



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2019; 7(1): 989-991

© 2019 JEZS

Received: 15-11-2018

Accepted: 20-12-2018

Maradona Nath

Department of Animal
Reproduction, Gynaecology &
Obstetrics, College of Veterinary
Science, Assam Agricultural
University, Khanapara,
Guwahati, Assam, India

KC Deka

Department of Animal
Reproduction, Gynaecology &
Obstetrics, College of Veterinary
Science, Assam Agricultural
University, Khanapara,
Guwahati, Assam, India

KC Nath

Department of Animal
Reproduction, Gynaecology &
Obstetrics, College of Veterinary
Science, Assam Agricultural
University, Khanapara,
Guwahati, Assam, India

P Borah

Department of Animal
Reproduction, Gynaecology &
Obstetrics, College of Veterinary
Science, Assam Agricultural
University, Khanapara,
Guwahati, Assam, India

BK Sarmah

Department of Veterinary
Physiology, Gynaecology &
Obstetrics, College of Veterinary
Science, Assam Agricultural
University, Khanapara,
Guwahati, Assam, India

DP Bora

Department of Veterinary
Microbiology, Gynaecology &
Obstetrics, College of Veterinary
Science, Assam Agricultural
University, Khanapara,
Guwahati, Assam, India

Correspondence**Maradona Nath**

Department of Animal
Reproduction, Gynaecology &
Obstetrics, College of Veterinary
Science, Assam Agricultural
University, Khanapara,
Guwahati, Assam, India

Incidence and Haemato-biochemical profile of prolonged oestrus crossbred cows

Maradona Nath, KC Deka, KC Nath, P Borah, BK Sarmah and DP Bora

Abstract

A total of 800 breedable cows maintained at Instructional Livestock Farm, C.V.Sc., Khanapara and at different private farms around the college campus were taken to record the incidence of prolonged oestrus, which was recorded to be 16.75 per cent. Out of which 20 apparently healthy prolonged oestrus and 6 normal duration of oestrus cow were taken to study the blood biochemical and haematological parameters. The behavioural signs and the physical signs of oestrus were also studied. These signs were subsided on day 5th except swelling of vulva (10.00 %). The occurrence of relaxed and open cervix, good to very good uterine tone, palpable Graafian follicle, tense and soft follicular wall in prolonged oestrus cows were observed even up to the 3rd day of oestrus. The level of serum inorganic phosphorus was significantly ($P < 0.01$) lower in prolonged oestrus cows at all days of oestrus. Level of serum cholesterol varies significantly ($P < 0.01$) between days of oestrus, highest level being recorded on 10th day and the serum glucose level varies significantly ($P < 0.01$) between oestrus duration groups as well as between days of oestrus. The haematological parameters *viz.* Hb, PCV, TEC, TLC, lymphocyte, monocyte and total granulocyte count were found to be within the normal physiological range and there was no significant difference of haematological parameters between the groups and different days of oestrus.

Keywords: Prolonged oestrus, Incidence, Graafian follicle Blood Biochemistry and Haematology

1. Introduction

Prolonged duration of oestrus more than 36 - 48 hours in crossbred cattle has been recognised as one of the major contributing factor towards repeat breeding in dairy herds [2]. Enhanced milk production obtained through crossbreeding was found to be associated with lower circulating steroids leading to decline in oestrus behaviour [9]. This led to difficulty in determining the proper time of insemination. Cows affected with prolonged oestrus need to be examined at frequent intervals for determining the correct time of artificial insemination or else be inseminated several times during the time of prolonged oestrus, which is painstaking and tedious. Keeping in view the changed pattern of duration of oestrus in crossbred cows the present study has been planned to ascertain the incidence along with blood biochemical and the haematology of crossbred cows affected with prolonged oestrus.

2. Materials and Methods

2.1 Location of the study

The present study was conducted on crossbred cows of Instructional Livestock Farm (Cattle), College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22 and in the private farms located around the college campus.

