

Calcium Administration to Improve Parturition in Dairy Cows

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Abstract

Parturition in bovine consider as a stressful event to the calving cows and calves as well. In general divided into three phases. The former involves the endocrinal and mechanical arrangement of uterine and cervical tissues, embryo and birth the newborn and expulsion of the placenta. Calcium is one of the essential materials in the body which was found that subclinical hypo-calcemia can highly affect cows and about 47% of the multiparous with 25% of the heifers were affected. Forty animals were selected and divided into two equal groups, first group treated with intramuscular administrations of calcium, the remained group were injected Intramuscular normal saline. The result showed there are significant decrease in the time of parturition in group administered with calcium as compared with non-treated group.

Aim of Study: Evaluate the role of calcium on time of parturition period and some trouble shot during it.

Keywords: Calcium, Parturition, Cow; nutrition.

Introduction

Parturition in bovine is a stressful event to the calving cows and calves as well^[1]. This mechanism can alter the energy profile of offspring and dams, producing a metabolic imbalance at birth. The dilation of pelvic canal, the contractions of abdominal and uterine muscles and pain related with fetal expulsion are strongly implicated in a complex pattern of neuroendocrine regulation^[2]. Parturition is generally partitioned into three phases. The former involves the endocrinal and mechanical arrangement of uterine and cervical tissues for parturition. The second stage includes bring out of the **embryo and birth the newborn**. The later stage includes **expulsion of the placenta**^[3].

It was found that subclinical hypo-calcemia can highly affect cows and about 47% of the multiparous with 25% of the heifers were affecte^[4]. The subclinical hypo-calcemia elevates of non-esterified fatty acids in the plasma and destroys the immune system^[5]. Moreover, hypo-calcemia leads to reduce reproductive performance, increase the risk of culling^[6], female genital tract diseases and lactation production^[7]. Therefore, calcium is the most critical electrolyte managing myometrium constrictions. The myometrium contains an intracellular pool of bound calcium put away in the sarcoplasmatic reticulum and the myometriumcells have high convergence of sarcoplasmaticreticulum^[8]. Calcium can be mobilized from the sarcoplasmatic reticulum just as from the extracellular liquid. The insufficiency of calcium may incline the cows to dystocia^[9] and reduce of uterine contractions resulting to the disappointment of fetal expulsion yet the immediate role of calcium in detachment of fetal membranes isn't comprehended. Troublesome birth is a main source of calf demise at or soon after birth and prompts uterine contaminations and increasingly retained placentas^[10]. Accordingly, this

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research was designed to evaluate the role of calcium on time of parturition period and some trouble shot during it.

Materials and Method

Animals: The current study was approved by the Institutional Animal Care and Use Committee, University of Kufa, Iraq. A single dairy farm was conducted to do the present study. The herd consisted of 80 cows. The cows had body condition score between 3.5 and 4.5. Cows without history of retained fetal membranes (n = 40) were randomly selected and divided into two groups. All animals were healthy at the time of the study and the herd was kept under sanitary conditions throughout the study.

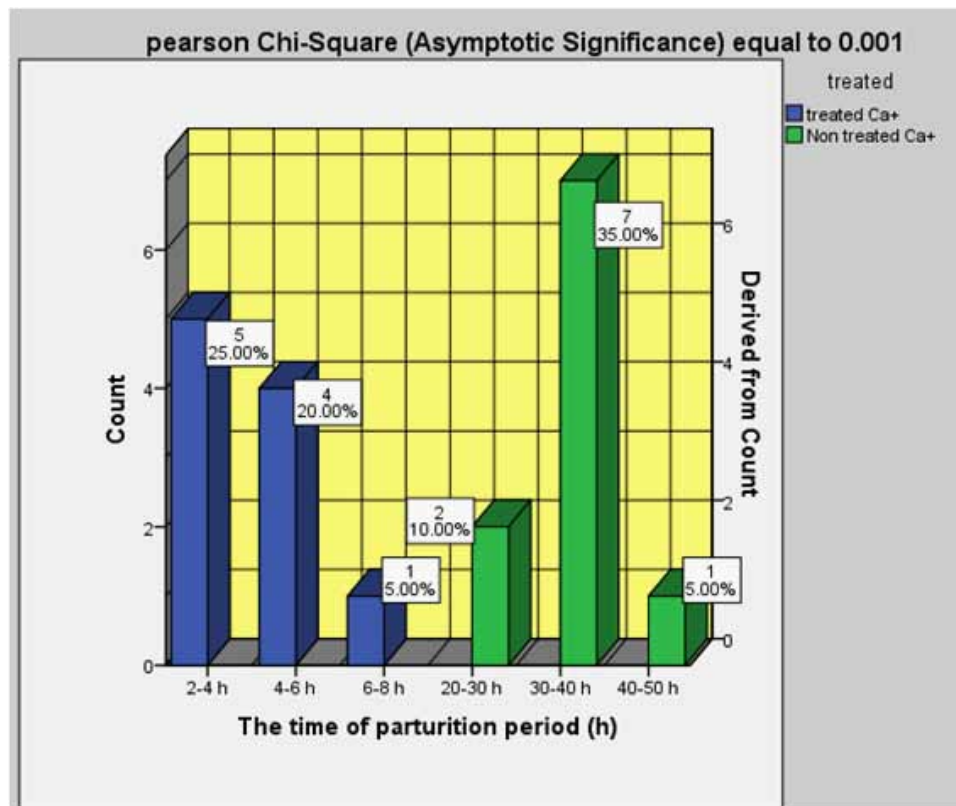
Cow and treatment local dairy cow utilized in the investigation were kept at a commercial farm under normal homestead conditions. Cows without history of retained fetal membranes (n = 20) were randomly divided into two equal groups. First ten cows were intramuscular administrations of calcium (20 mg/mL)

