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Screening the Health Status of Postpartum Anoestrus Cows of Biratnagar of Nepal

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Abstract

High yielding dairy cattle are often prone to postpartum anestrus that retards both production and reproductive performances. To investigate the postpartum anestrus, 21 nondescript dairy cows raised in and around Biratnagar have been included in this study. The basic information regarding the breeding history, nutritional status, milk yield, suckling and frequency of milking were obtained on request from the owners. Fecal samples were collected directly from the rectum of all cows to diagnose the parasitic infestations. Rectal palpation was performed to explore the status of the ovary and other reproductive tracts. Blood samples were collected through jugular vein puncture in vials with and without anticoagulant for hematological and serobiochemical analysis. Rectal palpation revealed inactive ovaries in most of the dairy cows. The fecal and blood samples had been forwarded to Regional Veterinary Diagnostic Laboratory, Biratnagar for further analysis.

Fecal examination resulted in severe parasitic infestations in 90.47% of dairy cows. The predominantly observed parasites were Paramphistomum (38%) followed by Paramphistomum + Nematodes (19%), Nematodes (9%), Liver fluke + Nematodes (9%), Liver fluke (5%), Liver fluke + Paramphistomum (5%) and Nematodes + *Moniezia expansa* (5%). Among all, 47.61%, 42.85%, 28.57%, 23.80% and 4.76% of cows revealed lower values for total protein (TP), hemoglobin (Hb), calcium (Ca), packed cell volume (PCV), glucose (Glc) and inorganic phosphorus (P), respectively. However, 23.80% and 9.52% of cows showed higher values of inorganic P and Glc.

It was concluded that lower values of TP, Hb, Ca, PCV, Glc and inorganic P rightly held responsible for the condition of postpartum anoestrus in cows. An improved managemental practices and nutritional status of cows is suggested for the management of postpartum anoestrus in cows.

Keywords: Postpartum; Anoestrus; Cows; Paramphistomum; Nematodes; Liver Fluke; Moniezia Expansa and Infestations

Abbreviations: TP: Total Protein; HB: Hemoglobin; Ca: Calcium; PCV: Packed Cell Volume; Glc: Glucose and RVDL: Regional Veterinary Diagnostic Laboratory.

Introduction

Increasing demand of livestock production can be achieved only if the animals have a long useful life with maximum production span and minimum offspring losses. More offspring per animal would allow judicious selection for replacement stock without which it might be difficult to improve the genetic merit of the herd from generation to generation. Consequently, good fertility management of farm animals provides valuable protein viz. milk, meat and other by-products become inevitable. Cows should calve yearly to attribute optimum production and economy in the life period

and this ideology can only be achieved if the cows remain empty for not more than 90 days of post calving. Postpartum anoestrus refers to a condition where dairy cows have not been observed and returned in estrus for several weeks after calving [1]. Every effort therefore should be implemented to resume the cows into estrus after 60 days and must conceive within 90 days after calving. Returns to normal cyclical ovarian activity, involution of uterus, rejuvenation of endometrium, elimination of bacterial contaminants are important changes that occur during this period. Postpartum anoestrum, a multifactorial syndrome, evinced after dystocia, metritis, retention of placenta, postpartum prolapse, mastitis as well as predisposed due to parity, breed, environment, nutritional status, managemental practices and hormonal interaction. All these factors determine the possibility of dairy cows to become pregnant during the breeding season. The reproduction is the main factor that positively correlates with the postpartum anoestrus and thereby influences the breeding efficiency of dairy cattle [2]. There is increased incidence of anestrus in high-yielding dairy herds [3-7]. Malnutrition also influences the reproductive performances thereby prolonging the post-partum anoestrus periods in cows. The changes in hormonal and biochemical milieu are also responsible for anoestrus. The biochemical profile depicts the nutritional status of the animal and furthermore helps in diagnosis and management of the postpartum anoestrus in cows. Therefore, the present study was performed to assess the status of parasitic infestations, relevant hematological and serobiochemical parameters in postpartum dairy cows.

