Haryana Vet. (March, 2020) **59(SI),** 23-26

Research Article

COMPARATIVE EFFICACY OF SYNCHRONIZATION PROTOCOLS FOR IMPROVING FERTILITY IN POSTPARTUM CROSSBRED DAIRY COWS

A.R. RATNAPARKHI, S.G. DESHMUKH*, H.S. BIRADE, V.B. KALE, S.B. HARKAL and A.D. JADHAO
Department of Animal Reproduction, Gynaecology and Obstetrics,
Post Graduate Institute of Veterinary and Animal Sciences, Akola-444104, India

Received: 20.03.2019; Accepted: 13.05.2019

ABSTRACT

The objective of present research work was to study the efficacy of two different synchronization protocols for improving the fertility in postpartum crossbred cows. A total of 20 healthy crossbred cows at 60-90 days postpartum were selected from Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola dairy farm. Pre synchronization medicinal treatment was given to the cows before synchronization. Cows in group-I (n=10) received Ovsynch protocol and cows from group II (n=10) received two injections of $PGF_{2\alpha}$ (500 µg Cloprostenol) 11 days apart and fixed time artificial insemination was done at 24 to 48 hrs post second $PGF_{2\alpha}$ administration in both the groups. The percent estrus response, mean time interval for onset of induced estrus, and mean duration of estrus showed no significant difference between the two synchronized groups. Estrus intensity was higher in Double PG protocol as compared to Ovsynch protocol. From the present findings, it was observed that the number of animal pregnant at first service was higher in Ovsynch as compared to double $PGF_{2\alpha}$. The Ovsynch protocol induces better estrus response and first service conception rate in postpartum cows.

Keywords: Conception rate, Double PG, Ovsynch protocol

The estrus synchronization is a hormonal regulation of estrous cycle at a time in a group of animals with timed artificial insemination (AI). It allows decrease in unproductive periods by controlling the postpartum subestrus or anestrus. Synchronization reduces the number of days spent visually appearing estrus, it also increases the accuracy of heat detection. Hormonal programs which eliminate the need for estrus detection and allow timed artificial insemination (TAI) are more attractive. For the proper time of AI at standing estrus at farmer's door, the synchronization of ovulation with Ovsynch protocol can be very effective. Prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) has so far been the most frequently used hormone for estrus synchronization in cows (Patterson *et al.*, 2003). $PGF_{2\alpha}$ controls life span of the corpus luteum, but cannot alter the course of follicular waves. Estrus occurs due to changes at the developmental stage of preovulatory follicles during the post injection period of $PGF_{2\alpha}$ and the ensuing ovulation may take a week. Therefore, due to the continuation of a need for estrus detection in $PGF_{2\alpha}$ applications, insemination time cannot be controlled (Pursley *et al.*, 1997). Ultimately, reproductive physiologists have developed methods that limit estrus observation where ovulation rather than estrus is synchronized (Pursley *et al.*, 1995). The method that synchronizes ovulations is named briefly as "Ovsynch" (Pursley *et al.*, 1995). The study was aimed to evaluate the efficacy of different methods of estrus synchronisation protocols in crossbred postpartum cows.

MATERIAL AND METHODS

A total of 20 healthy crossbred cows at 60-90 days postpartum were selected from dairy farm of the college. Cows were examined for health and palpated per rectum for ovarian activity before synchronization. In addition, animals with body condition score of 2.5-4.0 (Scale 0-5 units; 1 = emaciated, 5 = obese) were included in the study. Pre synchronization medicinal treatment was given to the cows before synchronization. It includes Injection Ivermectin (Hitek), Injection Phosphorus (Urimine), and Chelated mineral mixture (Chelated Agrimin forte) orally @ 50gm daily for next 15 days. All the injections were administered intramuscularly except injection Ivermectin for deworming. Cows of group-I received Ovsynch protocol with administrating 10µg of GnRH analogue (Buserelin acetate) at any stage of estrus cycle (day 0) followed by 500µg Cloprostenol (PregOva, Virbac Animal Health India Pvt. Ltd.) (day 7) and second GnRH inj. 48 hrs after $PGF_{2\alpha}$ administration and fixed time A.I. done at 18 to 20 hrs post second GnRH administration. Group-II cows (n=10) received two injections of $PGF_{2\alpha}$ (500µg Cloprostenol) 11 days apart and fixed time A.I. was done at 24 to 48 hrs post second $PGF_{2\alpha}$ administration. Estrus detection and intensity of oestrus was done by visual observation and per rectal examination. Statistical analysis was carried out by using Complete Randomized Design (CRD) using statistically Web Based Agricultural Statistics Software Package (WASP 2.0).

