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PARTURIENT PARESIS IN MARATHWADI BUFFALOES AND ITS THERAPEUTIC MANAGEMENT

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ABSTRACT

Parturient paresis an important production disease of high yielding dairy cows has been underreported in buffaloes. The present study highlights the occurrence of clinical parturient paresis in native Marathwadi buffaloes with clinical, haemato-biochemical and therapeutic aspects. Marathwadi buffaloes admitted to Veterinary Clinical Complex of college were screened for sings of parturient paresis-based on history and subjected to clinical, haemato-biochemical investigations. A total of nine adult Marathwadi buffaloes (6 to 10 year old) in their 3rd to 5th lactation and 2nd to 5th day of calving with daily milk yield of 5 to 10 liter/day were diagnosed with milk fever based on history, clinical signs and laboratory investigation of serum calcium. Clinical examination of ailing buffaloes showed sternal recumbency with lateral kink in neck, lateral recumbency, dry muzzles, salivation, depressed menace reflex, relaxation of anal sphincter, rectal or vaginal prolapse, subnormal body temperature, tachycardia and laboured respiration with snoring sound. Haemato-biochemical analysis showed significant decrease in lymphocyte counts while increase in granulocyte counts, significantly increased Hb and PCV indicative of haemoconcentration and marked reduction in serum calcium indicative of milk fever syndrome. Treatment with Inj. Calcium borogluconate 1 ml/kg body weight by intravenous route showed promising and rapid response to treatment with complete resolution of the clinical signs. Owing to the presence of milk fever in Marathwadi buffaloes, further studies are essential to know the prevalence of parturient paresis and formulation of dietary strategies for prevention.

Keywords: *Bubalus bubalis*, buffaloes, Marathwadi buffalo, parturient paresis, milk fever, haemato-biochemistry, treatment

INTRODUCTION

Milk fever or parturient paresis is an economically important production disease of high yielding dairy cows characterized by depression of ionized calcium in the extracellular space including plasma, most commonly observed within first 48 h after parturition (Constable *et al*., 2017). Rare incidences of milk fever have also

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been reported in less producing indigenous and native cattle (Jadhav *et al*., 2018) while very few studies describe parturient paresis in buffaloes (Muahammad and Khan, 1998; Khatri *et al*., 2013; Singh *et al*., 1974; Singh *et al*., 1994; Digraskar *et al*., 2007). An overall 3.1% incidence of milk fever has been reported in buffaloes in Punjab with highest occurrence during 3rd to 5th lactation between July and December months (Singh *et al*., 1994). Khatri *et al.* (2013) observed 6.7% incidence of milk fever in Kundhi buffaloes in Pakistan.

Incidence rates of 3.5 to 7% for clinical milk fever while about 30% for sub-clinical milk fever has been reported in dairy cattle. It pre-dispose cattle to disease conditions like dystocia, uterine prolapse, retained fetal membranes, mastitis, ketosis, abomasal displacement as well as immunosuppression and hence it is termed as 'gateway disease' (Mulligan and Doherty, 2008). The economic losses to the tune of USD 300 per case for clinical milk fever while USD 125 per case for sub-clinical milk fever have been reported on account of reduced milk production and increased risk towards periparturient diseases (Oetzel, 2013). Thirunavukkarasu *et al.* (2010) reported economic losses to the tune of Rs. 665.74 per milk fever affected cow mainly attributed to loss of milk production and treatment costs.

Studies on parturient paresis in buffaloes are lacking and correlation of various factors with the occurrence of disease in buffaloes, predisposition of affected buffaloes to other disease conditions are as well lacking. Hence, owing to absence of any studies on parturient paresis in Marathwadi buffaloes of Maharashtra, the present study has been planned with objective to record the clinical syndrome, haemato-biochemical alterations and therapeutic management of parturient paresis in Marathwadi buffaloes.

