EFFECT OF OVSYNCH AND PRESYNCH PROTOCOLS ON FERTILITY AND SERUM PROGESTERONE IN REPEAT BREEDER COWS UNDER FIELD CONDITIONS

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ABSTRACT

Repeat breeder cows, maintained under field conditions, were inseminated at observed estrus without any treatment (control, n=15), were subjected to Ovsynch (n=13; d0 and d9 - GnRH 10 µg im; d7 - $PGF_{2\alpha}$ 500 µg im; day 10 - AI 16 h after d9 GnRH) or Presynch (n=16; Two $PGF_{2\alpha}$ at 14-day interval and initiating Ovsynch 12 day after the second $PGF_{2\alpha}$) protocols. The pregnancy rate on d45 post-AI for control, Ovsynch and Presynch groups were 20%, 46.1% and 37.5%, respectively. In both treatment groups, serum progesterone between pregnant (P) and non-pregnant (NP) cows at the time of first GnRH injection was similar ($p>0.05$). Serum progesterone on the day of AI was lower ($p<0.05->0.05$) and on d6 post-AI was higher ($p<0.05$) in P cows compared to their NP counterparts in all the groups. In brief, ovsynch protocol even without pre-synchronization enhances conception rate in repeat breeder cows.

Keywords: Conception rate, Ovsynch, Presynch, Progesterone, Repeat breeder cows

INDRODUCTION

Repeat breeding syndrome was mostly due to improper estrus detection and error in the timing of artificial insemination (Keskin *et al*., 2010). To remove these constraints, hormonal treatments were attempted in repeat breeder cows for synchronization of estrus and ovulation followed by fixed-time-AI (Rodrigues *et al.,* 2010). Ovsynch protocol is one such hormonal treatment that was developed to synchronize ovulation for FTAI (Ghuman *et al*., 2011). Others reported that Ovsynch protocol was more effective when the protocol is initiated during early luteal phase (Moreria *et al.,* 2000). Thus, the objective of present study was to compare the influence of initiating Ovsynch protocol at random stage of estrous cycle with Ovsynch treatment initiated at early luteal phase on pregnancy rate and serum progesterone in crossbred repeat breeder cows maintained under field conditions.

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MATERIALS AND METHODS

A total of 44 apparently normal crossbred cows with the history of not conceiving even after three inseminations with fertile bull semen were utilized for the study. Fifteen repeat breeder cows were inseminated with frozen semen at observed estrus without any treatment and were utilized as control group. Animals in Ovsynch Group (n=13) were treated with GnRH (Buserelin 10 µg im) on any day of estrous cycle (d0), a luteolytic dose of $PGF_{2\alpha}$ (Cloprostenol 500 µg im) on d7, and a second dose of GnRH (10 µg i.m.) on d9 followed by AI 16h after second GnRH. Animals in Presynch group (n=16) were treated with two $PGF_{2\alpha}$ at 14 day interval and Ovsynch treatment (in early luteal phase) was initiated 12 days after the second $PGF_{2\alpha}$ treatment. Blood samples were collected for progesterone estimation at the time of first GnRH injection, at the time of AI and 6 days post-AI in treatment groups. In control group, blood was collected at the time of AI during natural estrus and 6 days post-AI. Serum was separated by centrifugation

and stored at -20°C until assayed. Serum progesterone was determined using progesterone ELISA Kit (Labor Diagnostika Nord GmbH and Co. KG, Germany). Pregnancy diagnosis was carried out for all the cows on d45 post-AI by rectal palpation. Pregnancy rates between the different groups were statistically compared by using Chi-square test and mean progesterone values were analyzed using student's t-test.

