

EFFECT OF PRESYNCHRONIZATION WITH SIMULTANEOUS GNRH AND PGF_{2α} ADMINISTRATION PRIOR TO OVSYNCH ON SECOND SERVICE CONCEPTION RATE IN ANESTRUS INDIGENOUS COW

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ABSTRACT

Two hundreds anestrus indigenous cows were randomly divided into two groups and received either “Ovsynch” (Control; n=54) or “Treatment” (Pre-OV; n=146). First Artificial Insemination (AI) was done 18-24 hours after administration of 2nd dose of GnRH of Ovsynch in both groups, while second AI was done at observed estrus in cows returned to estrus between 20-25 days post-first AI. Pregnancy was diagnosed by ultrasonography day 45 post-second AI. Return to estrus rate between 20-25 days post-first AI was similar (p>0.05) in both groups. In the present study, second service conception rate obtained was higher (p<0.01) in the Pre-OV group (28.2%) as compared with control (9%).

Keywords: Anestrus, Indigenous cows, Ovsynch, Pre-OV, Ultrasonography

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Cattle are one of the principal milk-producing animals contributing more than 48 per cent of total milk production in the country. High milk production and excellent fertility are desirable traits for a profitable dairy enterprise. Following parturition, all the females undergo through anestrus for a variable but short period of time, known as postpartum anestrus (Jainudeen and Hafez, 1993). Most of the dairy cows resume ovulatory estrus cycle within 15–45 days postpartum (Forde *et al.*, 2011). In India, incidence of postpartum anestrus has been reported between 2.13 and 67.11 per cent in indigenous cattle (Thakor and Patel, 2013). Various estrus synchronization protocols such as Ovsynch, Co-synch, Ovsynch plus and Heatsynch have been proved to enhance reproductive efficacy in infertile animals (Dhami *et al.*, 2015; Chandra Prasad *et al.*, 2020).

Initiating Ovsynch on day 6 or 7 of the estrus cycle maximizes ovulatory response and increases conception rates following timed AI (Pursley and Martins, 2011). Various strategies to optimize ovulation to first GnRH that in turn to increase the percentage of cows on day 6 or 7 of the estrus cycle at the first GnRH of Ovsynch like Double-Ovsynch (Souza *et al.*, 2008), G6G (PGF_{2α} followed by GnRH after 2 days and initiating Ovsynch 4 days after of GnRH injection; Bello *et al.*, 2006) and Presynch-10 (Stevenson and Pulley, 2012) have compliance problem due to their large treatment period. Presynch PGF_{2α}+ GnRH (PG+G) (Yousuf *et al.*, 2016) is a simpler presynchronization

protocol with smaller treatment duration yet provides comparable results to other laborious presynchronization protocols (Presynch-10 and G6G) in terms of pregnancy per AI in exotic cattle (Martins *et al.*, 2017). However, no study has been conducted so far in indigenous cow.

The present study was conducted at different farms of Hisar and Jhajjar districts of Haryana on 200 anestrus indigenous cows during months from December to April. All cows were of parity between 2nd and 5th and having history of anestrus for atleast last 4 months as provided by the owner, having body condition score between 3-5 without any reproductive abnormalities like utero-ovarian adhesions, pyometra, fibrosed cervix were included in study and randomly assigned to two treatment groups. Experimental cows were kept in loose housing system under group management practice with provision of fresh drinking water and shelter was also provided to protect animals from climatic adversities. This system of housing allowed free movement of animals. Animals were fed as per availability of green fodder, roughage, concentrate, and mineral supplementation was also done regularly. Two hundreds anestrus cows were randomly assigned to Control (OV; n=54) or Treatment (Pre-OV; n=146) groups. Cows in Control (OV, n=54) group were provided i.m. injections of Buserelin acetate, 10 µg (Zolcol®, Carus Laboratories Pvt. Ltd., India) on day 0, Cloprostenol sodium, 500 µg (Ashored®, Carus Laboratories Pvt. Ltd., India) on day 7, and Buserelin acetate, 10 µg on day 9. Cows in treatment (Pre-OV, n=146) group were pre-

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synchronized by administering Buserelin acetate, 10 µg and Cloprostenol sodium, 500 µg, i.m. simultaneously 7 days before the starting of Ovsynch protocol. First Artificial Insemination (AI) was performed through frozen thawed semen 18-24 hours after administration of 2nd dose of GnRH analogue (Buserelin acetate) of Ovsynch (Fig. 1). Return to estrus rate (%) was defined as number of cows showing estrus signs between 20 and 25 days post-first AI. Second AI was done at observed estrus in cows returned to estrus.

Pregnancy was confirmed through transrectal ultrasonography using real time B-mode ultrasound scanner (Sonoscape S6) equipped with inbuilt interchangeable 7.5 MHz linear-array rectal transducer. Second service conception rate (SSCR %) was defined as number of cows found pregnant day 45 post second AI out of total cows showing estrus signs between 20 and 25 days post-first AI. Statistical analysis was performed in computer based SPSS software. Effect of treatment on return to estrus rate (%) after first AI and SSCR (%) was determined by using Chi-square test.

In present study, number of cows returning to estrus after first AI (timed-AI 18-24 hours after administration of 2nd dose of GnRH analogue of Ovsynch) were found to be similar ($p>0.05$) in both groups (26.7% (39/146) vs 20.3% (11/54), Pre-OV vs OV; Fig. 2). Cows returning to estrus after first timed-AI may be due to failure of synchronization of ovarian activity which resulted in fertilization failure or due to early embryonic mortality (Vasconcelos *et al.*, 1999, Rani *et al.*, 2018). SSCR (%) was found to be significantly higher ($p<0.01$) in Pre-OV group as compared to control (28.2% (11/39) vs 9% (1/11), $\chi^2 = 3.95$, Pre-OV vs OV; Fig. 3).