MATERIALS AND METHODS

History and Clinical Signs

The clinical cases of buffaloes between advance pregnancy to mid-lactation admitted with clinical signs of acute onset of sternal or lateral recumbency admitted to Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Udgir were screened for parturient paresis. Routine physiological parameters like body temperature, heart rate, respiration and ruminal motility were recorded in the ailing buffaloes. The data regarding age, lactation number, lactation stage and milk yield was also recorded for the study buffaloes. A total of nine Marathwadi buffaloes were confirmed for parturient paresis during the study period which were in their 3rd to 5th lactation and 2nd to 5th day of calving with daily milk yield of 5 to 10 liters/day. Similarly, nine apparently healthy buffaloes in mid to late lactation from Instructional Livestock Farm Complex of the college were included in the study for comparing the data of vital parameters, haematology and serum calcium with buffaloes suffering from parturient paresis.

Haematology

About 2 ml of blood was collected by jugular venipuncture in EDTA vial from both buffaloes with recumbency and healthy 9 buffaloes for complete blood count on automated haematology analyser (Abacus Junior Vet, Diatron GMBH, Austria).

Serum calcium

About 3 ml of blood was collected by jugular venipuncture from both buffaloes with recumbency and healthy 9 buffaloes in clot activator tube and centrifuged at 3000 rpm for 5 minutes. The clear serum separated out at top was

harvested with pipette and used for estimation of serum calcium by using standard diagnostic kit (Span Diagnostics Ltd. India) by O-Cresolpthalein Complexone (OCPC), end point assay.

Treatment

All the ailing buffaloes with sternal or lateral recumbency having history of advanced pregnancy or early to mid-lactation with decreased serum calcium levels were confirmed for parturient paresis. While buffaloes with sternal or lateral recumbency but showing normal serum calcium levels were excluded from the study. The buffaloes suffering from parturient paresis were treated with Inj. Calcium borogluconate 1 ml/kg slowly by intravenous route by warming preparation to normal body temperature and the response to treatment was recorded. The response to the treatment was evaluated by observing the clinical improvement in the treated buffaloes in the form of ability to sit or stand, resumption of moisture on muzzle, alertness, improved corneal reflexes, urination, defecation, resumption of food and water intake etc.

Statistical analysis

The paired 't' test for equal number of observations was used for comparison of values of parturient paresis affected and healthy buffaloes using SPSS 20 version software to estimate the level of significance at 99% and 95%.

RESULT AND DISCUSSION

Parturient paresis is an important production disease of transition cows and has been extensively studied. The investigations on epidemiology, pathogenesis and risk factors are extensively studied in exotic dairy cows (DeGaris and Lean, 2008). Similarly various predisposing factors like breed, nutrition, parity, milk yield and genetic predisposition have been studied in milk fever (Mulligan *et al*., 2006). Parturient paresis has been comparatively less studied in buffaloes (Khatri *et al*., 2013; Singh *et al*., 1994). Singh *et al*. (1994) reported 3.1% prevalence of milk fever in buffaloes at private and organized farms in Punjab with cases reported during July to December months. Similarly, Khatri *et al.* (2013) reported 6.7% prevalence of milk fever in Kundhi breed of buffaloes in Pakistan with highest occurrence during 2nd to 4th lactation. Sai Krishna *et al.* (2014) reported 36.75% prevalence of subclinical hypocalcemia in buffaloes with highest occurrence during 3rd to 4th lactation.

In the present study, parturient paresis has been studied in the Marathwadi buffalo. Marathwadi buffaloes are native of Latur, Parbhani, Nanded, Beed and Jalna districts of Marathwada region of Maharashtra state with average lactational milk yield of 1118 kg and average milk fat of 8.8%. The Marathwadi buffalo breed is predominantly used for milk purpose in the region (NBAGR, 2010). In the present study, clinical parturient paresis has been reported in the nine Marathwadi buffaloes in various stages of production cycle.