Materials and Methods

Dairy Cows

A total of 21-nondescript postpartum anoestrus dairy cows of apparently healthy conditions from Biratnagar and its vicinity were included purposively in this study A well-structured questionnaire containing breeding history, nutritional status, milk production, suckling and frequency of milking were filled after direct consultations with owners. Rectal palpations were performed in all selected cows to know the status of their reproductive organs before sample collections.

Sample Collection

Feces were collected directly from the rectum of the cows and placed in the zip plastic bag. Thereafter, it was coded and brought soon to Regional Veterinary Diagnostic Laboratory (RVDL), Biratnagar for investigation of parasitic infestations. After proper restraining of the cows, blood samples were collected aseptically through jugular vein puncture in vials with EDTA (5 ml) for hematological (Hb and PCV) and without anticoagulant (5 ml) for serobiochemical evaluation (Ca, P, TP, ALB, Mg and Glc).

Processing of the Sample

All fecal samples had been examined by both sedimentation and floatation methods to estimate the parasitic infestations and their load. The blood in vials with EDTA was analyzed quickly for Hb and PCV. The whole blood without anticoagulant was kept overnight at room temperature for serum separation. The serum, extracted after clot retraction using pasteur pipette, was transferred into the sterile serum vials. However, serum had been separated after centrifugation at 3000 rpm for 15 minutes from the blood samples that had haemolysed. The serum vials were labeled properly and stored in the deep freeze until estimation of Ca, inorganic P, TP, ALB, Glc and Mg following the method described in their respective kits using spectrophotometer.

Statistical Analysis

Data are presented as Mean ± S. D. and percentage as appropriately. Descriptive analyses were performed utilizing the IBM-SPSS versus 23 (Armonk, NY: IBM Corp).

Results and Discussion

Postpartum anestrus is one of the most dynamic periods in the reproductive life of the dairy cow. It is of natural occurrence, and is characterized by the absence of estrus [1]. The postpartum period plays a pivotal role in cattle reproduction. The duration of postpartum anestrus has an important influence on reproductive performance [2]. The prevalence of postpartum anoestrus in dairy cattle is herd-specific and varies widely from one herd to another. The exact prevalence rates of postpartum anoestrus at the end of the elective waiting period i.e., 60-80 days after calving is in the range of 10-30% [8-11] whereas it is reported as higher as 59% in individual herd [8,10,12]. In the present study, all experimental cows were in a state of anoestrus for more than 90 days after calving. Upon rectal examination, most of them revealed inactive ovaries with normal genitalia. The rectal examination revealed the inactive ovaries with normal genitalia in most of the cows which would be considered as the cause of anoestrus. Kumar and Sharma [13] investigated 47 heifers and 86 cows and reported 36.16% heifers and 43% cows had inactive ovaries. The incidence of anoestrus can occur from moderate to high to correlate infertility of the dairy animals and thereby the economic loss to the farmer [14]. The interval from calving to first estrus was longer in high milk producing cows or being milked four times a day, in poor or low level of nutritive intake as well as in the older pluriparous cow. Furthermore, a longer postpartum interval to first estrus occurred in nursing cows, anemic cows and

those fed with thyroprotein [15]. There is failure of displaying the overt signs of estrus by the animals after attaining puberty or 60–90 days postpartum [16]. The multifactorial causes of postpartum anoestrus could be broadly categorized into physiological, nutritional, managerial, environmental and pathological conditions in dairy cattle [17-26]. All three classes of parasites i. e., Trematodes (Paramphistomum and Liver fluke), Nematodes and Cestodes (*Moniezia expansa*) or their mixed infestatons were observed in microscopic examination of faecal samples. As shown in Figure 1, 90.47% of dairy cows were infested severely with different internal parasites.

