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Ovarian activity and vaginal resistance in postpartum anestrus Sahiwal cows*

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ABSTRACT

Postpartum anestrus Sahiwal cows (n=4) which had not shown the signs of estrus three months after parturition and did not show presence of corpus luteum in one of the ovary at two examinations made by rectal palpation 11 days apart were selected for present investigation. Ovaries of all the experimental animals were monitored at 4 days interval for 24 days by the use of Real time B-mode ultrasonography (Scanner 200 EMC/ Pie Medical) for the development of ovarian follicle with 5 Mhz transducer. On each examination the diameter of the largest follicle in each ovary was measured. Vaginal mucus impedance was measured daily for 24 days with the help of vaginal probe and impedance meter. The mean follicular diameter at days 0, 4, 8,12,16,20 and 24 were 3.9±0.60, 6.72±1.60, 5.57±1.89, 6.72±1.75, 8.6±0.67, 7.97±0.65 and 10.23±0.87 mm respectively. Changes in VMI indicated a clear increasing and decreasing pattern at a very short interval with very high individual variation. Correlation (r) between VMI and follicular diameter was negative and significant ($r = -0.83$ $P < 0.01$). It was concluded by the present investigation that ovarian activity in prolonged postpartum anestrus cow has negative correlation of VMI with follicular diameter. VMI could be a cost and time effective means to determine the ovarian functional status in true anestrus postpartum animals, which are beyond the reach of rectal palpation.

Key words: VMI, ovarian activity, postpartum anestrus, cattle

Profitability in a dairy herd is dependent on onset of puberty and calving interval. Delayed puberty and prolonged calving interval are considered to be the important factors to reduce profitability. A calving interval of 365 days has been suggested (Esslemont *et al.*,1985) for optimum production. The cows therefore must become pregnant by 80-85 days postpartum, if the above target is to be achieved. Unfortunately this goal is seldom realized because of anestrus, a prevalent from of ovarian dysfunction, which prolongs the interval from calving to conception. Postpartum anestrus has been reported to occur in approximately 30% of dairy cows (Archibald *et al.*,1990; Humblot and Thibier, 1980). The normal postpartum dairy cow ovulates by 27 days postpartum (Savio *et al.*, 1990); therefore dairy cows that do not have functional luteal tissue by 32 days postpartum are considered to be in postpartum anestrus. The literature is lacking with regard to ovarian functional status in postpartum anestrus Indian cattle. So the present investigation carried out to develop simple technique for the study of ovarian functional status in postpartum anestrus Sahiwal cows using ultrasonography and vaginal impedance monitoring.

MATERIALS AND METHODS

Four postpartum Sahiwal cows of Bull Mother Experimental Farm, College of Veterinary Science and Animal Husbandry Anjora, Durg, which had not shown the signs of estrus 3 months after parturition and did not show presence of CL in any of the ovary at two examinations made per rectally11 days apart were selected. Beginning from day 0 i.e. starting day of observation ovaries of experimental cows were monitored at 4 days interval for 24 days by using Real Time B-Mode Ultrasonography (Scanner 200 EMC/ Pie Medical)

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for the development of ovarian follicle with 5 Mhz transducer. On each examination the diameter of the largest follicle in each ovary were measured. Vaginal mucus impedance (VMI) was monitored daily with the help of vaginal probe and impedance meter designed in the Department of Veterinary Obstetrics and Gynaecology, College of Veterinary Science and Animal Husbandry, Anjora Durg (Sharma *et al.*, 2000) in all the experimental cows. Statistical analysis was done as per Snedecor and Cochran (1989).

RESULTS AND DISCUSSION

The pattern of follicular growth at 4 days interval in postpartum anestrus cows are given in Fig.1. The mean follicular diameter at days 0, 4, 8, 12, 16, 20 and 24 were 3.9±0.60, 6.72±1.60, 5.57±1.89, 6.72±1.75, 8.6±0.67, 7.97±0.65, and 10.23±0.87 mm respectively. These data showed an increasing and decreasing pattern in follicular diameter at 4 days interval.This represent presence of anovulatorry follicular wave, which indicated state of true anestrus in these animals. These findings are consistent with the findings of Adams (1999) that pregnancy, prepubertal period and anestrus are characterized by anovulatory follicular waves. Spicer and Echternkamp (1986) reported that gonadotropin receptors are present in follicles between 5 and 9 mm and follicles are potentially ovulatory at size > 9 mm. In the present study follicles between 5 and 9 mm did not turned to be ovulatory during the time of study. This might have been due to lack of occurrence of an LH surge as described by Adams (1999) that periodic anovulatory follicular waves continue to emerge until the occurrence of and LH surge. Anovulatory follicular waves in anestrus cows might be due to insufficiency of hypothalamic stimuli of GnRH to induce release of gonadotropin from anterior pituitary (Peters and Lamming, 1984) rather than not having a GnRH responsive follicle. There is a lot of literature on ovarian follicular dynamics in cattle during estrous cycle (Fortune *et al.*, 1988; Ginther *et al.*, 1989; Ko *et al.*, 1991; Fortune, 1993; Evans *et al.*, 1997), However there is paucity of literature on ovarian functional status in prolonged postpartum anestrus in cattle in general and in Sahiwal in particular.