mg.kg-1, the remained ten were injected Intramuscular normal saline (10 ml) and the following parameters were examined and evaluated: Time of parturition period, nature of parturition and the occurrence of retained placenta.

Statistical analysis: Statistical analysis of data was performed on the basis of Chi-Square Analysis using a significant level of (P<0.05). Specific group differences were determined using.

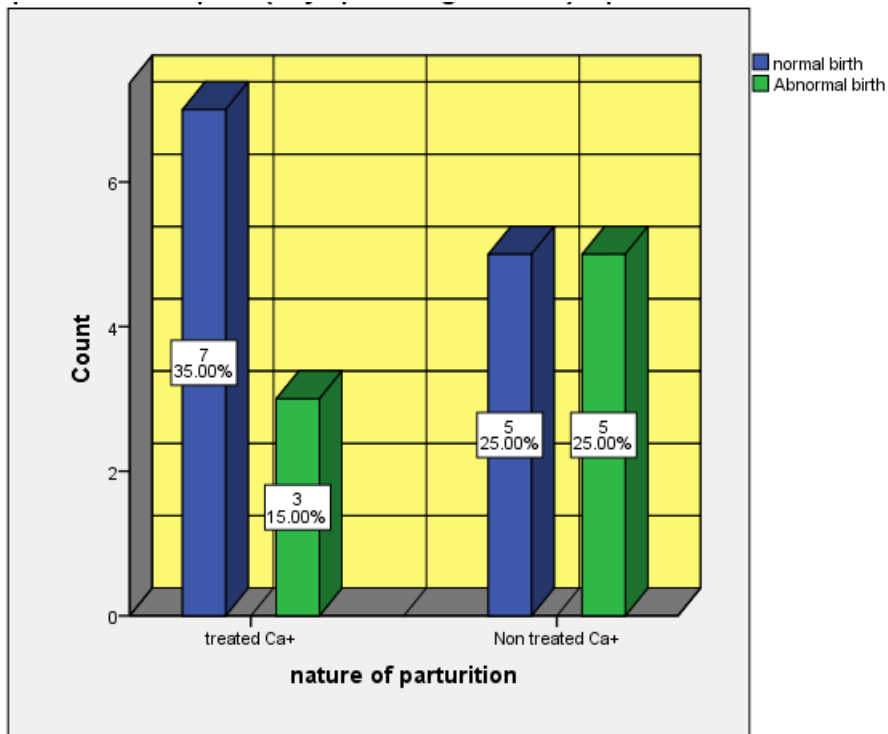
Results

The time of parturition period in cow treated and non-treated with calcium/hour illustrated in figure (1), the result show significant decrease (P<0.05) in the time of parturition in group treated with calcium as compared with non-treated group. While the nature of parturition normal and abnormal (birth with a veterinary intervention) and the occurrence of retained placenta clarified in figures (1 and 2) respectively, the results show no significant changes (P<0.05) between treated and non-treated with calcium.



