Research Article

Management of postpartum anoestrus in Vechur cows by hormonal methods[#]

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Abstract

The study aimed to evaluate suitable hormonal treatment regimen for inducing oestrus in postpartum anoestrus Vechur cows and its reproductive outcome. The efficiency of Ovsynch and Ovsynch + progesterone protocols in 12 anoestrus cows was studied. Six anoestrus cows were kept as untreated control and they were observed for a period of 180 days postpartum. Both treatment protocols resulted in a complete oestrus induction response of 100 per cent. The interval from treatment to induced oestrus was significantly lower in the Ovsynch group (50.10 ± 1.44 h) than in the Ovsynch + progesterone (54.40 ± 0.48 h) group. In comparison to the control group, treatment group animals displayed a high intensity score for oestrus. The duration of oestrus in the Ovsynch group (26.41 ± 0.53 h) was significantly longer than the control (24.45 ± 0.46 h) group and the Ovsynch + progesterone group (24.13 ± 0.42 h). The overall conception rate for three consecutive AI in Ovsynch, Ovsynch + progesterone and control group were 66.67, 83.33 and 33.33 per cent, respectively. The calving to conception intervals were significantly (p<0.001) shorter in Ovsynch (118.33 ± 9.71 d) and Ovsynch + progesterone (106.67 ± 8.12 d) groups than the control (191.5 ± 5.36 d). It is concluded that hormonal treatment is effective in inducing postpartum oestrus and reducing the calving to conception interval in Vechur cows.

Keywords: *Ovsynch, postpartum anoestrus, progesterone, Vechur*

Vechur breed is the only indigenous cattle breed recognised in Kerala and it is one of the smallest breeds of cattle in the world. This breed having its origin in southern districts of Kerala, is well known for its disease resistance, adaptability to hot humid tropical climate and could be well managed by locally available feeds and fodders. Because of these characteristics there is an increasing demand for Vechur cows among the farmers.

Studies have shown that the average calving interval for Vechur cow is 481 days (Iype and Venkatachalapathy, 2001) and one of the common contributing factors for prolonged intercalving interval is postpartum anoestrus. In order to maintain the recommended calving interval, the cows need to conceive within 85-90 days. However, factors such as stress, low energy intake and hormonal imbalance can delay the return to cyclicity (Arthur *et al.,* 1996). The incidence of anoestrus in dairy cows was reported to be 30.42 per cent (Yadav *et al.,* 2004). Vechur cow, still being a breed of critically endangered status in the domestic animal diversity and in huge demand, the enhancement of its reproduction potential is

indispensable. Reduction in calving to conception interval would make available more Vechur calves to meet the huge demand.

Hormonal interventions for tackling postpartum anoestrus have promising results in dairy cows, however such studies are meagre in Vechur breed. Adoption of Ovsynch and progestogene based protocols for postpartum anoestrus and its treatment response has not been studied in Vechur cattle yet. Hence, the present study was carried out to evaluate the effect of different oestrus induction protocols in postpartum anoestrus Vechur cows and its effect on reproductive parameters.

Materials and methods

The study was conducted in 18 postpartum Vechur cows maintained under uniform management conditions at Vechur Farm of Centre for Advanced Studies in Animal Genetics and Breeding, Kerala Veterinary and Animal Sciences, University, Kerala. The selected animals were devoid of any parturient or post parturient complications, yet not exhibited behavioural oestrus by day 60 postpartum. Detailed clinico-gynaecological examination was performed in these cows to rule out any uterine pathology. Per rectal and ultrasonographic examination was carried out to assess the ovarian status of these anoestrus cows before initiation of the treatment. The selected cows were randomly allocated to three different groups of six animals each.

Experimental design

Group I (Control) animals were not given any treatment and they were monitored for a period of 180 days from day 60 postpartum for the natural oestrus to occur. The oestrus characteristics were observed and the cows were inseminated with frozen- thawed semen.

In group II (Ovsynch group), oestrus induction was done by administering 20 µg of GnRH analogue, Buserelin acetate, (IM) on day 0, followed by 500 µg of $PGF_{2\alpha}$ analogue, Cloprostenol sodium, on day 7 (IM). On day 9, a second dose of Buserelin acetate (20µg) was administered, followed by artificial insemination (AI), in those animals which exhibited oestrus signs 16-24 h later.