RESULTS AND DISCUSSION

In present study, the lowest (p>0.05) pregnancy rate was obtained in control animals (20%) compared to Ovsynch and Presynch treated repeat breeder cows (46.1% and 37.5%, respectively). An improvement in pregnancy rate obtained after FTAI recorded in the two treatment groups compared to control group confirm the results of previous studies in which sequential treatment with GnRH and $PGF_{2\alpha}$ was able to synchronize follicular development and regression of CL to facilitate timed insemination without compromising fertility (Burke *et al*., 1996). Within treatment groups, presynchronization before initiation of Ovsynch protocol was not unable to improve (p>0.05) conception rate compared to Ovsynch initiated at random stage of estrous cycle. The result of present study concurs with an earlier report in which Ovsynch even without presynchronization enhanced pregnancy rate in repeat breeder cows (Kasimanickam *et al.* 2005). However, our results are inconsistent with other studies (Vasconcelos *et al*., 1997; Moreira *et al*., 2000), where higher pregnancy rates were obtained when Ovsynch was initiated following presynchronization.

In both treatment groups, there was no difference (p>0.05) in the mean serum progesterone concentration for pregnant and non-pregnant cows at the time of first GnRH injection (Table 1). Further, all the progesterone values in both treatment groups at first GnRH injection were >1 ng/ml, indicating that majority of cows were in luteal phase at the beginning of Ovsynch protocol (Table 1). This could be one of the reasons for better conception rate in both FTAI treatment groups. The result agrees with Murugavel *et al.,* (2003) who observed that in cows with high serum progesterone (>1 ng/ml) at treatment onset, Ovsynch treatment resulted in improved pregnancy rate.

At the time of AI, serum progesterone in pregnant and non-pregnant cows of two treatment groups were <1 ng/ml indicating that the animals were in estrum at the time AI (Table 1). This shows that both estrus synchronization protocols were effective in bringing the cows to estrus for FTAI. However, in control group, the mean progesterone level for non-pregnant cows at the time of natural estrum was >1 ng/ml (Table 1), thus demonstrating that some animals were not in estrum at the time of reporting for AI. This result agrees with Ezhilarasan *et al*., (2014) who reported that only 67.6% of crossbred cows were reported for AI at right time in natural estrus in the same region of study. This may also be one of the reasons for low pregnancy rate in control group, when compared to

Table 1: Serum progesterone on different days of treatment in pregnant (P) and non-pregnant (NP) cows

Group	P/NP	n	Serum Progesterone, ng/ml		
			At 1st GnRH	On day of AI	D6 post-AI
Control	P	3	-	0.43 ± 0.15^{bp}	1.77 ± 0.46^{aq}
	NP	12	-	1.07 ± 0.46^{a}	0.97 ± 0.23^{b}
Ovsynch	P	6	2.28 ± 0.71	0.57 ± 0.04^{p}	2.88 ± 0.04^{aq}
	NP	7	1.81 ± 0.30	0.71 ± 0.52	0.60 ± 0.52^{b}
Presynch	P	6	2.43 ± 0.32	0.48 ± 0.07^{p}	1.82 ± 0.32^{aq}
	NP	10	2.18 ± 0.27	0.62 ± 0.04^{p}	0.81 ± 0.25^{bq}

p<0.05, Means bearing different superscripts within a group of a column (a, b) or within a row (p, q) differ significantly

two treatment groups. Serum progesterone on the day of AI was higher in non-pregnant cows compared to pregnant cows in all the groups (Table 1). This observation concurs with the results of Selvaraju *et al*., (2011), who also reported higher level of progesterone in nonpregnant cows compared to pregnant cows. Higher progesterone at the time of estrus might affect sperm and ovum transport as well as the fertilization process and subsequent embryo passage to the uterus (De Silva *et al*., 1981).

In control and two treatment groups, serum progesterone on day 6 post-AI was higher ($p<0.05$) in pregnant cows compared to non-pregnant cows (Table 1). Low serum progesterone during post-AI would explain the low fertility in cows, as progesterone levels after AI is critical for inhibiting luteolysis and maintaining pregnancy (Mann *et al*., 1995).

In brief, as the beneficial effect of presynchronization was not evident in the present study, we can conclude that Ovsynch protocol is sufficient to improve the pregnancy rate in repeat breeder crossbred Jersey cows under field conditions.

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