The mean age of buffaloes affected with parturient paresis was 7.55 year (6 to 10 year) and mean lactation number was 3.77 (3rd to 5th lactation). The occurrence of milk fever in 6 to 10 years aged buffaloes in 3rd to 5th lactation is in agreement with those reported by Sai Krishna *et al.* (2014); Singh *et al*. (1994). The mean time period from parturition to the occurrence of parturient paresis in Marathwadi buffaloes in the present study was 3.77 day (2nd to 5thday of lactation) in 6 buffaloes while one buffalo in advanced pregnancy (10 months, 4 days) with

uterine prolapse was found affected with parturient paresis. Two lactating buffaloes suffered from parturient paresis on 90th and 150th day of lactation. Various authors have reported the occurrence of parturient paresis in buffaloes during advanced pregnancy and 1 to 3 days of lactation (Singh *et al*., 1974; Mandali *et al*., 1993) as well as even after 8 weeks after lactation (Singh *et al*., 1994). The mean milk yield of 8 lactating buffaloes suffering from parturient paresis in the present study was 7.14 liters/day (5 to 10 liter/day). The occurrence of parturient paresis in Marathwadi buffaloes mainly during first 3 days of lactation might be attributed to heavy drain of calcium in colostrum and milk in high yielding buffaloes.

The characteristic clinical signs observed in ailing buffaloes were anorexia, loss of milk yield, congested conjunctival mucous membranes, apprehension (Figure 1), dullness followed by clinical signs of second (Figure 2) or third stage (Figure 3) of milk fever depending upon time lapsed. Out of 9 cases of parturient paresis reported, 2 buffaloes were presented in first stage of milk fever, 4 buffaloes were presented in second stage of milk fever, while 3 buffaloes were presented in lateral recumbency with tympany indicative of third stage of milk fever. The typical clinical signs reported in milk fever affected buffaloes in the present study were in agreement with Constable *et al.* (2017); Singh *et al.* (1994).

The vital, haematological parameters and values of serum calcium in Parturient paresis affected Marathwadi buffaloes were depicted in Table 1. Vital clinical parameters showed highly significant (P>0.01) reduction in body temperature (97.84±0.63 vs. 100.97±0.19^{o}F), highly significant (P>0.01) increase in heart rate (75.71±4.92 vs. 53.28±0.56 beats per minute), significant (P>0.05) increase in respiration rate (28.00±2.35 vs.21.28±0.77 per minute) with ruminal atony in milk fever affected Marathwadi buffaloes compared to healthy counterparts. The clinical

Table 1. Mean (±) S.E. values of vital, haematological parameters and serum calcium in parturient paresis affected and healthy Marathwadi buffaloes.

Sr. No.	Parameter	Milk Fever (n=9)	Healthy (n=9)	't' value
1	Body temperature (^{o}F)	97.84±0.63	100.97±0.19	-4.516**
2	Heart rate (/minute)	75.71±4.92	53.28±0.56	4.616**
3	Respiration rate (/minute)	28.00±2.35	21.28±0.77	2.216*
4	WBC (x10^{3}/µl)	10.32±1.60	8.23±0.68	1.455^{NS}
5	Lymphocytes (%)	32.58±4.86	66.95±1.38	-7.194**
6	Granulocytes (%)	64.74±4.95	27.05±1.27	7.668**
7	RBC (x 10^{6}/µl)	6.92±0.44	6.68±0.31	0.443^{NS}
8	Hb (gm/dl)	14.67±0.85	9.72±0.32	5.304**
9	PCV (%)	44.93±2.99	29.97±0.83	4.925**
10	Platelets (x10^{3}/µl)	267.28±24.33	298.14±45.09	-0.479^{NS}
11	Serum calcium (mg/dl)	4.01±0.53	9.50±0.31	-14.528**

NS - Non significant; *-Significant (P<0.05); **-Highly significant (P<0.01).