SSCR (%) after similar pre-synchronization strategy had been not reported in any study. But SSCR (%) obtained in present study was similar to as reported for other pre-synchronization protocols. Dhami *et al.* (2019) obtained 28.6% SSCR (%) in anestrus indigenous cattle after Double-Ovsynch protocol, also they obtained 31.3% SSCR (%) in repeat breeder anestrus cows in same experiment. Naikoo *et al.* (2016) in their study involving anestrus indigenous cows obtained 20% and 25% SSCR (%) after CIDR protocol and Ovsynch-CIDR protocol, respectively. Also, SSCR (%) in present study was in accordance with results (28.7%) obtained in anestrus buffalo (Chandra Prasad *et al.*, 2020).

SSCR (%) in Ovsynch in present study was higher than obtained during previous study (0%) involving anestrus indigenous cattle (Naikoo *et al.*, 2016) but lower

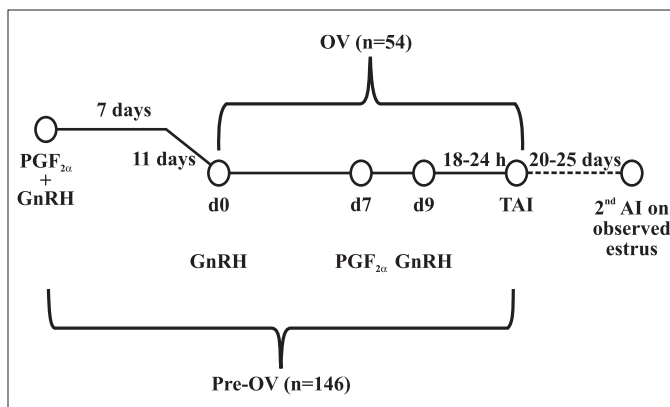


Fig. 1. Schematic diagram for experiment schedule in cows. (AI : artificial insemination, d : day; GnRH : buserelin acetate; h: hours; n: number of cows; PGF_{2α} : cloprostenol sodium; TAI : times artificial insemination).

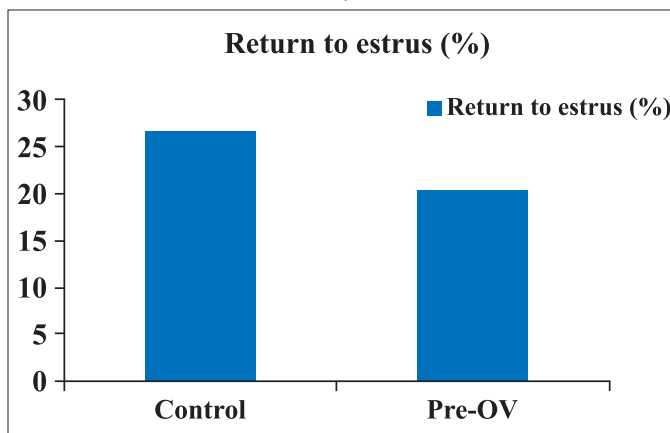


Fig. 2. Percentage of cows returning to estrus between day 20 and 25 post-first AI after estrus synchronization with Ovsynch alone (Control) or Pre-OV treatment.

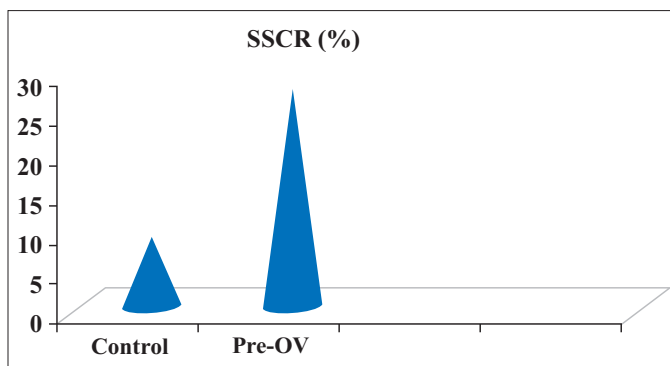


Fig. 3. Second service conception rate (SSCR%) in cows inseminated on observed estrus between day 20 and 25 post-first AI after synchronization of estrus with Ovsynch alone (Control) or Pre-OV treatment.

than (31.6%) obtained by Dhami *et al.*, (2019) in anestrus indigenous cattle.

Researchers have reported increased fertility response subsequent to pre-synchronization of estrous cycle compared to Ovsynch alone (Galvão *et al.*, 2007) and results for SSCR (%) in present study are in accordance to this observation. Better SSCR (%) were also obtained after

pre-synchronization strategies before Ovsynch as compared to Ovsynch alone in indigenous cows (Dhami *et al.*, 2019). Yet the number of treated cows that returned to estrus were similar in both groups but higher SSCR (%) suggested that synchronization of ovarian function was better in Pre-OV group and early embryonic mortality could be reason for majority of cows returning to estrus in presynchronised group, but on other hand failure of synchronization of ovarian activity may be the reason for cows returning to estrus in control group. On contrary, Dhami *et al.* (2019) reported lower SSCR (%) after Double-Ovsynch strategy in indigenous cows as compared to Ovsynch alone. The possible reasons for variation in results of different studies could be due to variations in environmental, management and genetic factors like nutritional status, parity, stage of lactation, suckling stimulus, season/climate and drug source etc.

Thus, from above observation it can be concluded that simpler pre-synchronization strategy consisting of simultaneous administration of PGF_{2α} and GnRH one week before Ovsynch (Pre-OV) led to better synchronization of ovarian activity and increased SSCR (%) in indigenous anestrus cattle as compared to Ovsynch alone.

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