

EFFICACY OF DIFFERENT THERAPEUTIC PROTOCOLS TO IMPROVE FERTILITY IN REPEAT BREEDING CROSSBRED COWS

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Repeat breeding is the most commonly encountered but poorly understood condition in cattle leading to reproductive failure. Delayed ovulation and early embryonic death are two important causes of repeat breeding. Various hormonal treatments have been used to improve pregnancy rate in repeat breeding cattle. Both GnRH and hCG can effectively synchronize the duration of oestrus, ovulation time and thereby increase the conception rate (Goley and Kadu, 1995 and Kaitenbatch *et al.*, 1998). Administration of progesterone on the fifth day of oestrus was found to bring an improvement in progestational status of cows and improve conception by preventing early embryonic death (Devanathan and Pattabhiraman, 1997). In the present study effect of different therapeutic protocols on duration of oestrus, ovulation time and conception rate were studied.

Materials and Methods

A study was conducted on eighty repeat breeding crossbred cows presented to Veterinary Hospitals in and around Tirupati, Chittoor district of Andhra Pradesh, during the period from December 2002 to May 2003. All the animals selected for the study were with the history of failure of conception even after three or more consecutive inseminations. The animals selected were free from gross palpable anatomical defects, pathological defects and infections. Subclinical endometritis was ruled out by conducting white side test (Pateria and Rawal, 1990). Later on, the pattern of oestrous cycle was studied for one cycle and then the animals were subjected to treatment.

Based on oestrus checks at 8 hour intervals, duration of oestrus was calculated as the period extending from 4 hours before the onset to 4 hours after the last observation of standing for mounting

(Tanabe *et al.*, 1994). Duration of oestrus was categorized into less than 24 hours, 24-36 hours and beyond 36 hours. Ovulation time was observed based on the rectal examination at 8 hour intervals. Time of ovulation was considered to be the mid point between the last two examinations at which the follicle was present and then found ruptured (Tanabe *et al.*, loc.cit.). Ovulation was confirmed by noting the developed corpus luteum at the site of ruptured follicle 8-12 days post ovulation. Time taken for ovulation was classified into less than 16 hours (normal ovulation), 16-48 hours (delayed ovulation) and more than 48 hours (failure to ovulate) after the cessation of oestrus signs. The animals were divided randomly into 4 groups, consisting of 20 cows in each group (3 treatment groups and one untreated control group) and treated as given below and inseminated with good quality frozen semen.

Group I: 20 µg GnRH intramuscularly after detection of oestrus and inseminated 6 hours later.

Group II: Chorulon 1500 IU immediately after detection of oestrus and inseminated 6 hours later.

Group III: 500 mg of progesterone intramuscularly on fifth day post insemination.

Group IV: 5ml of normal saline was injected immediately after detection of oestrus and inseminated 6 hours later.

All the four groups of animals were observed for duration of oestrus and time of ovulation on the same cycle. The animals which failed to conceive were subjected to second insemination without any treatment. All the non-return animals from all four groups were subjected to pregnancy diagnosis after 60-90 days of last insemination.

Results and discussion

The results are summarized in the Table. There was a marked increase in groups I and II after treatment, in the number of animals that showed duration of oestrus less than 24 hours and that which ovulated less than 16 hours after the end of oestrus.

Groups III and IV showed no change after treatment, since no treatment was adopted in these groups on day zero. This showed that GnRH and hCG reduced duration of oestrus to a period within 24 hours and the ovulation time to less than 16 hours, which is in agreement with the findings of Goley and Kadu (1995) and Kaltenbach et al. (1998).

Table. Effect of different treatments on duration of oestrus, ovulation time and conception rate in repeat breeding crossbred cows (Figures in parentheses indicate the number of observations)

Parameters		Percent of animals			
		Group I GnRH on day 0 (n=20)	Group II hCG on day 0 (n=20)	Group III Progesterone on day 5 (n=20)	Group IV Control (n=20)
Duration of oestrus					
< 24	Before treatment	40(8)	45(9)	50(10)	40(8)
	After treatment	75(15)	85(17)	50(10)	45(9)
24-36 hrs	Before treatment	35(7)	35(8)	25(5)	30(6)
	After treatment	20(4)	15(3)	30(6)	25(5)
> 36 hrs	Before treatment	25(5)	20(3)	25(5)	30(6)
	After treatment	5(1)	0	20(4)	30(6)
Ovulation time					
< 16 hrs	Before treatment	35(7)	45(9)	40(8)	45(9)
	After treatment	80(16)	85(17)	45(9)	45(9)
16-48 hrs	Before treatment	45(9)	40(8)	40(8)	30(6)
	After treatment	20(4)	15(3)	40(8)	35(7)
> 48 hrs	Before treatment	20(4)	15(3)	20(4)	25(5)
	After treatment	0	0	15(3)	20(4)
Conception rate					
I st insemination		45(9)	60(12)	35(7)	10(2)
II nd insemination		9(1)	12(1)	15(2)	11(2)
Overall		50(10)	65(13)	45(9)	20(4)

An improved conception rate (50 Vs 20) was observed in the repeat breeding crossbred cows when GnRH was administered close to the onset of oestrus coupled with late insemination. The result was in agreement with the findings of Stevenson et al., (1988), who observed that administration of GnRH analogue close to the onset of oestrus in repeat breeding crossbred cows might have induced an early preovulatory surge release of LH, which in turn terminated the maturation of oocyte and caused the ovulation with in normal range of time. The GnRH has also the capacity to elicit the synchronization of ovulation by initiating PGF2 α -pulses. This in turn leads to stimulation of fibroblast to secrete collagenase, which collapses the thecal matrix of collagen and leads to ovulation (Ryan et al., 1991).

An improved conception rate was observed with the administration of hCG (65 Vs 20) close to the onset of oestrus coupled with late insemination. It was established that the hCG with more LH like activity for a prolonged period, when administered close to the onset of oestrus induced an early and direct preovulatory LH surge, which in turn matured the follicle and decreased the variation about the average ovulation time, resulting in synchronization of ovulation with in normal time. The continuous action of hCG due to its long half life resulted in more proliferation and differentiation of luteal tissue by recruiting more granulosa cells (Babler and Hoffman, 1974).

An improved conception rate (45 Vs 20) was observed with the administration of progesterone on the fifth day of insemination in repeat breeding crossbred cows. The result was in agreement with the findings of Devanathan and Pattabhiraman, (1997) who reported that administration of progesterone on fifth day post insemination will improve the progestational status of cow and improved the conception rate.

Summary

This experiment was conducted to study the effect of different therapeutic protocols on duration of oestrus, ovulation time and conception rate. In the present study Group I and Group II animals were

treated with GnRh and hCG immediately after the detection of oestrus and inseminated six hours later and Group III animals were treated with progesterone on fifth day post insemination. It was found that both GnRH and hCG can effectively synchronize the duration of oestrus and ovulation time with in the normal range. An improved conception rate in repeat breeders was observed with the treatment of GnRH (50%), hCG (65%) and progesterone (45%) when compared to the control group (20%)

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* Part of M. V. Sc thesis submitted to Acharya NG Ranga Agricultural University, Hyderabad by the first author.

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