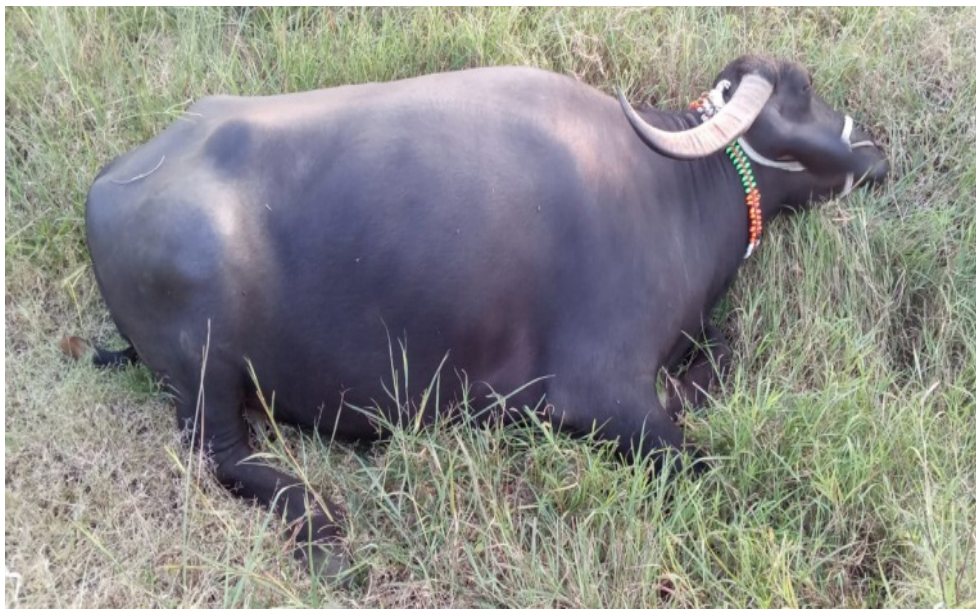

Figure 1. Marathwadi buffalo in first stage of milk fever showing apprehension, getting down.

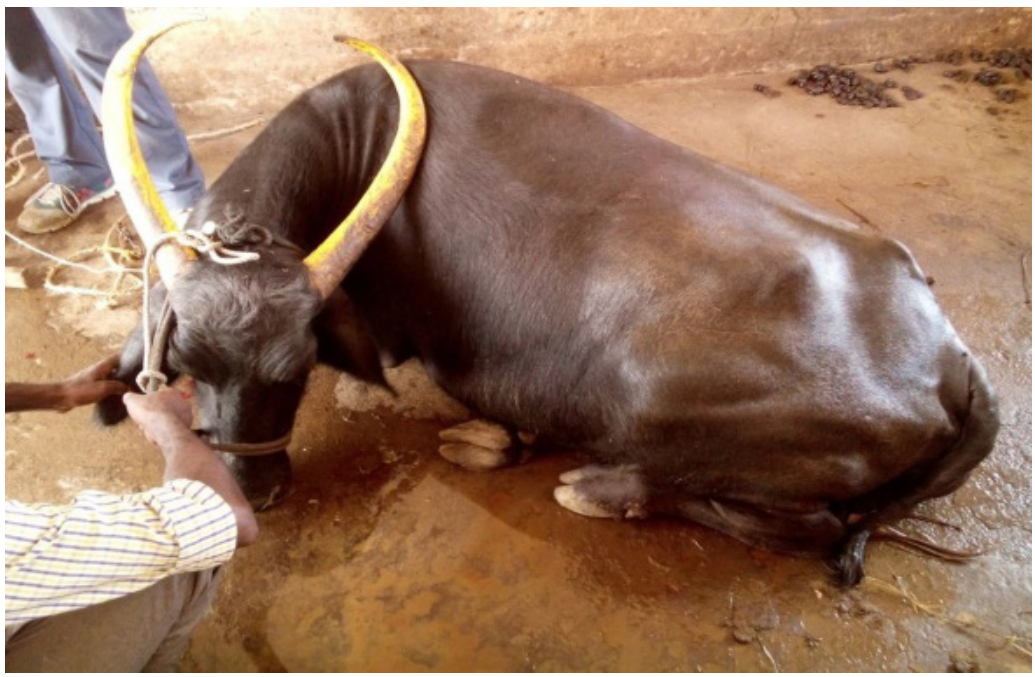

Figure 2. Ten-month 4 day advanced pregnant Marathwadi buffalo in second stage of milk fever with sternal recumbency.