2.2 Incidence of prolonged Oestrus

A total of 800 breedable crossbred cows were surveyed and incidence of prolonged oestrus was calculated and expressed in percentage.

2.3 Experimental animals

Among the prolonged oestrus cows, 20 apparently healthy crossbred cows and 6 normal oestrus cows (control) were selected for studying haematological and blood biochemical profiles. These cows were examined per rectum daily for 5 days to determine the duration of oestrus based on vaginal discharge and uterine tone. They were divided into three groups based on the duration of prolonged oestrus *i.e.* 2 days (8 cows), 3 days (7 cows) and 4 days (5 cows). Blood samples from the jugular vein of all the three different oestrus duration groups

and control group cows were collected for determining biochemical and haematological profiles on 1st, 3rd, 5th and 10th day of the oestrus.

2.4 Study of blood biochemical profiles

A total of 20 prolonged oestrus crossbred cows and 6 control animals were selected to study blood biochemical constituents on 1st, 3rd, 5th and 10th day of the oestrus.

2.4.1 Collection of blood and preservation of serum

Blood was collected from jugular vein with a sterile 18 gauge needle. Ten ml of whole blood was taken in a sterilized 20 ml test tube and was kept in slanting position until clotting was completed. Serum was separated from the coagulated blood and it was collected by sterilized pipette and kept in a clean dry sterilized plastic vial which was stored at -20° C. The serum was centrifuged whenever necessary.

2.4.2 Estimation of blood biochemical constituents

The biochemical constituents of serum samples were estimated by using quality reagent kits of calcium (as per cresolphthalein complexone method), inorganic phosphorus (as per phosphomolybdate U.V. end point method, Magnesium (as per the Calmagite EGTA Colorimetric method), glucose (as per GOD/POD method), cholesterol (as per CHOD/PAP method) and protein by Biuret method.

2.5 Study of haematological profiles

2.5.1 Collection of blood

Blood was collected from the jugular vein of each cow at 2nd, 3rd, 5th and 10th day of the oestrous cycle in glass vials containing EDTA by aseptic method. Blood samples were used for estimation of haematological parameters *viz.*, TLC, DLC, TEC, Hb and PCV.

2.5.2 Haematological Parameters

Total leukocyte count (TLC), differential leukocyte count (DLC), total erythrocyte count (TEC), haemoglobin (Hb), packed cell volume (PCV) in whole blood estimated with the help of automated haematology cell counter (Model MS4e, Melet Schloesing Laboratoire-9, Chaussee Jules Cesar- Porte 420-95520 OSNY, France).

2.6 Statistical Analysis

The data obtained during the experiment were analyzed by using software package (SAS 5.0.1 version)

3. Results and Discussion

3.1 Incidence of prolonged oestrus

Out of the total 800 breed able crossbred cows 74, 41 and 19 cows were found to have two days, three days and four days oestrus duration with the respective percentage frequencies of 9.25, 5.12 and 2.37. The overall incidence of prolonged oestrus in crossbred cows was 16.75 per cent. Singh *et al.* [13] and Mathew [10] reported a higher incidence of prolonged oestrus in crossbred cows (30–40 and 59.64 % respectively) than that of the present study. The variation in the incidence of prolonged oestrus in crossbred cows in the present study might be due to differences in breeds of cattle and their environment [17], level of nutrition [16] and stress factor affecting the animals.

3.2 Blood Biochemical profile

The mean level of serum calcium, inorganic phosphorus,

magnesium, protein, cholesterol and glucose in the control and prolonged oestrus cows were within the normal physiological range. There was no significant difference in the level of serum calcium, magnesium and protein between oestrus duration group as well as between days of oestrus.

