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Incidence of anestrus due to smooth ovaries in Indigenous cattle

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Abstract

In present study incidence of anestrus due to smooth ovaries was studied in indigenous cows. 353 cows were ultrasonographically examined on 11 days interval and blood samples were taken for plasma progesterone estimation. 9.6% cows were having anestrus due to smooth ovaries.

Keywords: Indigenous cow, Anestrus, USG, Plasma progesterone

1. Introduction

Reproductive efficiency is the most crucial component for success of a dairy farm, whereas reproductive inefficiency is the most costly problems faced by dairy farm owners (Fricke, 2000) [3] and anestrus remained the most common reason of reproductive inefficiency in dairy animals. Efficiency of milk production in the herd is affected by reproductive performance of dairy through its influence on the calving to service interval which is affected by efficiency of heat detection and level of anestrus in the herd. Anestrus is a broad term that indicates the lack of expression of estrus (or absence of estrous signs), despite efficient estrus detection. Anestrus could be broadly classified into physiologic including gestational, lactational and postpartum anestrus and pathologic (clinical) types, with the following four types: silent ovulation, cystic ovarian disease, smooth ovaries, and “persistent” CL (Mwaanga and Janowski., 2004) [7]. Incidence of anestrus in Indian conditions is higher in case of indigenous cattle as compared to cross breed (Thakor and Patel, 2013) [8] and smooth or inactive ovaries remained one of the most prominent reason for anestrus in case of indigenous cows. Smooth ovaries are characterized as absence of substantial changes in the follicular structures, accompanied by a characteristic absence of a CL or cystic follicular structures on two ultrasonographic examinations of the ovaries, approximately 11 days apart (Markusfeld., 1987) [5]. Also, monitoring progesterone in plasma using an Enzyme Linked Immunosorbent Assay (ELISA) can be effectively used to determine acyclicity in cows and < 1ng/ml plasma progesterone in paired plasma samples on 11 days interval is associated with acyclicity (Mekonin *et al.*, 2018).

2. Material and Methods

The study was conducted on 353 indigenous cattle maintained at farms of Hisar and Jhajjar districts of Haryana during months of December to April, 2021. The experimental cows were kept in loose housing system under group management practice with provision of fresh drinking water and shelter was also provided to protect animals from climatic adversities. Cows were of parity between 2nd to 5th and had history of anestrus for atleast last 4 months. Ovarian status of cows was scanned with help of per-rectal ultrasonography on 11 days interval.

2.1 Blood collection

10 ml blood was collected from jugular vein in heparinized 15 ml centrifuge vials at time both ultrasonographic examination. Blood was brought to laboratory in cool cage within two hours after collection. Centrifugation was done at 1500Xg for 15 minutes to separate plasma, and plasma aliquots were stored in duplicates at -20 °C until analysis.

2.2 Hormonal analysis

Plasma progesterone was estimated using a commercially available Solid phase competitive ELISA Kit.

3. Results and Discussion

Ultrasonographic examination coupled with estimation of plasma progesterone concentration in paired blood samples revealed that 9.6% (34/353) animals were having no change in ovarian structure (additionally absence of cystic structures) coupled with less than 1 ng/ml plasma progesterone concentration in both blood samples. Similarly, Zemjanis *et al.* (1969) [9] reported an incidence of 10% in case of exotic cattle. Also, smooth ovaries had been reported in 10% of postpartum exotic cows (Markusfeld, 1987) [5]. The pathophysiology of smooth ovaries is not well understood, but it is presumed to be due to extreme undernutrition or severe energy deficit which may cause this condition through a lack of essential LH support to sustain follicular growth and dominance (Jolly *et al.*, 1995) [4]. Reduced feed intake during late gestation and early postpartum period or negative energy balance (NEB) due to very high metabolic load following parturition especially in high yielders delays postpartum restoration of LH pulsatility, resulting into smooth ovaries. Under high metabolic load, nutrients are utilized for production rather than reproduction (Ferguson, 2001) [2]. In addition to NEB, the deficiency of minerals like calcium (Ca), phosphorus (P), copper (Cu), zinc (Zn) and manganese (Mn) are also associated with smooth ovaries (Campbell *et al.*, 1999) [1].

4. Conclusion

Smooth ovaries are common cause of anestrus in case of indigenous cattle and negative energy balance or undernutrition remains the most common cause for their occurrence.

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