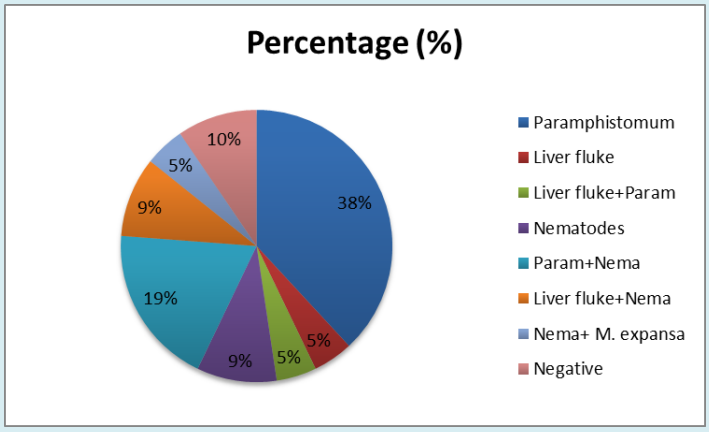

Figure 1: Prevalence of parasitic infestation in postpartum anoestrus cows.

Of them, Paramphistomum infestations were the predominant followed by mixed infestations of Paramphistomum plus nematode, Liver fluke plus nematode, Nematode, Negative, Liver fluke and Nematode plus *Moniezia expansa*.

The values of hematological and serobiochemical parameters have been presented in Table 1. Blood analysis revealed the lower values for TP, Hb, Ca, PCV, Glc and inorganic P in 47.61%, 42.85%, 28.57%, 23.80 % and 4.76% of dairy cows, respectively. However, 23.80% and 9.52% of cows showed higher values of inorganic P and Glc. These values remained in normal range in few postpartum anoestrus cows.

S.N.	Parameters	Unit	Mean ±S.D.	Normal Range
1	Hemoglobin (Hb)	gm%	8.45±1.61	Aug-15
2	Packed Cell Volume (PCV)	%	28.71±6.94	24-46
3	Calcium (Ca)	mg/dl	8.96±1.69	8-10.5
4	Phosphorus (P)	mg/dl	6.25±1.51	04-Jul
5	Total Protein (TP)	gm%	5.95±0.95	5.7-8.1
6	Albumin (ALB)	gm%	2.72±0.43	2.1-3.6
7	Magnesium (Mg)	mg/dl	3.06±0.22	1.2-3.5
8	Glucose (Glc)	mg/dl	45.18±12.25	35-55

Table 1: Haematological and serobiochemical parameters in postpartum anoestrus cows.

During postpartum, cows present a period of negative energy balance that can last up to 140 days [27]. The lag phase between the higher milk production and the gradual increase in the energy consumption capacity trigger the postpartum anoestrus in dairy cows [28]. The low level of Ca could affect fertility and ovarian pituitary axis. The lower P level results in reproductive failures and ovarian dysfunction [29]. The increased partitioning of energy to milk production can result in anestrus by delaying resumption of follicular activity. However, factors such as limited energy intake, lower body reserves, and postpartum diseases can also delay the return to cyclicity. A trouble-free calving favors prompt resumption of postpartum ovarian activity [7]. The lower blood Glc level in non-fertile animals indicates the sub

normal energy status and cessation of estrus in cows and heifers exposed to negative energy balance and pituitary function.

It is interesting to note that half of the dairy cows exhibited the lower TP level. A very earlier study of Kesler, et al. [30] described the TP level as an indicator for better fertility in postpartum anoestrus cows. The results of the present study revealed deficiencies in various biochemical constituents which are associated with postpartum anoestrus conditions of dairy cows. Nutritional supplementation and hormonal therapy to shorten or to break postpartum anestrus are directed towards reestablishing the hormonal and metabolic balance of the cow [28].

Conclusions

Most postpartum anoestrus cows revealed inactive ovaries with normal genitalia and parasitic infestations followed by lower values of several hematological and serobiochemical parameters. Thereby cows should be dewormed routinely and must be supplemented with mineral mixtures to shorten their postpartum anoestrus period. The dairy cows should be flushed during the last trimester and fed with higher nutrients to the parturated cows in order to have a few animals suffering from this condition [29,30].

Conflict of Interest

The author declares no any Conflict of Interest

Author Contributions

MKS solely involved with conception, design, draft and revision of the manuscript. The author read and approved the final manuscript.

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