic GOD-POD end point method, serum calcium by O.C.P.C. method and serum phosphorus by UV molybdate end point method using reagent kits supplied by Span Diagnostic Ltd., Surat (India) on an autoanalyzer. The serum biochemical parameters were estimated at different intervals i.e. on '0' day (before treatment), 7th day and 30th day post treatment.

Statistical Analysis: The data was statistically analysed

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using Factorial Completely Randomized Design (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Plasma Glucose: Mean values of plasma glucose in control and treatment groups of animals at different intervals are summarized in Table 1. In all the groups (T₁, T₂ and T₃), mean plasma glucose level decreased on the day of parturition. Similar findings were also reported by Nale (2003) and Bani Ismail *et al.* (2011). Lowered plasma glucose concentration on the day of parturition might be due to large amount of blood glucose withdrawal by the mammary gland for the synthesis of milk lactose. Jagatheesan *et al.* (2005) and Hagawane *et al.* (2009) also reported that negative energy balance and stress condition immediately after parturition might also be the reasons of reduced blood glucose level.

The animals treated with oral therapy (T₂) showed a significant improvement in plasma glucose level on 7th and 30th day parturition when compared to control group. Similar improvement in the level of plasma glucose was also reported by Mir and Malik (2003). The efficacy of the therapy in improving plasma glucose level could be attributed to slow and consistent absorption of glucose from abomasum and thus, maintaining consistent blood glucose level for prolonged periods. The animals treated with parenteral therapy (T₃ group) showed a significant improvement in plasma glucose levels on 7th and 30th day of parturition over the level recorded on day of parturition i.e. before initiation of therapy. The statistical analysis revealed (T₃) non-significant variation in plasma glucose level on 7th and 30th day of parturition indicating failure of

parenteral therapy to maintain blood glucose level for a prolonged period. Similar findings were also reported by Mir and Malik (2003).

Comparison of two treatment regimens i.e. oral and parenteral revealed that the animals treated with parenteral therapy (T₃) showed a significant improvement in plasma glucose level as compared to oral therapy (T₂). The blood glucose levels were not maintained for prolonged period in parenteral therapy, whereas oral therapy recovered animal slowly but maintained blood glucose level for a longer period of time (Radostits *et al.*, 2006). This indicates that in emergency cases of hypoglycemia, parenteral therapy is more useful but in general, oral therapy is beneficial because of long lasting maintenance of blood glucose level and convenience of administration.

Serum Calcium: On the day of parturition, the serum calcium level was found to be low in all the groups indicating hypocalcaemia (Table 1). This could be attributed to the impaired absorption of food metabolites from G.I. precursors, excessive losses through urine, colostrum and due to insufficient mobilization from the skeleton (Radostits *et al.*, 2006). These findings are in accordance with those reported by Hagawane *et al.* (2009). In group T₂, there was a significant improvement in serum calcium levels on 7th and 30th day of parturition over the pretreatment level indicating effectiveness of oral therapy. Similar findings were also reported by Singh *et al.* (2009).

There was a significant variation in levels of serum calcium in T₂ and T₃ groups. More significant improvement in serum calcium level in T₃ as compared to

Table 1
Biochemical parameters in hypocalcaemic and hypoglycaemic buffaloes before and after treatment

Parameter	Group	Day of parturition ('0' day)	7 th day of parturition	30 th day of parturition
Blood glucose	T ₁	32.66 ^d ±1.85	37.83 ^d ±2.22	39.83 ^{cd} ±2.57
	T ₂	34.68 ^d ±2.41	46.96 ^{bc} ±5.55	47.66 ^{bc} ±3.02
	T ₃	36.86 ^d ±2.33	61.60 ^a ±4.04	54.16 ^{ab} ±3.42
Serum calcium	T ₁	6.93 ^d ±0.36	6.98 ^d ±0.26	7.13 ^d ±0.21
	T ₂	7.08 ^d ±0.09	9.9 ^{bc} ±0.29	9.23 ^c ±0.29
	T ₃	7.10 ^d ±0.08	11.23 ^a ±0.20	10.53 ^{ab} ±0.19
Serum phosphorus	T ₁	3.66±0.14	4.61±0.17	4.81±0.16
	T ₂	3.95±0.45	5.41±0.32	5.18±0.23
	T ₃	4.30±0.46	6.11±0.24	5.11±0.37

C.D. for Treatment (4.805), Periods (4.805) and Interaction (8.334) for serum plasma (P< 0.05); C.D. for Treatment(0.448), Periods (0.448) and Interaction (0.772) for serum calcium (P<0.01); and C.D.for Treatment (0.461), Periods (0.461) and Interaction (NS) for serum phosphorus (P<0.05)

T₂ group suggested better response of parental therapy. Similar findings were also reported by Braun *et al.* (2009). Improvement in serum calcium level on 7th and 30th day of parturition in both the treatment groups indicated that oral and parenteral therapies are at par in their effectiveness, however, parenteral therapy improved the serum calcium levels quickly because of direct infusion of calcium in blood circulation as compared to oral therapy. Similar findings were also observed by Rollin *et al.* (2010).

Serum Phosphorus: In control group (T₁), mean values of serum phosphorus at different periods showed non-significant variation (Table 1) which might be due to the effect of various metabolic processes occurring on the day of parturition and subsequently. However, decrease in the serum phosphorus level was observed on the day of parturition as also reported by Chakraborti (2008) which might be due to moderate depression in the level of serum phosphorus expressing its major role as colostrum synthesis (Hagawane *et al.*, 2009). Overall mean values of serum phosphorus levels in T₂ and T₃ groups showed significant increase as compared to T₁ group indicating the significant effect of both treatments. Similar findings were also reported by Wadhwa *et al.* (2008) and Singh *et al.* (2009) where oral supplementation of phosphorus augmented the serum phosphorus level in blood by interfering with the Ca:P ratio.

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