RESULT AND DISCUSSION

Estrus response to treatment: The percent estrus response observed in first $PGF_{2\alpha}$, second $PGF_{2\alpha}$ and ovsynch protocol were 80.00, 100 and 100 percent, respectively (Table 1).

*Corresponding author: dr.sgdeshmukh@rediffmail.com

Table 1

Induced estrus response in different groups

Sr. No	Groups		No. of cows treated	No. of cows responded	Percent responded
1	Group-I $PGF_{2\alpha}$	First	10	08	80.00
2	Group-I $PGF_{2\alpha}$	Second	10	10	100.00
3.	Group-II protocol	GPG	10	10	100.00

Table 2

Mean time required for onset of induced estrus in Ovsynch and double $PGF_{2\alpha}$ protocol

Sr. No.	Groups (n=10)	No. of cows treated	No. of cows exhibited estrus	Average time required for onset of estrus (hrs)	Student 't' test
1.	Group-I (Ovsynch)	10	10	54.60±2.44	NS
2.	Group-II (Double PG $F_{2\alpha}$)	10	10	56.40±2.22	

NS- non-significant

From the present findings, it was observed that the efficiency in terms of estrus response was numerically lower with first $PGF_{2\alpha}$ injection as compared to second $PGF_{2\alpha}$ injection in Group – I, whereas, it recorded similar induced oestrus response with second PG injection of Group-I and Group–II cows. The present findings for the induced estrus response in double $PGF_{2\alpha}$ group (GI) after second $PGF_{2\alpha}$ injection is in accordance with Hirole *et al.* (2018). Similarly, Sahatpure and Patil (2008) reported 100% estrus response in crossbred cows. The present findings of Ovsynch group are in accordance with Bhoraniya *et al.* (2012), Ramkrishnan *et al.* (2012) and Deshmukh *et al.* (2017) who reported 100% oestrus response after Ovsynch treatment. The similar type of results were also obtained by researchers such as Velladurai *et al*. (2014), Dhami *et al.* (2015) and Ahmed *et al.* (2016), who have found the 100 percent estrus response with Ovsynch protocol for synchronization. The lower induced estrus response was reported by Sathiamoorthy and Subramanian (2003) and Hirole *et al.* (2018) as 80, 83.33 in Gir cows and 83.33% in crossbred cows, respectively, which is not in accordance with the present findings of Ovsynch protocol.

Time required for onset of estrus: The average time required for onset of estrus after last $PGF_{2\alpha}$ injection observed in Ovsynch and double $PGF_{2\alpha}$ protocol were 54.60±2.44 and 56.40±2.22 hrs, respectively (Table 2).

From the present findings, it was observed that mean time interval for onset of induced estrus showed non-significant difference in Ovsynch and double $PGF_{2\alpha}$ protocols. The result observed in present study for mean time required for onset of induced estrus are similar and in agreement with findings of Hirole *et al.* (2018) who recorded the time required for onset of induced estrus with Ovsynch protocol as 53.20±1.8 hrs. Similarly, Sathiamoorthy *et al.* (2007) reported time required for induced oestrus in non-descript cows as 56.40±8.40 hrs with Ovsynch protocol. The present findings of mean time interval for onset of induced estrus in double $PGF_{2\alpha}$ group (Group-II) is in accordance with Sahatpure and Patil (2008) who recorded 54.40±2.60 and 55.58±3.28 hrs average time interval for onset of induced estrus in non-descript and crossbreed cows with double dose of $PGF_{2\alpha}$ (Lutalyse 25 mg) injection at 11 days apart, respectively. Similarly, Ahlawat *et al.* (2015) reported 56.86±1.96 hrs mean time interval for onset of estrus with double dose of $PGF_{2\alpha}$ 11 days apart.