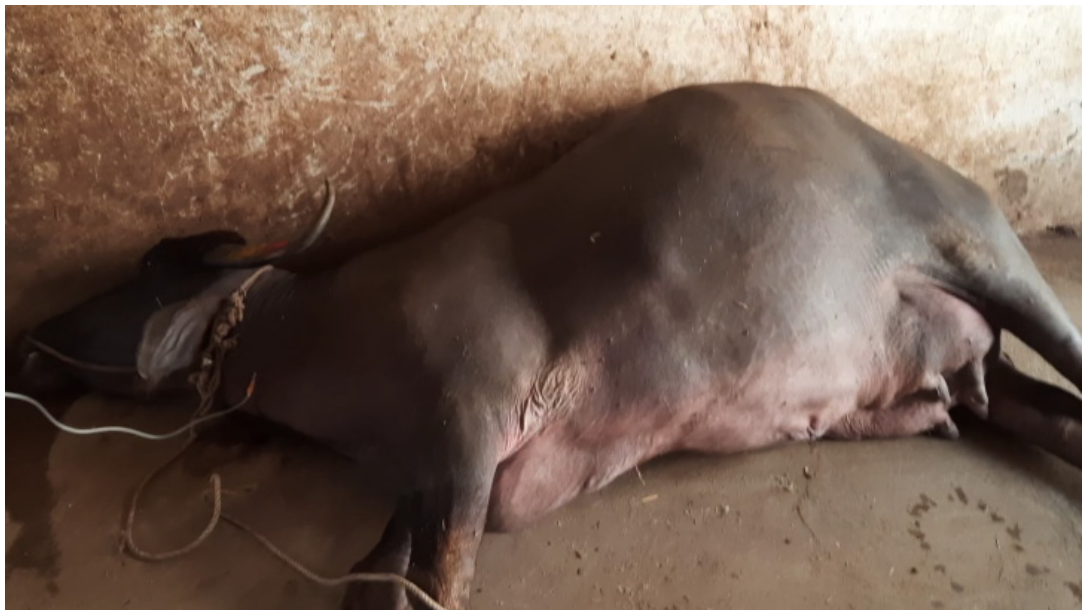

Figure 3. Marathwadi buffalo in third stage of milk fever in lateral recumbency with tympany and salivation.