In group III (Ovsynch + intravaginal progesterone sponge), induction of oestrus was done by administering 20µg of Buserelin acetate (IM) along with vaginal insertion of custom-made progesterone sponge containing 1 g of progesterone on day 0. The sponge was removed on d 7 along with 500 µg of Cloprostenol (IM) injection. A second dose of Buserelin acetate (20µg) was administered on day 9, followed by AI, in animals that exhibited oestrus signs 16-24 h later.

The characteristics of induced oestrus was observed in experimental groups and compared with

that of control. The interval from the administration of $PGF_{2\alpha}$ analogue to the onset of oestrus signs was recorded as the time taken for induction of oestrus. The period from the beginning to the end of the exhibition of oestrous signs was recorded as the duration of oestrus (Azeez, 2014). The intensity of the oestrus was assessed based on behavioural changes, physiological changes and gynaecological observations and it was scored as intense, intermediate and weak as described by Meenuja (2017). Serum progesterone values were estimated using chemiluminescent immunoassay (CLIA) and compared between groups on the day of oestrus and day 12 of oestrus.

Pregnancy was confirmed in all the groups 30 days post-AI using transrectal ultrasonography. Overall conception rate was calculated as the percentage of animals pregnant in three consecutive AIs out of the total number of cows treated in each group. Calving to conception interval was calculated for all the groups and compared. Descriptive statistics were computed for all variables. The data on oestrus induction, intensity of oestrus and conception rates were analysed by chi-square test and time taken for onset of oestrus, duration of oestrus, and calving to conception interval were calculated by one-way ANOVA.

Results and discussion

Ovarian status of anoestrus Vechur cows

On transrectal ultrasonography commencing from day 60 postpartum, it was observed that 88.89 per cent (16/18) of postpartum anoestrus Vechur cows had no corpus luteum in either ovary, while 11.11 per cent (2/18) had corpus luteum in one of the ovaries.

Oestrus induction response

In the control group, only three (50 per cent) animals exhibited behavioural signs of oestrus until the observation period of 180 days. However, both treatment protocols (group II and III) resulted in 100 per cent oestrus response, but the intensity varied between them (Table 1). Similar results were documented earlier in crossbred cows (Ammu *et al.,* 2012; Abubaker, 2013) using Ovsynch and Ovsynch + progesterone.

Time taken for induction of oestrus

The mean time taken for induction of oestrus in the Ovsynch group (50.1 ± 1.44 h) was significantly (p<0.001) shorter compared to the Ovsynch + progesterone group (54.4 ± 0.48 h). These results were consistent with the findings of Rajeshwari (2008) and Abubaker (2013), who reported that, in Ovsynch treated postpartum anoestrus cross bred cows, the average time taken for the onset of oestrus was 52.50 ± 0.99h and 51.71 ± 0.78h, respectively. Deshmukh *et al.* (2015) reported that the time required for

Table 1. Oestrus induction response, mean time taken for induction of oestrus (h) and duration of oestrus (h) in control and experimental groups

Groups	Oestrus induction response (%) (n)	Time taken for induction of oestrus (h) (Mean ± SE)	Duration of oestrus (h) (Mean ± SE)
Group I (n=6)	50 (3)	-	24.45[b] ± 0.46
Group II(n=6)	100 (6)	50.1[b] ± 1.44	26.41[a] ± 0.53
Group III(n=6)	100 (6)	54.4[a] ± 0.48	24.13[b] ± 0.42
F- value (P-value)	0.074[ns]	2.557* (0.029)	13.393** (<0.001)

Means bearing different superscripts within a column differ significantly ns- Non significant
** Significant at 1% level

Table. 2. Overall conception rate and calving to conception interval in control and experimental groups (days)

Response to treatment	Group I	Group II	Group III	F-value (P-value)
Overall conception rate	33.33 (2/6)	66.67 (4/6)	83.33 (5/6)	0.35[ns]
Calving to conception interval (Days) (Mean ± SE)	191.5[a] ± 5.36	118.33[b] ± 9.71	106.67[b] ± 8.09	33.62** (<0.001)

Means bearing different superscripts within a column differ significantly ns- non-significant,
** Significant at 1% level

the onset of oestrus in postpartum cyclic cows treated with the Ovsynch + CIDR protocol was 58.8 ± 2.65 h.

This variation in the onset of oestrus between the protocols might be due to the difference in the stage of follicular wave during $PGF_{2\alpha}$ injection and the rate of reduction of progesterone concentration to the basal level during oestrus (Twagiramungu *et al.,* 1995).

