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Treatment of postpartum anestrus Sahiwal cows on the basis of VMI and ultrasonography using single injection of GnRH*

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ABSTRACT

Four postpartum anestrus Sahiwal cows which has not shown the signs of estrus even three months after parturition and having no corpus luteum in one of the ovaries at two examination made by rectal palpation 11 days apart were selected. Ovaries of all the animals were monitored at 4 days interval for 24 days by the use of Real-time B-mode ultrasonography machine. Vaginal mucus impedance (VMI) was monitored daily with help of vaginal probe and impedance meter for 24 days. Correlation between VMI and follicular diameter was found to be negative and significant ($r = -0.83$, $P< 0.01$). On this basis treatment was instituted at lowest possible probe reading in individual animals using aqueous solution of synthetic analogue of GnRH i.e. Busereline acetate, 20 µg (Receptal®, 5ml marketed by Intervet Laboratories Ltd., Pune) after 24 days of monitoring in cows showing a clear increasing and decreasing trend in VMI. Two animals with VMI values of 21 and 25 showed external signs of estrus at days 19 and 21 post treatment respectively. Other two animals with lowest VMI values of 20 and 25 did not show external signs of estrus but one was suspected to be in silent estrus as indicated by decreasing probe reading. The changes in VMI between pretreatment and post treatment period were significant ($P< 0.05$). The interval between injection and induction was 16.25±2.10 days. It was indicated from the present study that treatment of postpartum anestrus cows with single injection of GnRH on the basis of VMI and ovarian ultrasonography may give satisfactory response.

Key words: Cattle, GnRH postpartum anestrus, ultrasonography, vaginal mucus impedance

Various attempts have been made to induce normal cyclicity in postpartum anestrus cows by the use of single injection of GnRH in different dose regimen with variable results (Pattabiraman *et al.* 1986; Deen *et al.*, 1995; Stevenson and Call, 1988; Shams *et al.*, 1991).The presence of responsive follicle on the ovaries during GnRH treatment is essential for inducing ovulation and ovarian cyclicity (Short *et al.*, 1988) while Garverick *et al.* (1980) reported that cows having follicles larger than 15 mm in size at the time of GnRH administration did only ovulate while those having follicles below 10 mm in size remained unovuluated. Present investigation was conducted to treat the postpartum anestrus Sahiwal cows by the use of single injection of GnRH at the lowest Vaginal Mucus Impedance (VMI).

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 even 3 months after parturition and did not show presence of corpus luteum in either ovary at two examinations made by rectal palpation 11 days apart, were selected. Beginning from day 0 i.e. starting day of observation ovaries of experimental cows (n =4) were monitored for follicular development 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 were measured. Vaginal Mucus Impedance (VMI) was monitored daily with the help of vaginal probe and impedance meter, in all the experimental cows. The vaginal probe was assembled and applied to monitor VMI (Sharma *et. al*, 2001). Aqueous solution of 5 ml (20 µg) of synthetic analogue of GnRH i.e. Buserelin acetate, (Receptal®, marketed by Intervet Laboratories Ltd., Pune) was administered intramuscularly

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after 24 days of monitoring at lowest possible VMI values in those cows showing a clear increasing and decreasing trend in VMI. Statistical analysis was done as per Snedecor and Cochran (1989).

RESULTS AND DISCUSSION

Correlation between VMI and follicular diameter was found to be negative and significant ($r = -0.83$, $P<0.01$). This finding was consistent with the findings of Sharma *et al.* (2003) in cyclic cows. On the basis of this finding it was assumed that these animals might have GnRH responsive follicle of sufficient size at low VMI. So the treatment was instituted at lowest possible probe reading in individual animal, rather than going for treatment at random. The mean VMI at the time of treatment was 34±2.27 Ohms and having follicular diameter of 10.23±0.48 mm. The ovarian follicle of this size must have gonadotropin receptors and should be potentially ovulatory (Spicer and Echternkamp, 1986). In two of the GnRH treated cows VMI increased up to 2-3 days and later on these values decreased . However, Rao *et al.* (1989) reported rise in VMI 7 days after GnRH treatment in postpartum anestrus animals. This trend of VMI in present study may be due to presence of responsive follicle to GnRH treatment (Peters and Lamming, 1984) which after luteinization resulted in rise of P_4 levels followed by decline associated with follicular development and manifestation of estrus (Deen *et al.*, 1995). Rest of the two animals showed continuous decreasing pattern in VMI. Out of these, two animals with VMI values of 21 and 25 showed external sign of estrus at days 19 post treatment. Estrus in these animals was followed by edema of vulvar lips, hyperaemia of vaginal mucosa, clear mucus discharge and standing to be mounted. Rectal palpation revealed tonic uterus and ovary with preovulatory follicle.

