

COMPARING EFFICACY OF DIFFERENT HORMONAL PROTOCOLS FOR INDUCTION OF CYCLICITY IN POSTPARTUM ANESTRUS SAHIWAL COWS

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ABSTRACT

Eleven Sahiwal cows with the history of postpartum anestrus were selected and divided into two groups (Groups I and II). Group I (n=6) cows were treated with controlled internal drug release (CIDR) protocol where CIDR was inserted intravaginally on day 0 (start of experiment) followed by 500 IU PMSG on day 8 (one day prior to CIDR withdrawal) and 1500 IU hCG at the time of artificial insemination. The Group II cows (n=5) were given Ovsynch protocol for treatment of postpartum anestrus in which 500 IU PMSG was administered (day 0) followed by 16 µg GnRH (day 3), 25 mg Dinoprost (day 10) and second injection of 16 µg GnRH analogue (day 12). Both the treatments were found to be 100% effective in induction of estrus but the conception rate at first service was observed to be 50% and 20% in groups I and II, respectively. It may be concluded that of these two protocols, CIDR protocol was better in terms of higher conception rate.

Key words: Anestrus, CIDR, heat induction, Ovsynch, Sahiwal cows

Sahiwal, a breed of zebu cattle, is well known for its superior dairy qualities, tick-resistance and heat tolerance. Infertility among dairy animals is still a major bottleneck in exploiting full production potential of animal wealth. High-producing dairy cows have inherently low expression of estrus signs, particularly during the early postpartum period (Opsomer *et al.*, 2000). There are many factors such as limited energy intake, lower body reserves, and postpartum reproductive disorders that may delay the resumption of cyclicity after calving. However, increased partitioning of energy to milk production can result in anestrus by delaying resumption of follicular activity. The duration of postpartum anestrus has an important influence on reproductive performance (Lucy, 2007). Under optimal conditions, there is a deviation in follicular growth, selection of a dominant follicle, its growth to maturity, ovulation and subsequently luteolysis, resulting in reestablishment of cyclical ovarian activity with an opportunity for becoming pregnant. Failure of any of these processes prolongs postpartum anestrus period and thereby increasing intercalving interval. Various hormonal protocols have been administered by various researchers with varied degree of success (Wheaton and Lamb, 2007; McDougall, 2010; Huerta *et al.*, 2011). Therefore the present study was undertaken to compare the efficacy of Controlled Internal Drug Release (CIDR) and Ovsynch protocols

for the induction of ovulatory estrus and conception rate at the induced and subsequent estrus in Sahiwal cattle that did not come in heat for more than 200 days after calving.

MATERIALS AND METHODS

The research was carried out on eleven Sahiwal cows belonging to the Cattle Farm, Department of Animal Genetics and Breeding, College of Veterinary Sciences, LUVAS, Hisar in the month of January. All the cows that were acyclic for more than 200 days after calving were used in this study. Optimum health score conditions and managerial care were confirmed in each animal as per the BCS-score card as described by Balakrishnan *et al.* (1997). Cows were examined by vision and palpation to indicate body condition score in a 1 to 5 scale and were classified as 1.0-1.5 poor (emaciated), 2.0-2.5 Moderate (Thin), 3.0-3.5 Good (Average), 4.0- 4.5 Fat (Heavy condition) and 5.0 Grossly fat. The body condition score for each of the experimental animal was above 2.5. The animals selected for the trial were approximately of same age and nutritional health status with the history of postpartum anestrus.

The cows were examined per rectally for the confirmation of anestrus and then divided into two groups (group I and group II). Group I animals (n = 6) were treated with CIDR (Eazi-breed CIDRTM, Inter Ag,

