

ELECTROCARDIOGRAPHY MARKERS IN HYPOCALCAEMIA  
OF PERIPARTUM BUFFALOES

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**ABSTRACT**

The present report was done on 42 buffaloes which were identified with hypocalcemia. Confirmation of the hypocalcemia was done by serum calcium levels estimation. Electrocardiographic assessment was carried out with base apex lead system and recorded the prolonged QT and QTc interval. Based on present study, electrocardiography can be utilized for assessment of the buffaloes with hypocalcemia diagnostic as well as therapeutic response.

**Keywords:** *Bubalus bubalis*, buffaloes, hypocalcemia, electrocardiography, QT interval

**INTRODUCTION**

Milk fever is one of the most important diseases during the peri-parturient period in buffaloes. During the disease process, it reduces smooth muscle contraction, which results in gastrointestinal motility disorders. Early diagnosis and intervention of hypocalcemia is very essential for the better therapeutic outcome (Reddy *et al.*, 2019). Literature on the electrocardiography

studies in large animals very limited in India (Reddy *et al.*, 2015) and no valid study was reported on electrocardiography changes in buffaloes with hypocalcemia. The present report on documentation of hypocalcemia in periparturient buffaloes can be rapidly diagnosed using electrocardiography.

**MATERIALS AND METHODS**

The present study was carried out at DVCC, CVSc., Proddatur during the one year period of study. Forty-two buffaloes were identified suffering with hypocalcemia ranging from 3 to 8 years. All the buffaloes had a history of calving within eight days and were off feed and reduced milk yields / No milk yield. Physical examination revealed reduced rumen motility and dung output. On the first day of admission, blood was collected for serum biochemical analysis which revealed hypocalcemia (Klein, 2012). After confirmation of the hypocalcemia, electrocardiography was carried out on standard procedure (a bipolar base apex lead system using limb lead I; paper speed 25 mm/second and calibration 10 mm/mV) (Reddy and Sivajothi, 2016). To study electrocardiography



Figure 1. The electrocardiogram of buffalo with hypocalcemia.

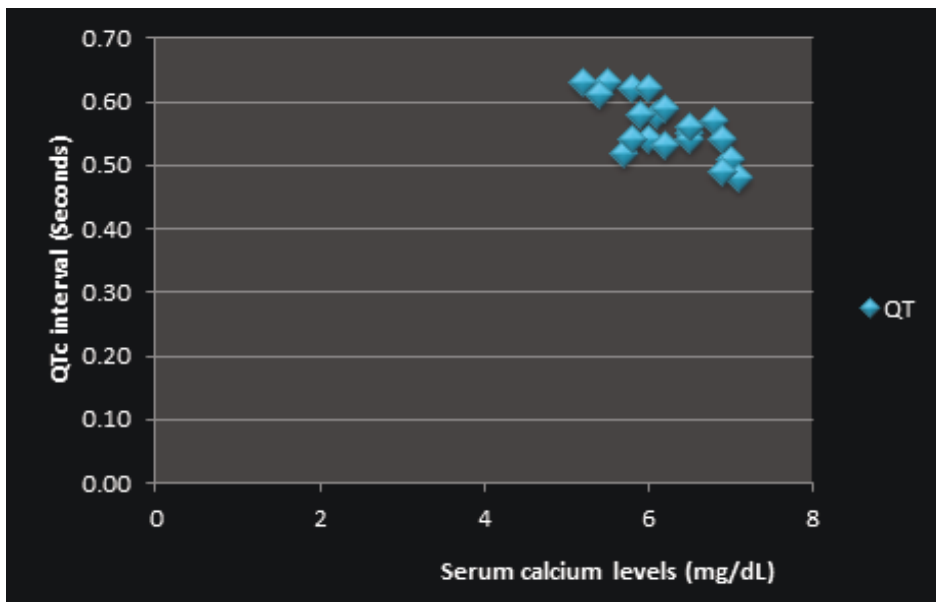


Figure 2. Graphical representation of serum calcium levels and QT interval in buffaloes with hypocalcemia.

changes, heart rate, the presence of arrhythmias and Q-T interval was measured. Due to the effects of heart rate, the corrected QT interval (QTc) was utilized by the formula of Bazett where  $QTc = QT/\sqrt{R-R}$ . All the hypocalcemia buffaloes were treated with calcium supplementation and herbal anti stressor product (Restobal).

## RESULTS AND DISCUSSIONS

Select buffaloes under the study, had reduced levels of serum calcium (5.2 to 7.1 mg/dL with mean of  $6.14 \pm 1.2$  mg/dL). Electrocardiography showed prolonged QT interval (0.48 to 0.63 seconds) and QTc of  $0.54 \pm 0.08$  seconds in buffaloes with hypocalcemia status than compare with the electrocardiographic parameters of apparently healthy buffaloes in the same geographical location (Figure 1 and Figure 2) (Reddy *et al.*, 2015). There is no change in the QRS wave and T wave amplitude in the buffaloes. Atrial Fibrillation, premature atrial beat was noticed in buffaloes with peri-parturient buffaloes. Electrolyte changes and hypocalcemia depicted in electrocardiography in the present study which were in association with previous literature (Radostits *et al.*, 2014).

Milk fever is one of the frequently noticeable diseases of peripartum dairy animals and it can be diagnosed by estimation of serum calcium levels. At field level on spot assessment lower levels of calcium is a difficult task. It was reported that variations in the blood calcium levels can cause alterations in the electrocardiographic parameters (Bronsky *et al.*, 1961). Matsuo *et al.* (1987) recorded the serum Ca and  $Ca^{++}$  significantly correlated with  $QoTc$  and  $QTc$  in cows with milk fever. During hypocalcemia, heart rate increased, and the strength of the cardiac

conduction ability depends on the calcium ionic concentration in ECF (Mogumi *et al.*, 2015).

In conclusion, the present study records the correlation in-between the hypocalcemia and QT interval of electrocardiography in peri-parturient buffaloes. Nowadays, electrocardiography machines are smaller and inexpensive which allows for recording of ECG at field level itself.

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