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Estrus Induction and Fertility Response following Ovsynch Alone and Ovsynch plus PRID Protocol in Postpartum Anestrus Surti buffaloes

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Abstract

The study was undertaken to find out the estrus induction and conception rate in 18 postpartum anestrus Surti buffaloes divided equally into three groups and treated with Ovsynch protocol alone and in combination with PRID, keeping one group as control. The use of Ovsynch alone and Ovsynch + PRID protocols with fixed-time artificial insemination resulted in 100% estrus induction with 66.66% and 50.00% conception rate at induced estrus, respectively, and the overall conception rate was 83.33% in both the groups. In untreated anestrus control (n=6), only four (66.66%) buffaloes exhibited spontaneous estrus within 120 days of follow-up and conceived giving the first service and overall conception rate as 75.00% and 66.66%, respectively. The mean number of services per conception did not differ significantly among the treatment and control groups. The service periods of buffaloes under both the treatment groups were significantly ($p<0.05$) shorter (57.00±2.81 and 61.20±3.11 days) than the control group (104.00±20.22 days). Thus, the Ovsynch and Ovsynch + PRID protocol can be successfully used to induce fertile estrus in postpartum anestrus buffaloes.

Key words: Ovsynch, PRID, Anestrus, Surti buffaloes, Estrus induction, Conception bate

Introduction

The productive and reproductive efficiencies of animals are complimentary to each other. Low reproductive efficiency in buffaloes remains a major economic problem globally and its incidence is higher in India. Incidence of anestrus is more in buffalo than the cattle (Kumar *et al*., 2014). This fact has made theriogenologists to play a pivotal role in developing technology to improve the reproductive efficiency in anestrus dairy buffaloes to increase the efficiency and profitability of milk production. Estrus can be induced, using various hormones that act on the hypothalamo-pituitary-ovarian axis. These procedures are based on manipulating the corpus luteum, either to induce premature luteolysis using prostaglandins or to prolong the luteal phase using progestogens. Such approaches have many advantages and are increasingly used in modern animal husbandry practices, particularly in buffaloes which are known to have anestrus and silent estrus. Hence, the present investigation was carried out to study the estrus induction and fertility response in postpartum anestrus Surti buffaloes treated with Ovsynch protocol alone and in combination with PRID (Progesterone Releasing Intravaginal Device).

Materials and Methods

The study was conducted on 18 anestrus (inactive ovaries) Surti buffaloes from 45 to 120 days postpartum at Livestock Research Station, NAU, Navsari, Gujarat between October 2015 and April 2016. All these buffaloes had normal calving and subsequent normal genital health as assessed gynaeco-clinically. Estrus occurrence was detected daily with the help of teaser bull parading during morning and evening hours. The animals which were not exhibiting overt signs of estrus during routine heat detection program were segregated and subjected to rectal palpation. The animals with smooth inactive ovaries (no palpable structure over ovary i.e. follicle or CL) were selected for another palpation after 11 days to ascertain their cyclic nature and considered as postpartum anestrus buffaloes. The anestrus buffaloes were randomly divided into three equal groups of six animals each and were treated as under.

Treatment Protocols

In Group-I (Ovsynch protocol, T1), the buffaloes were administered i/m with injection Busereline - GnRH analogue 0.01 mg (Pregulate, 2.5 ml) on day 0, injection Cloprostenol Sodium - $PGF_2\alpha$ analogue 500 μg (Pregova, 2 ml) on day 7 and second injection of Busereline 0.01 mg on day 9 followed by fixed time insemination (FTAI) twice 12 hrs apart on day 10.

In Group-II (Ovsynch + PRID protocol, T2) of six true anestrus buffaloes, PRID (0.9 g of progesterone; Triu-B, Virbac AH India Pvt Ltd) was inserted intravaginally and kept it *in situ* for 7 days and injection Busereline 0.01 mg was given i/m on day 0. The PRID was removed on day 7 together with i/m injection of Cloprostenol 500 μg; second injection of Busereline 0.01 mg was administered on day 9 and FTAI was performed twice on day 10 as above.

The buffaloes in Group-III (T3) served as control without hormone therapy. Buffaloes in spontaneous or induced estrus were inseminated using good quality frozen-thawed semen. Animals detected in estrus subsequent to FTAIs were re-inseminated on next cycle and in non-return cases pregnancy was confirmed per rectum 60 days of last AI.

The data were analysed for Mean ± SE, ANOVA and DNMRT using Statistical Package for Social Sciences (SPSS) software version 20.0.

Results and Discussion

The number of buffaloes responded to the treatment with induction of estrus were cent per cent in both the treatment groups (Ovsynch and Ovsynch + PRID), as all of the six buffaloes came in heat within 48 hours following PG injection on day 7, while the buffaloes from the acyclic control group-III remained anestrus during that period and only four were found in estrus between 62 and 120 days (Table 1).