The level of serum inorganic phosphorus was significantly ($P < 0.01$) lower in prolonged oestrus cows at all days of oestrus. In the present study the level of serum inorganic phosphorus at different days of oestrus varied within the range of 5.04±0.22 to 5.09±0.24 mg/dl in control group, 4.04±0.12 to 4.09±0.20 mg/dl in 2 days duration group, 4.02±0.18 to 4.08±0.16 and 4.03±0.26 to 4.09±0.20 in 3 days and 4 days duration group respectively. There is significant difference in level of serum inorganic phosphorus between control and prolonged oestrus groups. Serum inorganic phosphorus level in crossbred cows in the present study was nearer to the level reported by Talukdar [15]. Significantly ($P < 0.01$) lower level of inorganic phosphorus (3.73 ± 0.29 mg /dl) in infertile repeat breeder cows than normal cyclic cows (5.06 ± 1.19 mg/dl) was also reported by Awasthi and Kharache, [1]. Das *et al.* [3] observed that the serum inorganic phosphorus concentration was significantly higher in the animals with normal ovulation (5.45 ± 0.15 mg/dl) than the animals with anovulation (4.45 ± 0.14 mg/dl). Inorganic phosphorus had been reported to be essential for energy transformation at the cellular level and normal phospholipids metabolism and it was also an integral part of many coenzymes and its involvement in phospholipids and CAMP synthesis may be a key to its effect on reproduction as stated by Seifi *et al.* [12]

Level of serum cholesterol varies significantly ($P < 0.01$) between days of oestrus and highest level was recorded on 10th day. Cholesterol had been reported to be a starting material for the biosynthesis of steroid hormones as reported by Hu *et al.* [6] In the present study the mean level of serum cholesterol at different days of oestrus in crossbred cows varied within normal ranges of 109.33±1.87 to 119.09±2.30 mg/dl in control group, 105.12±3.85 to 115.56 ± 4.05 mg/dl in 2 days duration group, 105.90±2.31 to 115.64 ± 4.64 mg /dl and 105.24±5.21 to 115.85±3.74 mg/dl in 3 days and 4 days duration group respectively. These values were slightly lower to that reported (125.4 ± 4.03 mg/dl) by Singh and Pant [14]. The variation in the level of serum cholesterol might be attributed to several factors like fertility status of the animal, stage of the oestrous cycle and genotype. Several workers reported that serum cholesterol was higher in repeat breeder cows as compared to that in normal cows (Dutta *et al.* [4] In the present study the highest level of cholesterol on day 10th of oestrus in crossbred cows could be due to increased steroidogenesis in the active luteal cells during midluteal phase of the cycle.

The mean level of serum glucose in crossbred cows at different days of oestrus ranged from 60.64±0.45 to 68.55±0.38 mg/dl in control group, 55.19±0.83 to 63.23±0.88 mg/dl in 2 days duration group, 55.60±0.1.24 to 63.15±0.78 mg /dl and 55.04±1.39 to 63.11±1.29 mg/dl in 3 days and 4 days duration group respectively. Between different days and groups of oestrus variation was found to be significant ($p < 0.01$). The glucose level as observed in the present study was higher on day 5th and day 3rd of oestrus in all the groups. Similar observation was also made by Khan *et al.* [8] El-Belely [5] suggested that altered level of glucose might be the reason for reduced luteal functions in repeat breeding cows. Higher blood glucose concentrations directly increase the

pulse and mean concentration of LH ^[11] or indirectly stimulated prolonged progesterone release during early luteal phase by increasing insulin level. Poor energy status in repeat breeders due to hypoglycemia could be the reason for impaired hypothalamic hypophyseal ovarian axis and reduced ovarian activities ^[7].

3.3 Haematological profile

The haematological parameters *viz.* Hb, PCV, TEC, TLC, lymphocyte, monocyte and total granulocyte count were found to be within the normal physiological range and there was no significant difference of haematological parameters between the groups and different days of oestrus.

4. Conclusion

The findings of the present study suggested that the incidence of prolonged oestrus in crossbred cows is 16.75 per cent and more commonly observed duration of prolonged oestrus was 2 days. Prolonged oestrus animals showed lower level of serum inorganic Phosphorus and serum Glucose in comparison to the cow with normal oestrus duration.

