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Vikas Kumar Meena
Ph.D. Scholar, Department of Veterinary Medicine, CVAS, Navania, Vallabhnagar, Udaipur, Rajasthan, India

Shiv Kumar Sharma
Professor and Head, Department of Veterinary Medicine, CVAS, Jodhpur, Rajasthan, India

Suman Meena
Ph.D. Scholar, Department of Veterinary Extension Education, CVAS, Bikaner, Rajasthan, India

Lokesh Kumar Chandolia
Department of Animal Husbandry, Veterinary Officers, Rajasthan, India

Corresponding Author:
Vikas Kumar Meena
Ph.D. Scholar, Department of Veterinary Medicine, CVAS, Navania, Vallabhnagar, Udaipur, Rajasthan, India

Assessment of the efficacy of Calcimust gel and Himshakti on clinical parameters during the transition period in buffaloes

Vikas Kumar Meena, Shiv Kumar Sharma, Suman Meena and Lokesh Kumar Chandolia

Abstract
The transition period from 3 weeks prepartum to 3 weeks postpartum, is the most stressful phase for buffaloes. A total of 65 transition buffaloes were included in present study. The mean value of rectal temperature was significantly (p<0.05) higher during transition period as compared to control animals while the mean value of respiration rate and heart rate were significantly (p<0.05) higher during prepartum period in buffaloes. The supplemented group received an oral prophylactic regimen consisting of Calcimust gel (containing calcium, phosphorus, vitamin D_3 and vitamin B_{12} along with *Pueraria mirifica*) @ 300 gm per day per animal and Himshakti (containing gluconeogenic precursors with vitamin B_3 and vitamin E) @ 150 ml per day per animal for six days (3 days before expected calving to 3 days after calving). Supplementation of Calcimust gel and Himshakti had improved the altered values of the ruminal motility (/2 min) during transition period in buffaloes. It was concluded that transition period was the stressful phase for dairy buffaloes with marked changes in clinical parameters. Administration of prophylactic regimen had positive effect in transition buffaloes.

Keywords: Transition period, stress, periparturient disorders, prophylactic

1. Introduction
The transition period in buffaloes, spanning from late gestation to early lactation, is a critical phase characterized by significant physiological changes and metabolic adaptations. During this pivotal time, the evaluation of clinical parameters becomes essential for understanding the health status and well-being of the animals. Clinical parameters encompass a range of measurable indicators, including but not limited to vital signs, blood parameters and other health-related metrics.

Assessing clinical parameters in transition buffaloes provides valuable insights into their overall health, nutritional status and the challenges they may encounter during the periparturient period. Monitoring parameters such as body condition score (BCS), subcutaneous back fat thickness (BFT), blood biochemistry and other clinical markers enables a comprehensive understanding of the metabolic demands, potential stressors and disease susceptibility during this critical transition.

Minerals play a crucial role in the health and productivity of dairy animals, and even minor imbalances or deficiencies can have detrimental effects on their well-being and performance. There are complex inter-relationships between certain minerals, immune functions and disease resistance in dairy animals, as these minerals act as components of metallo-enzymes, enzyme cofactors and regulators of various mechanisms involved in pregnancy and lactation. Macro-minerals are particularly noteworthy for their roles in conditions such as milk fever, alert downer cows and downer cow syndrome, while micro-minerals contribute to body metabolism, protein synthesis, growth, immunity and the overall production and reproduction of animals. Due to the increased demand for minerals during lactation, dairy animals are more susceptible to deficiencies.

The availability of these minerals significantly impacts the performance and health of dairy animals, influencing aspects such as fertility, lactation and immune function.

During the periparturient period, variations in the concentration of minerals in the blood occur due to changes in dry matter intake, nutrient concentration in the diet, interactions between nutrients, nutrient transfer to the foetus, initiation of milk synthesis, alterations in hormone levels and body weight loss.

This study aims to delve into the dynamic interplay of clinical parameters in transition buffaloes, shedding light on the intricate balance required to navigate the physiological challenges associated with parturition, lactation onset and the subsequent postpartum period. By examining these clinical markers, we aim to contribute valuable insights to enhance the management and welfare of buffaloes during this crucial phase in their reproductive and lactation cycles.