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Hamilton, New Zealand) followed by an intramuscular administration of 500 IU PMSG (eCG) (Folligon®, Intervet International, The Netherlands) on day 8 (one day prior to CIDR withdrawal) and 1500 IU hCG (Chorulon®, Intervet International, The Netherlands) at the time of artificial insemination. Group II animals (n=5) were treated with Ovsynch protocol; PMSG 500 IU was administered intramuscularly on day 0 followed by 16 µg GnRH analogue (Receptal® VET, Intervet International, Germany) on day 3, 25 mg Dinoprost (Lutalyse, Pfizer Animal Health Limited, Mumbai) on day 10 and a second dose of GnRH analogue (16 µg) on day 12 of the start of experiment. Detection of animals in heat was done by parading a teaser bull daily in the morning and evening. Animals that showed signs of estrus were artificially inseminated. Insemination in group II animals was done at 12 and 24 hours after second GnRH injection in case if any animal was not detected in heat by the teaser bull. The total duration of the experiment was 150 days in order to record induction of estrus, conception rate and nature of discharge.

Estrus response was observed as percentage of females showing estrous of total animals treated. First service conception rate was calculated as percentage of animals conceived to first insemination at induced estrus in each group. Pregnancy was confirmed by palpation per rectum at 80 days post insemination. Comparative study of both the treatment regimens was carried out by comparing their effectiveness and efficacy for estrus induction and successful conception.

RESULTS AND DISCUSSION

The cows of both the groups had 100% success of induced estrus within 48-96 hours after treatment as recorded by parading a teaser bull (Table 1). All the animals showed prominent heat symptoms such as oedema of vulva, congestion of vulvar mucus membranes, tone of uterine horn and open os-cervix. The results on induction of estrus using CIDR protocol are in consonance with the findings of El-Shahat and Badr (2011) in cows. The higher estrus response in animals treated with CIDR protocol might be due to PMSG supplementation alongwith CIDR. PMSG leads to induction of behavioral estrus due to enhanced ovarian stimulation (Singh *et al.*, 2004).

In the present study, artificial insemination was done using cryopreserved semen. In group I, 50% cows conceived at first service. In contrast, the conception rate in group II cows was recorded to be 20% at first service.

Table 1
Response of hormonal preparations in Sahiwal cows

Experimental groups	No. of animals	No. of animals expressed estrus	No. of animals pregnant out of expressed estrus
CIDR+ Folligon +Chorulon	6	6	3
Ovsynch Protocol	5	5	1

Higher pregnancy rate in CIDR group might be due to hCG as well as eCG along with CIDR. The administration of hCG at the time of insemination could result in the synchronization of ovulation, fertilization and events necessary for the successful maintenance of pregnancy (Breuel *et al.*, 1989). eCG stimulates the growth of dominant follicle that consequently increases ovulation rate (Sa Filho *et al.*, 2010), especially in cows in postpartum anestrus and/or in low BCS (Bo *et al.*, 2007). Bryan *et al.* (2013) also reported that the addition of eCG to the progesterone regimen significantly improved all reproductive outcomes in anestrus dairy cows. The use of eCG in conjunction with P4 devices has also been demonstrated to increase pregnancy rates in *Bos taurus* and *Bos indicus* herds with high incidence of postpartum anestrus (Baruselli *et al.*, 2004; Bo *et al.*, 2007). However, Small *et al.* (2009) reported that administration of eCG at the time of CIDR removal in an estradiol-based synchronization treatment did not increase the size of the ovulatory follicle and pregnancy rates were only significantly improved in cows with a BCS <2.75 in lactating cattle.

Little or no significant improvement in pregnancy rates using Ovsynch has been reported in lactating dairy cows (Rabiee *et al.*, 2005). The Ovsynch protocol appears to induce ovulation in a high percentage of anestrus dairy cows, but some of these cows have a subsequent short luteal phase (Gumen *et al.*, 2003; McDougall, 2010) resulting in lower conception rates than in cycling cows. Klindworth *et al.* (2001) also reported a positive effect of Ovsynch in acyclic cows and observed that nine out of eleven cows reacted with the resumption of ovarian activity and two cows were pregnant after first insemination. Although Ovsynch may induce ovulation in non-cycling cows, there is still likely to be a reduction in conception rates in these cows.

It can be concluded that both the hormonal preparations were effective in induction of estrus in acyclic cows. However, higher conception rate was recorded by

the administration of progesterone based CIDR protocol as compared to the Ovsynch protocol.

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