5. References

1. Awasthi MK, Kharche KG. Studies on some blood constituents in normal cycling, fertile and infertile repeat breeder crossbred cows. *Indian Journal of Animal Reproduction*. 1987; 8 (2):95-97.
2. Bage R, Gustafsson H, Larssoli B, Forsberg, Rodriguez-Martinez H. Repeat breeding in dairy heifers: follicular dynamics and estrous cycle characteristics in relation to sexual hormone patterns. *Theriogenology*. 2002; 57:2257-69.
3. Das JM, Dutta P, Deka KC, Biswas RK, Sarmah BC, Dhali A. Comparative study on serum macro and micro mineral profiles during oestrus in repeat breeding crossbred cattle with impaired and normal ovulation. *Livestock Research and Rural Development*. 2009; 21(5):72.
4. Dutta JC, Barman NN, Baruah RN. Blood biochemical and microbial spectrum in repeat breeder cows. *Indian Veterinary Journal*. 1991; 68:435-438.
5. El-Belely MS. Progesterone, oestrogen and selected biochemical constituents in plasma and uterine flushing of normal and repeat breeder cows. *Journal of Agricultural Science*. 1993; 120:241-250.
6. Hu J, Zhang Z, Shen WJ, Azhar S. Cellular cholesterol delivery, intracellular processing and utilization for biosynthesis of steroid hormones. *Journal of Nutrition & Metabolism*. 2010; 7:47.
7. Joe Arosh A, Katheiresan D, Devanathan, TG, Rajasundaram RC, Rajasekaran J. *Journal of Animal Science*. 1998; 68:154-156.
8. Khan S, Thangavel A, Subramanayam S. Blood biochemical profile in repeat breeding cows. *Taminadu Journal of Veterinary & Animal Science*. 2010; 6(2):75-80.
9. Lopez H, Satter LD, Wiltbank MC. Relationship between level of milk production and estrous behavior of lactating dairy cows. *Animal Reproduction Science*. 2004; 81:209-223.
10. Mathew RM, Ghosh KNA, Harshan HM, Kurien MO. Prolonged oestrus and its occurrence among repeatbreeding cattle of Kerala. *Indian Veterinary Journal*. 2014; 91(01):46-47.

11. Richards MW, Wettmann RP, Schenemann MH. Concentrations of glucose and non esterified fatty acids in plasma and insulin in serum. *Journal of Animal Science*. 1989; 67:354-362.
12. Seifi HA, Farzaneh N, Mohri, M. Relationships between fertility, serum calcium and inorganic phosphorus in dairy cows. *Iranian Journal of Veterinary Research*. 2005; 6 (2):12-14.
13. Singh J, Dadarwal D, Honparkhe M, Dhaliwal GS, Ghuman SPS. Prolonged estrus in repeat breeding cross-bred cows: incidence, hormonal profile and ovarian dynamics. Project Report. ICAR, New Delhi, India. 2009.
14. Singh M, Pant HC. Blood biochemical profile of normal and repeat breeder cows in Himachal Pradesh. *Indian Journal of Animal Reproduction*. 1998; 19(2):156-157.
15. Talukdar DJ. Induction of ovulation in repeat breeder crossbred cattle with hCG and manual pressure. M.V.Sc. thesis, Assam Agril. Univ., Guwahati, Assam, 2010.
16. Van Rensburg SWJ, De Vos WH. Ovulatory failure in bovines. *Onderst Journal of Veterinary Research*. 1962; 29(1):55-79.
17. Zemjanis R. Repeat Breeding or Conception Failure in Cattle. In: *Current Therapy in Theriogenology: Diagnosis, Treatment and Prevention of Reproductive Diseases in Animals*. Edited by D.A. Morrow, W.B. Saunders Co., Philadelphia, London, Toronto, 1980, 206.