2. Material and Method

The current study focused on 65 transition buffaloes, covering the three weeks preceding and following parturition, within the Udaipur district of Rajasthan. A comprehensive assessment of the general physical condition of these buffaloes was conducted to gauge their health status during the critical transition period. Information pertaining to breed, age, parity, pregnancy, calving and diet among other relevant factors, was systematically recorded. Key reproductive events, including the date of service, date of pregnancy diagnosis and expected date of calving, were meticulously documented for each buffalo. Additionally, a control group consisting of ten apparently healthy buffaloes, not within the periparturient period, was selected to establish baseline data for clinical parameters, facilitating comparative analysis. Detailed physical and clinical examinations were conducted on both the periparturient buffaloes and the control group, utilizing the methods outlined by Radostits *et al.* (2007) [10] to identify any disorders or diseases.

The twenty transition buffaloes were then divided into two groups – one receiving supplementation and the other serving as the unsupplemented group. The supplemented group received an oral prophylactic regimen consisting of Calcimust gel (containing calcium, phosphorus, vitamin D_3 and vitamin B_{12} along with *Pueraria mirifica*) @ 300 gm per day per animal and Himshakti (containing gluconeogenic precursors with vitamin B_3 and vitamin E) @ 150 ml per day per animal for six days (3 days before expected calving to 3 days after calving). The unsupplemented group did not receive any prophylactic regimen. The assessment of the prophylactic regimen's efficacy took place during the fresh stage of the transition period, specifically between 18 and 21 days postpartum, involving a subsequent examination of all buffaloes.

The data collected in this research study underwent statistical analysis and comparison utilizing the mean and standard error as per statistical methods described by Snedecor and Cochran (1994) [14].

3. Result and Discussion

3.1 Clinical parameters during transition period

Mean ± SE values of various clinical parameters in control animals and during transition period (prepartum and postpartum) in buffaloes are presented in Table 1.

Table 1: Mean ± SE values of various clinical parameters in control animals and during transition period in buffaloes

S. No.	Parameter	Control animals (n=10)	Periparturient period	
			Prepartum period (n=65)	Postpartum period (n=65)
1	Rectal Temperature (°F)*	101.15±0.11^{b}	101.63±0.14^{a}	101.44±0.18^{a}
2	Respiration Rate (per minute)*	22.5±1.46^{b}	25.3±1.18^{a}	23.2±1.82^{b}
3	Heart Rate (per minute)*	69.50±1.98^{b}	70.53±1.66^{a}	69.57±1.53^{ab}
4	Rumen Motility (per 2 minute)*	2.80±0.14^{a}	2.05±0.18^{c}	2.55±0.23^{b}

Means with different superscripts differ significantly

* Significant at 5% level (p<0.05)

3.1.1 Rectal Temperature

The mean value of rectal temperature (°F) was significantly (p<0.05) higher during prepartum and postpartum periods (periparturient period) in buffaloes as compared to control animals. There was also non-significant decrease in mean value of rectal temperature (°F) during postpartum period as compared to prepartum period in buffaloes. Similar findings were also reported by Delfino *et al.* (2018) [2], Hady *et al.* (2018) [6] and Shareef and Luaibi (2020) [13] in dairy cows and buffaloes. Non-significant changes in rectal temperature during postpartum period were observed by Kaur (2017) [7] in dairy cows.

The increase of body temperature during the period of pregnancy may be caused by an increase in the speed of metabolic processes in the dams' body. High levels of the progesterone hormone during pregnancy may also be responsible for an increase in body temperature. Similarly, low levels of progesterone along with high levels of estrogen after birth lead to a decrease in body temperature (Radostits *et al.*, 2006) [9]. Abdelatif and Alameen (2012) [1] reported an increase in rectal temperature with the advancement of pregnancy due to increase in metabolic heat production.

3.1.2 Respiration rate

There was significant difference (p<0.05) in the mean values of respiration rate (per minute) in control animals and during transition period in buffaloes (Table 1). The mean value of respiration rate was significantly (p<0.05) higher during prepartum period in buffaloes as compared to control animals. There was also significant decrease in mean value of respiration rate during postpartum period as compared to prepartum period in buffaloes. There was non-significant difference (p<0.05) in the mean values of respiration rate during postpartum period in buffaloes as compared to control animals. Similar findings were also reported by Hady *et al.* (2018) [6], Reddy *et al.* (2018) [12] and Shareef and Luaibi (2020) [13] in dairy cows and buffaloes. On contrary, decreased respiration rate was reported by Elshahawy and Abdullaziz (2017) [3] in dairy cows during transition period. Non-significant changes in respiration rate during postpartum period were observed by Kaur (2017) [7] in dairy cows. The respiration rate was increased during advanced pregnancy due to the increase of tidal volume. The reason for the increase may also be due to foetal growth, as a natural result of increased body temperature and pulse (Kelly, 1984) [8].