Many workers (Ghuman *et al*., 2009; Naikoo *et al*., 2010 and Nakrani *et al*. 2014) have also used Ovsynch protocol in anestrus buffaloes and obtained cent per cent estrus induction response as in the present study, whereas some workers reported estrus induction rate around 80-87 % (Savalia *et al*., 2013; Thorat *et al*., 2014; Buhecha *et al.,* 2016), while Ali *et al.* (2012) found it as only 50 % in anestrus buffaloes. Further, Naikoo *et al.* (2010) and Bhoraniya *et at.* (2012) used Ovsynch + CIDR protocol and obtained cent per cent estrus induction response in postpartum anestrus Mehsana buffaloes and Kankrej cows, respectively, while Ravikumar *et al.* (2007) and Bartolome *et al.* (2004) found considerably lower estrus induction responses (45-75 % in postpartum anestrus and/or subestrus buffaloes.

The conception rates at induced estrus in buffaloes subjected to Ovsynch and Ovsynch + PRID protocols were 66.66 and 50.00 %, respectively. The corresponding conception rates at second cycle post-treatment were 50.00 and 66.66 %, with the overall conception rates of 83.33 % in both the groups. In untreated anestrus control group, out of 6 animals only 4 animals exhibited the estrus,

and the conception rates at first service, second service and overall were 75.00, 100 and 66.66 %, respectively (Table 1).

Table 1: Effect of different treatments on reproductive performance of postpartum anestrus Surti buffaloes (Mean ± SEM)

Protocols/ Groups (n=6)	Estrus Induction Response	Number of Service per Conception	Service Period (days)	Conception rate		Overall Conception Rate
				First Service	Second Service	
Group-I (Ovsynch)	100% (6/6)	1.20±0.20	57.00±2.81[a]	66.66% (4/6)	50.00% (1/2)	83.33% (5/6)
Group-II (Ovsynch + PRID)	100% (6/6)	1.40±0.24	61.20±6.11[a]	50.00% (3/6)	66.66% (2/3)	83.33% (5/6)
Group-III (Anestrus control)	66.66% (4/6)	1.25±0.25	104.00±20.22[b]	75.00% (3/4)	100% (1/1)	66.66% (4/6)

Means bearing different superscripts within a column differ significantly ($p<0.05$).

As compared to the present findings, very low first service conception rate at induced estrus (18-35%) was reported with Ovsynch protocol by Ghuman *et al*. (2009), Savalia *et al.* (2013), Dhami *et al.* (2014), Buhecha *et al.* (2016) in anestrus buffaloes, while Naikoo *et al.* (2010); Kundalkar *et al.* (2014); Nakrani *et al*. (2014) and Vikash *et al.,* (2016) recorded conception rates of 50-60% in anestrus buffaloes. Further, 50 % second service conception rate observed in Ovsynch protocol closely corroborated with Naikoo *et al.* (2010), whereas, a very low CR of 40 % was found by Savalia *et al.* (2013).

Similarly, in the treatment group-II (Ovsynch + PRID) 50.00 % conception rate obtained at induced estrus closely corroborated with Bhoraniya *et al.* (2012) in Kankrej cows, while lower CR of 18% was observed by Ravikumar *et al*. (2007) in anestrus buffaloes. On the other hand, higher first service CRs (50-70%) following Ovsynch + CIDR protocol were recorded by others (Naikoo *et al*., 2010; Vikash *et al.,* 2016) in anestrus buffaloes. Further, 50 % second service conception rate reported by Naikoo *et al*. (2010) following this combined protocol was lower than 66.66 % found in the present study.

The present overall 83.33 % conception rate obtained with Ovsynch (group-I) was in agreement with 85.71 % reported by Thorat *et al.* (2014) in Marathwadi buffaloes, while lower overall CRs of 50-70% were reported by Naikoo *et al.* (2010), Savalia *et al.* (2013), Nakrani *et al*. (2014) and Vikash *et al.* (2016) in postpartum anestrus buffaloes. Further, the present overall 83.33 % conception rate found with Ovsynch + PRID (group-II) also corroborated with 83.33 % CR obtained by Naikoo *et al.* (2010) in postpartum anestrus Mehsana buffaloes. However, relatively much lower overall CR of 70.16 % was reported by Vikash *et al.* (2016).

The mean number of services per conception did not differ significantly ($p>0.05$) among the treatment and control groups (Table 1). Since, gestation length is fixed parameter, the number of services required for each conception influence the service period and calving interval. The goal should be 1.5 services per conception however, 2 services per conception are acceptable under our system of breeding. The mean service periods for treatment group I & II and control group III observed were 57.00 ± 2.81, 61.20 ± 6.11 and 104.00 ± 20.22 days, respectively. It varied non-significantly ($p>0.05$) between treatment groups, but was significantly ($p<0.05$) lower than in control group (Table 1).

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Conflict of Interest: All authors declare no conflict of interest.

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