Table 3

Duration of induced estrus in Ovsynch and Double PGF2α protocol

Sr. No.	Groups	No. of cows treated	No. of cows exhibited estrus	Duration of estrus (hrs)	Student 't' test
1	Group-I (Ovsynch)	10	10	22.80±0.44	NS
2	Group-II (Double $PGF_{2\alpha}$)	10	10	23.80±0.55	

NS-non-significant

Duration of induced estrus with Ovsynch and double $PGF_{2\alpha}$ protocol in postpartum dairy cows: The mean duration of estrus recorded in Ovsynch and double $PGF_{2\alpha}$ protocol were 22.80±0.44 and 23.80±0.55 hrs, respectively (Table 3). There was no significant difference between the mean duration of estrus between the synchronized groups.

The present findings for mean duration of estrus in Ovsynch group (Group-I) are in accordance with Sathiamoorthy and Subramanian (2003), Ahmed *et al.* (2016) and Hirole *et al.* (2018) who reported 20.50±2.50, 21.083±0.78, 21.2±0.58 and 21.80 ±0.80 hrs duration of estrus in cows, respectively. Similarly, Deshmukh *et al.* (2017) reported the duration of estrus observed as 21.42±0.57, 22.25±0.54 and 21.84±0.65 hrs in Crushed Flaxseed, soybean supplementation and no fat supplementation crossbred cows, respectively, which is in accordance with the present findings. The present findings of mean duration of estrus in double $PGF_{2\alpha}$ group (Group-II) are in accordance with Hirole *et al.* (2018) who reported 21.33±0.49 hrs in crossbred cows.

Table 4

Per cent intensity of estrus in different groups

Group	Intensity of Estrus (%)		
	Intense (%)	Intermediate (%)	Weak (%)
Group-I Ovsynch protocol	40	40	20
Group II Double PG protocol	50	30	20

Intensity of estrus: The incidence of intense (40%), intermediate (40%) and weak (20%) intensity of estrus in ovsynch protocol and 50% intense, 30% intermediate and 20% weak in double PG protocol was recorded in the present study (Table 4).

The estrus intensity was higher in double PG protocol compared to Ovsynch protocol which might be due to the variation in large preovulatory follicle size. The present findings of per cent intensity of estrus in Ovsynch protocol are in accordance with the observations of Deshmukh *et al.* (2015) who recorded the incidence of intense, intermediate and weak estrus to be 40, 40 and 20 per cent, respectively. Similarly, Bhoraniya *et al.* (2012) reported 50, 33.33, and 16.66 % intense, medium and weak type of intensity, respectively. The present findings of intensity of estrus in double PG protocol are similar and are partially in accordance with Makode (1990) who recorded intense, intermediate and weak estrus to be 37.5, 37.5 and 25.0 %, respectively.

Conception rate: In present study, 10 animals were included in each treatment groups (n=10). The first service conception rate was observed as 50.00 and 40.00 percent, respectively in both GPG and double PG group (Table 5).

From the present findings, it was observed that the number of animala pregnant at first service was higher in Ovsynch as compared to double $PGF_{2\alpha}$. This might be due to the administration of the first GnRH injection of Ovsynch on day 5 and 10 of estrus cycle that may increase the probability of ovulating the dominant follicle of first follicular wave of estrus cycle, and improving synchrony of emergence of a new wave and synchronized ovulation rate to second GnRH injection of Ovsynch (Navanukraw *et al.*, 2004). The present findings for first service conception rate in Ovsynch group (GI) are in accordance with Pursley *et al.* (1995), Ramkrishnan *et al.* (2012) in Gir cows, Dhami *et al.* (2015) in crossbreed anestrus cows and Ahmed *et al.* (2016) who reported 50, 51, 50, 50 and 50% first service conception rate, respectively.

Table 5

Conception rate in different groups

Group	No. of cows treated	No. of cows responded	No. of animal inseminated	No. of cows pregnant
Group-I Ovsynch protocol	10	10 (100%)	10	05 (50%)
Group II Double PG protocol	10	10 (100%)	10	04 (40%)

The present findings for first service conception rate in double PGF2α (GII) are in accordance with Anderson (1998) who reported 38.9% first service conception rate.

CONCLUSION

The Ovsynch protocol induces better estrus response and first service conception rate in post partum crossbred cows.

ACKNOWLEDGEMENT

I humbly grab this opportunity to acknowledge reverentially, Dr. Sanjay Awaghate, Regional Business Manager, Mr. Azher Ali, Area Business Manager and Mr Syed Shoaib Ali, Business Officer of M/s. Virbac Animal Health India Pvt. Ltd., Mumbai for their kind cooperation in providing the requested Drugs/Hormones utilized in the present Ph.D. study.

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