The increase in respiration rate during pregnancy could also be related to the fact that pregnancy leads to limited excursion of the diaphragm; this is compensated by increase in respiratory frequency (Rattray *et al.*, 1974; Toharmat and Kume, 1997) [11, 15]. The increase in respiratory and pulse rate in dairy cows during the periparturient period may also be associated to stress of pregnancy and parturition (Kelly, 1984) [8]. Abdelatif and Alameen (2012) [1] reported an increase in respiration rate with the advancement of pregnancy due to increase in metabolic heat production.

3.1.3 Heart Rate

There was significant difference (p<0.05) (Table 1) in the mean values of heart rate (per minute) in control animals and during transition period in buffaloes. The mean value of heart rate (per minute) was significantly (p<0.05) higher during prepartum period in buffaloes as compared to control animals. There was also non-significant decrease in mean value of heart rate during postpartum period and prepartum period in buffaloes. There was non-significant difference (p<0.05) in the mean values of heart rate during postpartum period in buffaloes as compared to control animals. Similar findings were also reported by Elshahawy and Abdullaziz (2017) [3], Reddy *et al.* (2018) [12], Delfino *et al.* (2018) [2] and Shareef and Luaibi (2020) [13] in dairy cows and buffaloes. Non-significant changes in heart rate during postpartum period were observed by Kaur (2017) [7] in dairy cows.

Heart rate is gradually increased with the advancement of the pregnancy and reached to the highest level in the late pregnancy period then began to decrease after birth in early lactation period. The effectiveness of the thyroid gland increased during pregnancy, and the effectiveness of thyroid hormone (thyroxin) affected almost all the organs, especially the heart, which responded to the minute change in the level of thyroxin. The increased thyroid effectiveness during pregnancy had a direct effect on the heart, causing an increase in the heart rate leading to increase blood volume and stroke volume (Fadel *et al.*, 2000) [4].

3.1.4 Rumen Motility

There was significant difference (p<0.05) (Table 1) in the mean values of rumen motility (per 2 minute) in control animals and during transition period in buffaloes. The mean value of rumen motility (per 2 minute) was significantly (p<0.05) lower during prepartum and postpartum period (periparturient period) in buffaloes as compared to control animals. There was also significant increase in mean value of rumen motility (per 2 minute) during postpartum period as compared to prepartum period in buffaloes. Similar findings were also reported by Elshahawy and Abdullaziz (2017) [3], Kaur (2017) [7] and Shareef and Luaibi (2020) [13] in dairy animals. The study showed significant (p<0.05) decrease in ruminal movements in the period of late pregnancy and near parturition which could be attributed to the increase of intra-abdominal pressure by gravid uterus on rumen and somewhat reduced calcium levels during early post parturient stage (Goff, 2008) [5].

3.2 Evaluation of Prophylactic Regimen

The evaluation of the prophylactic regimen's (Calcimust gel and Himshakti) efficacy in transition buffaloes was based on clinical parameters. The impact of the prophylactic trial on various clinical parameters, including rectal temperature, respiration rate, heart rate and rumen motility, is presented in Table 2.

Table 2: Mean ± SE values of various clinical parameters in control animals and other treatment groups (unsupplemented and supplemented)

S. No.	Parameter	Control animals (n=10)	Treatment groups	
			Unsupplemented group (n=10)	Supplemented group (n=10)
1	Rectal temperature (°F)	101.15±0.11	101.70±0.17	101.21±0.13
2	Respiration rate (per minute)	22.5±1.46	23.2±1.14	22.8±1.43
3	Heart rate (per minute)	69.50±1.98	70.21±1.45	69.51±1.42
4	Rumen motility (/2min)*	2.80±0.14^{a}	2.12±0.12^{b}	2.75±0.18^{a}

Means with different superscripts differ significantly

* Significant at 5% level (p<0.05)

There was non-significant difference in the mean values of rectal temperature (°F), respiration rate (per minute) and heart rate (per minute) while significant difference (p<0.05) in the mean values of rumen motility (/2 min) in control animals, unsupplemented and supplemented groups of buffaloes (Table 2). The mean value of rumen motility (/2 min) was significantly (p<0.05) higher in supplemented group as compared to unsupplemented group. There was non-significant difference in mean value of rumen motility (/2 min) in control animals and supplemented group. It is concluded that there was no effect of the prophylactic regimen on rectal temperature, respiration rate and heart rate in transition buffaloes, but rumen movements were significantly increased in the supplemented group. Here it is pertinent to mention that rumen movements were almost within normal range in supplemented group which showed the effectiveness of prophylactic therapy in normalizing the rumen movements and appetite during transition period.