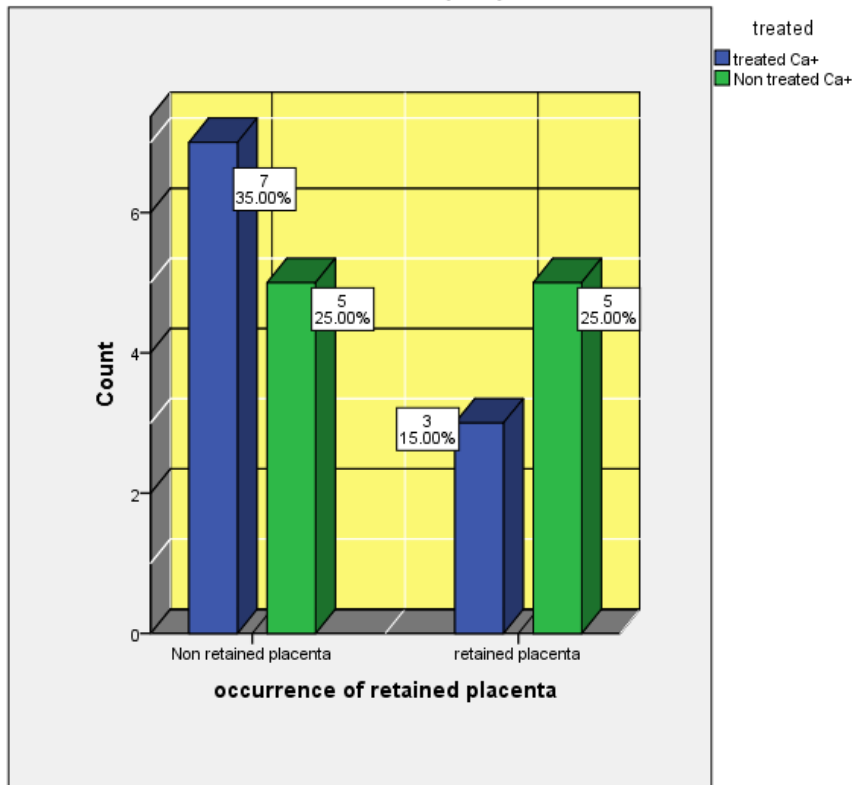
*significant difference P<0.05 between two groups due to the value of Pearson Chi-Square (Asymptotic Significance) equal to 0.001 is less than (0.05).

Figure (1):The time of parturition period in cow treated and non-treated with calcium/hour (h).



*Non-significant difference $P < 0.05$ between two groups due to the value of Pearson Chi-Square (Asymptotic Significance) equal to 0.361 is more than (0.05).

Figure (2): Nature of parturition in cow treated and non-treated with calcium



*Non significant difference $P < 0.05$ between two groups due to the value of Pearson Chi-Square (Asymptotic Significance) equal to 0.361 is more than (0.05).

Figure (3): The occurrence of retained placenta in cow treated and non-treated with calcium

Discussion

The objective of the present study was to study the effect of calcium supplementation to pregnant cows to minimize the risk of dystocia in cows of low or high risk of retained fetal membranes.

Calcium concentrations in the circulatory system are kept up by the eating routine and calcium discharged from the skeleton. The disappointment of calcium absorption from the eating routine and skeleton result in an abrupt deduction in blood calcium concentrations. At the point when the mammary drain of plasma calcium causes hypocalcaemia extreme enough to disrupt neuromuscular function^[11]. Due to the start of colostrum production and consequently increasing calcium demand, the nadir of serum calcium concentration occurs 12 to 24 h after parturition^[11-12].

The results give an indication that calcium is not needed to initiate the labour while that showed decreased in time of parturition compared with non-treated group, that was agreed with^[14], which showed the calcium oral administration of calcium is improved parturition as well as Zhang et al (2020)^[15] showed the which Ca status is associated with energy metabolism of transition dairy cows.

The time of parturition related to the energy therefore to Cabalance which is associated with energy metabolism of transition dairy cows. In generally cows in the transition stage of parturition are susceptible to risk of negative energy balance due to lack of synchronization between appetite recovery and milk secretion while milk production related to energy balance [16-15]. On other hand study results showed the increased significantly in time of parturition in non-treated group compared with the treated groups.

Administration of Calcium was not affected on nature of parturition which result of study showed non-significant different between treated and non-treated group with calcium as agreed with find on similar studies^[16-17] when used oral administration of calcium. As well as the causes of retained placenta is usually by an inflammatory state as showed by present studies^[18] or by late gestation and labor.^[19]

The occurrence of retained placenta did not affected which the study found that are non-significant different between treat and non-treated groups in the same time we agreed present studies^[15] which showed calcium did not effected in the nature of parturition.

Conclusion

The administration of calcium improved parturition which decreased the period of parturition time, while that did not effect on nature of parturition and retained placenta.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

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