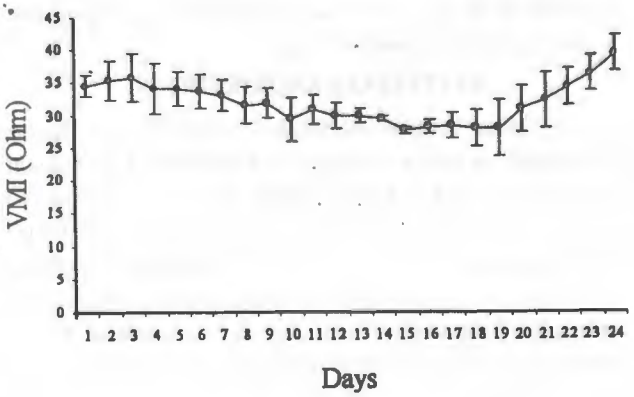

Fig.1 Changes in VMI (±SE) after GnRH treatment

Out of total eight animals selected in this group four animals detected in estrus at days 3, 11, 13 and 19 of initiation of monitoring for VMI. VMI during estrus in these animals was 30, 45, 38 and 52 Ohms (41.25±4.71) respectively indicating a large individual variation in lowest value at the time of estrus. All these animals were removed from the group for further monitoring.

The changes in VMI in remaining four experimental animals indicated a clear increasing and decreasing pattern at certain interval. These findings are in accordance with Rao *et al.* (1991) that RV is occasionally high in acyclic cows. Along with this there was very high individual variation in the values of VMI, This also supported the findings of Rao *et al.* (1991) for both cyclic and acyclic cows. But the current finding in VMI in anestrus aninals for 24 days were quite different from those reported in cyclic animals by Schams and Butz (1972); Foote (1975); Canfield and Butler (1989); Rao (1991); Meena *et al.* (2001); Sharma (2001) and Tiwari and Sharma (2002).

Diameter of the largest follicle at 4 days interval from day 0 (starting day of VMI recording) to day 24 and VMI values at this follicular diameter of all the experimental animals are presented in Fig. 1. Correlation (r) between VMI and follicular diameter was negative and significant ($r = -0.83$, $P < 0.01$), which is similar to the findings reported by Sharma (2001) in cyclic cows.

Out record and visual observation by herdsman, 4 animals caught to be cyclic during the course of monitoring from VMI. The mean VMI in these animals at estrus was 41.25±4.08 Ohms. Changes in external signs like swollen vulva, redness of vaginal/vulvar mucosa, mucus discharge, frequent urination, nervousness, marked decrease in milk yield, decreased intake of feed, relaxed cervix, marked tonicity and turgidity of uterine horns were found in these animals. VMI at estrus

(41.25±4.08) in these animals supported the findings of Sharma (2001).Similar findings of impedance value on day of estrus was reported by Metzer *et al.* (31-39 Ohms), Schams and Butz 1972 (41±2.60 Ohms). But it was inconsistent with 30.57 Ohms (Foote, 1975); Leidl and Stolla (1976); Feldman *et al.* (1978), 44 Ohms (Gartland *et al.*, 1976), 55±1.1Ohms (Alo-baidi and Larson, 1976), 30.90 Ohms (Bobrik *et al.*,1978) 31.5±0.6 Ohms (Foote *et al.*, 1978), 45.9±7.8 Ohms (Carter and Dufty, 1980), 31.21±3.78 Ohms (Bustamante *et al.*, 1981), 46±4.3 Ohms (Rao, 1991) and 32.68±0.64 Ohms (Meena *et al.*, 2001).

It is therefore concluded by the present investigation that ovarian activity in prolonged postpartum anestrus has some sort of relationship with vaginal resistance as evidenced by negative correlation of VMI with follicular diameter in these animals.

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