Duration of oestrus

The Ovsynch group (26.41 ± 0.53 h) had a significantly (p<0.001) longer duration of oestrus compared to animals in both the control (24.45 ± 0.46 h) and Ovsynch + progesterone groups (24.13 ± 0.42 h) (Table 1). These results were consistent with the findings of Deshmukh *et al.* (2015), who reported that the mean duration of oestrus in cows treated with Ovsynch + CIDR was 23.80 ± 055 h. Conversely, a longer duration of oestrus in the Ovsynch group was reported by Rajeshwari (2008) and Ramalakshmi (2015), *i.*e., 37.33 ± 0.71 h and 50.62 ± 8.39 h, respectively.

In the present study, higher serum progesterone (ng/dL) on the day of oestrus in Ovsynch (0.79) compared to Ovsynch + progesterone group (0.66) might have caused the extended duration of oestrus as it blocked the LH surge and delayed the ovulation (Niyas, 2017).

Intensity of oestrus

In the present study, the proportion of animals in the Ovsynch group that exhibited intense, intermediate and weak signs of oestrus was 66.67, 33.33 and 0 per

cent, respectively. In Ovsynch + progesterone group, it was 83.33, 16.67 and 0 per cent, respectively. While in control, it was 33.33, 0 and 66.67, respectively. Bhoraniya *et al.* (2012) observed oestrus intensity of 33.33 per cent intense, 50 per cent moderate and 16.67 per cent weak in the Ovsynch protocol and 50 per cent intense, 33.33 per cent moderate and 16.67 per cent weak using the Ovsynch + CIDR protocol. Statistical analysis revealed no significant difference in the oestrus intensity between the groups. However, more intense oestrus signs were noticed in the treated cows compared to the control. Irrespective of the hormonal protocols, the experimental groups were having higher oestrus intensity in Vechur cows than control which might be contributed by the use of gonadotropins and progesterone.

Serum progesterone

The mean serum progesterone concentration in cows of group I, ⬜ and ⬜ on the day of oestrus were 1.25 ± 0.27, 0.79 ± 0.27 and 0.66 ± 0.27 ng/ mL, respectively. On day 12 post-AI, the mean serum progesterone concentration in cows of group I, ⬜ and ⬜ were 2.85 ± 0.61, 5.56 ± 0.61 and 4.3 ± 0.61 ng/mL, respectively.

Conception rate

The overall conception rate in the group I (Ovsynch) was 66.67 per cent. This finding was in agreement with Abubaker *et al.* (2013) and Ammu *et al.* (2012), who reported an overall conception rate of 71.43 per cent and 66.66 per cent in crossbred and Gir cows , respectively, using Ovsynch protocol. However, in

anoestrous crossbred cows a higher overall conception rate of 90 per cent was reported by Muneer *et al.* (2009).

The overall conception rate in group II (Ovsynch + progesterone) was 83.33 per cent. Contrary to the present study, El-Zarkouny *et al.* (2004) reported a relatively lower overall conception rate of 59.3 per cent in dairy cows.

The overall conception rate obtained in group I (control) was 33.33 per cent. Statistical analysis revealed no significant difference (p≥0.05) in conception rate between treatment and control groups, which could be due to the smaller number of animals in each group (Table 2). The variation in the conception rate between groups might be attributed to the type of hormones used in each protocol. Moreover, the conception rate is also be influenced by the lactation, season, parity and age (Azeez, 2014).

Calving to conception interval

In the present study, the mean calving to conception interval of the control group was 191.5 ± 5.36 days, which is in concurrence with the findings of Iype and Venkatachalapathy (2001), who reported an overall service period of 201.3 ± 12.2 days in Vechur cows.

The mean calving to conception interval recorded in Ovsynch treated cows was 118.33 ± 9.71 days. The mean calving to conception interval recorded in Ovsynch + progesterone-treated animals was 106.67 ± 8.09 days.

Compared to control group, the calving to conception interval in experimental groups was significantly (p<0.001) shorter (Table 2). The study demonstrated that both oestrus induction protocols resulted in a decreased calving to conception interval in postpartum anoestrous Vechur cows under effective reproductive management.

Conclusion

The study revealed that, majority of the anoestrus Vechur cows were in true anoestrus condition and by adopting reproductive management protocols like Ovsynch and Ovsynch + progesterone by day 60 postpartum, an improved oestrus response and conception rate could be achieved, thus the calving to conception interval could effectively be reduced. Hence, these protocols can be recommended for addressing the postpartum anoestrus and enhancing reproductive efficiency in this breed.

Acknowledgements

Conflicts of interest

The authors declare that they have no conflict of interest.

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