The other two animals with lowest VMI of 20 and 25 did not show external sign of estrus. However, one cow out of these two showed constantly low VMI value. In this animal the GnRH treatment might have suppressed follicular growth to mature follicle, which due to ovulation failure persisted as follicular cyst with continuous low VMI during the period of observation, while other followed a definite trend of increasing and decreasing VMI value suggestive of silent estrus. This is in accordance with Pattabiraman *et al.* (1986), Mauer and Rippel (1972), Kesler *et al.*, (1980) who reported moderate, mild or no behavioral estrus in all or some of the GnRH treated animal.

The lowest values of VMI in individual animals were 20,21 28 and 25 Ohms (Mean 23.5 ± 1.60) on days 10., 19, 15 and 21 post treatment. These values of VMI during induced estrus are lower than reported by Metzer *et al.*(1972), Schams and Butz (1972), Sharma *et al.* (2000), Sharma *et al.* (2003), Gartland *et al.* (1976), Alo-baidi and Larson (1976),Carter and Dufty (1980) and Rao (1991) at estrus in normal cyclic animals. Variability in VMI value during estrus is also reported to be ranging from 30±5.7 to 32.68±0.64 Ohms by various workers (Foote, 1975; Leidl and Stolla, 1976; Feldman *et al.*, 1978; Bobrik *et al.*, 1978; Foote *et al.*, 1978; Busta-mante *et al.*, 1981; Meena *et al.*, 2001). However present findings agrees with 20 and 25 Ohms in cyclic animals reported by Rao *et al.*(1991). This present study indicated low VMI during estrus in postpartum anestrus cows after GnRH treatment. The low VMI in these cows might due to lack of corpus luteum which is present in cyclic animals in which comparatively higher VMI is reported (Sharma *et al.*, 2003; Metzer *et al.*, 1972; Schams and Butz, 1972; Shrma *et al.*, 2000; Gartland *et al.*, 1976 ; Alo-baidi and Larson, 1976; Carter and Dufty, 1980; Rao, 1991; Foote, 1975; Leidl and Stolla, 1976; Feldman *et al.*, 1978; Bobrik *et al.*, 1978; Foote *et al.*, 1978; Busta-mante *et al.*, 1981; Meena *et al.*, *2001).* However pronounced individual variation in VMI is noted in present study as reported by Rao *et al.*(1989) and Rao (1991).

The interval between injection and induction (16.25 ± 2.10 days) agree with the estrus induction on 17-18 days as reported by Heckman *et al.* (1979). However, variation in interval between GnRH injection and estrus induction was reported by Pattabiraman *et al.* (1986) (10-22 days); Shams *et al.* (1991) (21.00 ± 6.37 days); Dhoble and Gupta (1988) (29.17 days); Rao *et al.* (1989) (20. 3 ±1.05 days). Corpus luteum was palpable from 4th day onwards after lowest probe reading in three treated animals which is indicative of luteal phase. Per-rectal examination revealed CL during maximum VMI (39 ± 2.67 Ohms at day 24 after GnRH treatment. This value was consistent with 41.62+ 1.77 Ohms (Meena *et. al.*, 2001) but was inconsistent with 51.07 ± 0.43 Ohms (Sharma, 2003), 48.6 ±3.8 Ohms (Carter and Dufty, 1980), 55 ± 3.5 Ohms (Rao, 1991) and 58 Ohms (Alo-baidi and Larson, 1976).

Therefore, it is indicated from the present study that treatment of postpartum anestrus cows with single injection of GnRH on the basis of VMI and ovarian sonography may give satisfactory results. However, further studies involving greater number of animals are warranted to conclude.

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