4. Summary and Conclusions

The transition period emerged as a stressful phase for dairy buffaloes, marked by a series of physiological adaptations leading to significant changes in clinico-haemato-biochemical parameters, mineral status and biomarkers of oxidative stress. These adaptations, occurring rapidly, contribute substantially to various periparturient health problems, encompassing both single and multiple disorders. The present study aimed to assess clinical parameters during the transition period in buffaloes. Among the clinical parameters, the mean rectal temperature (°F) was found to be significantly higher (p<0.05) during the transition period in buffaloes compared to control animals. Additionally, the mean values of respiration rate and heart rate (per minute) were significantly higher (p<0.05) during the prepartum period in buffaloes compared to control animals. However, during the postpartum period, there were non-significant differences (p<0.05) in the mean values of respiration rate and heart rate in buffaloes compared to control animals. It was concluded that clinical parameter in the supplemented group had returned to normal levels, comparable to control animals, as opposed to the unsupplemented group. This finding highlights the efficacy of the prophylactic regimen consisting of Calcimust gel and

Himshakti in mitigating the impact of the transition period on clinical parameters in buffaloes.

5. References

1. Abdelatif AM, Alameen AO. Influence of season and pregnancy on thermoregulation and haematological profile in crossbred dairy cows in tropical environment. Global Veterinaria. 2012;9(3):334-340.
2. Delfino NC, De Aragao Bulcao LF, Alba HDR, Da Silva Oliveira MX, *et al*. Influence of body condition score at calving on the metabolic status and production performance of Murrah buffaloes (*Bubalus bubalis*) during the transition period. Asian-Australasian Journal of Animal Sciences. 2018;31(11):1756-1765.
3. Elshahawy II, Abdullaziz IA. Haemato-Biochemical Profiling in Relation to Metabolic Disorders in Transition Dairy Cows. Alexandria Journal for Veterinary Sciences. 2017;55(2):25-33.
4. Fadel BM, Ellahham S, Lindsay Jr J, Ringel MD, Wartofsky L, Burman KD. Hyperthyroid heart disease. Clinical Cardiology. 2000;23(6):402-408.
5. Goff JP. Transition period management and nutrition problems-A few solutions. In Proceedings of the High Plains Dairy Conference, Albuquerque, NM; c2008. p. 123-138.
6. Hady MM, Melegy TM, Anwar SR. Impact of the Egyptian summer season on oxidative stress biomarkers and some physiological parameters in crossbred cows and Egyptian buffaloes. Veterinary World. 2018;11(6):771-778.
7. Kaur N. Effects of seasonal variations on the transition period metabolic status and post parturient health in crossbred cattle. M.V.Sc. thesis, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab; c2017.
8. Kelly WR. Veterinary clinical diagnosis. Edn 3, William Clows Ltd., London; c1984.
9. Radostits OM, Gay C, Hinchcliff KW, Constable PD. Veterinary Medicine: a textbook of the diseases of cattle, sheep, goats, pigs and horses. Edn 10, Elsevier Saunders, Edinburgh London; c2006. p. 1777-2048.
10. Radostits OM, Gay CC, Hinchcliff KW, Constable PD. Veterinary Medicine: a textbook of the diseases of cattle, sheep, goats, pigs and horses. Edn 10, Elsevier Saunders, Edinburgh London; c2007.
11. Rattray PV, Garrett WN, East NE, Hinman N. Efficiency of utilization of metabolizable energy during pregnancy and the energy requirements for pregnancy in sheep. Journal of Animal Science. 1974;38(2):383-393.
12. Reddy BS, Reddy YP, Sivajothi S, Vani S, Ravikanth K, Ganguly B. Effect of polyherbal preparation (Restobal) supplementation on parturition stress in buffaloes. Journal of Pharmacognosy and Phytochemistry. 2018;7(5):1745-1747.
13. Shareef ABO, Luaibi OK. Clinical and biochemical profile of Iraqi local breed cows during pregnancy and early lactation. The Iraqi Journal of Veterinary Medicine. 2020;44(E0):51-56.
14. Snedecor GW, Cochran WG. Statistical Methods, Edn 6, Oxford and IBH Publishing Co, New Delhi; c1994.
15. Toharmat T, Kume S. Effect of heat stress on minerals concentration in blood and colostrum of heifers around parturition. Asian-Australasian Journal of Animal Sciences. 1997;10(3):298-303.