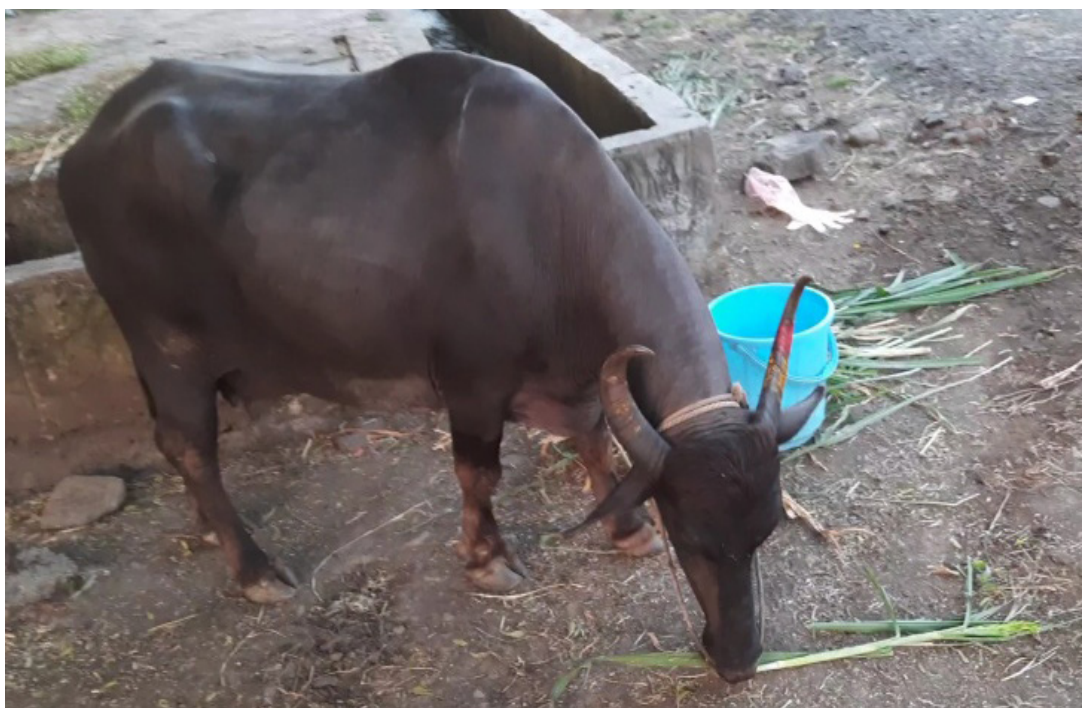

Figure 4. Marathwadi buffalo suffering from third stage milk fever, able to stand, started drinking water and taking food within 30 minutes after treatment.

signs recorded in buffaloes were in agreement with those reported by Constable *et al.* (2017) in dairy cows suffering from milk fever. Haematological parameters showed highly significant (P>0.01) decrease in lymphocyte count (32.58±4.86 vs. 66.95±1.38%) while increase in granulocyte count (64.74±4.95 vs. 27.05±1.27%), haemoglobin (14.67±0.85 vs. 9.72±0.32 gm/dl) and packed cell volume (44.93±2.99 vs. 29.97±0.83%). The haematological findings were in agreement with Constable *et al.* (2017) indicative of stress and dehydration in ailing buffaloes. Serum calcium values were significantly (P>0.01) decreased in milk fever affected Marathwadi buffaloes (4.01±0.53 vs. 9.50±0.31 mg/dl) compared to healthy counterparts. Similar decline in serum calcium has been reported in milk fever affected animals by several authors (Constable *et al.,* 2017; Singh *et al.,* 1994).

All the ailing buffaloes were treated with Inj. Calcium borogluconate 1 ml/kg slow IV after warming the preparation to normal body temperature. Rapid response to treatment was observed in ailing buffaloes with regain of strength in sternally and laterally recumbent buffaloes suffering from parturient paresis. Immediately after completion of treatment, treated laterally recumbent buffaloes were able to sit in sternal recumbency and slowly able to get up within 30 minutes of treatment. The buffaloes in second stage of milk fever showed instant response to calcium borogluconate, with signs of improvement during treatment. These buffalo showed appearance of moisture on the muzzle, increased alertness and improved corneal reflexes, efforts to stand up even during calcium administration etc. The defecation and urination were observed in treated buffalo after standing and some walk, followed by drinking water and resumption of voluntary feed intake (Figure 4). No case of relapsing milk fever was observed in the all-treated buffaloes. The treated buffaloes were kept under observation for 72 h and observed that, not a single buffalo treated for parturient paresis showed signs of Downer cow syndrome or relapse of milk fever. The response to treatment with calcium borogluconate in the present study was in agreement with the findings reported by Constable *et al.* (2017); Jadhav *et al.* (2018).

CONCLUSION

Milk fever/ parturient paresis an important production disease was reported in native Marathwadi buffaloes having high milk yield potential and could be managed immediately with parenteral calcium borogluconate therapy. Further studies are warranted to identify the prevalence of clinical and subclinical parturient paresis in Marathwadi buffaloes in order to establish guidelines for dietary management during dry period of pregnancy and during lactation for effective prevention of parturient paresis.

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