



Improving reproductive efficiency and fertility rate in anestrus buffaloes treated with progesterone based hormonal protocol

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Efficiency of reproduction is the key factor for a profitable herd. To maximise the productive life of a buffalo cow, it should be bred within 80–90 days after parturition to produce a calf and start a new lactation every 13–14 months (El-Wishy 2007). Moreover, longer inter-calving intervals in buffaloes are mainly due to prolonged postpartum anestrus (Barile 2005) which is mainly attributed to ovarian inactivity (Hattab and Osman 2000). Postpartum anestrus is affected by plane of nutrition, milk yield, body condition score (BCS) at calving, suckling, parity, calving season and other factors (El-Wishy 2007). Gonadotropin releasing hormone (GnRH), gonadotropins (Gn), estrogen, prostaglandin $F_2\alpha$ ($PGF_2\alpha$) and progesterone (Metwelly 2001, Singh *et al.* 2003, Metwelly 2006) were attempted to treat the prolonged postpartum anestrus in buffaloes.

The aim of this study was to evaluate the efficacy of CIDR (controlled internal drug release) protocol in anestrus buffaloes on resumption of cyclicity, fertility and reduction of intercalving interval.

This study was conducted on Murrah buffaloes in R S Pura, Jammu, Jammu and Kashmir, from July 2010 to November 2010. Healthy anestrus buffaloes (12) between the first to fifth parity (4.5–8 years old) that had not been detected in estrus since 3–9 months postpartum were used. Animals were kept under standard management conditions and were supplied with balanced ration and water *ad lib*. These buffaloes had BCS >3 (Edmonson *et al.* 1989). Animals were milked twice daily by hand milking (range of daily milk yield 4–8 kg/head).

Buffaloes suffer from ovarian inactivity when neither corpora lutea nor follicles were detected at 10 day intervals

by 2 rectal palpations on both ovaries of each animal. Rectal palpation of both ovaries was performed according to Noakes *et al.* (2001). The selected animals were divided into group 1 (6) and 2 (6).

Group 1 animals were given no hormonal treatment and were kept as control whereas group 2 animals were treated with CIDR protocol. Animals in group 2 were subjected to intra-vaginal placement of CIDR-B device for a period of 7 days (from day 0 to day 7), 25 mg i/m injection of $PGF_2\alpha$ on day of removal of CIDR-B device (day 7), 10 μ g i.m. injection of GnRH analogue (buserelin acetate) 48 h after $PGF_2\alpha$ (day 9) and timed insemination 12 and 24 h after second GnRH injection (day 10). The experimental buffaloes were frequently observed for estrus signs after $PGF_2\alpha$ injection. Onset of estrus was calculated in hours from the time of $PGF_2\alpha$ administration to appearance of first estrus signs. The intensity of estrus was studied using behavioural changes, physiological changes and gynaecological observations and it was scored as intense, intermediate and weak as described by Rao and Rao (1981). The animals returning to estrus after fixed time insemination were again inseminated. Pregnancy was confirmed by per-rectal palpation at 60 days after last insemination.

Several lines of evidence suggest that dysfunction of the hypothalamic gonadotropin releasing hormone (GnRH) and pituitary gonadotropins-follicle stimulating hormone (FSH) and luteinizing hormone (LH) secretion are the contributing factors in the etiology of inactive ovaries (Gordon 1996). CIDR is used for estrus synchronization, increased pregnancy rates and the treatment of postpartum anestrus in cattle (Macmillan and Peterson 1993). CIDR is effectively used to treat anestrus buffaloes (Andukar *et al.* 1997, Singh 2003).

In present study, none of the buffaloes in group 1 exhibited estrus during the period of treatment. In group 2, none of the animals lost CIDR device during the insertion period. Thus, overall retention rate of CIDR was 100%. Similar retention rates were reported by Baruselli *et al.* (2002). However, lower retention rate (62.50%) was reported by Hill *et al.* (1992). All treated animals (100%) in group 2 responded to treatment and exhibited estrus

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within 58.62 ± 3.19 h after PGF_{2 α} injection. Intensity of estrus was intense in two (33.33%), intermediate in 3 (50%) and weak in 1 (16%) buffalo. These findings are in agreement with Zaabel *et al.* (2009) who reported an estrus induction rate of 100% and mean time from PGF_{2 α} injection to onset of estrus was 65.2 ± 16.5 h. Similarly, the average duration of induced estrus was 23.65 ± 0.74 h. Similar duration of estrus was observed by Pawshe *et al.* (2004), who reported the average duration of estrus to be 23.38 ± 1.44 h in buffaloes. Progesterone (P₄) released from CIDR is absorbed through the vaginal wall into the circulation (Singh 2003). This increased circulatory concentration of P₄ exerted negative feedback on hypothalamus and anterior pituitary. Hence, favoring GnRH, FSH and LH storage. Following termination of P₄ therapy (after CIDR removal on day 7 after insertion), the rapid drop in circulatory concentration of P₄ promotes the release of GnRH, followed by FSH and LH release with subsequent resumption of ovarian cyclicity (Zerbe *et al.* 1999). Also, the increased circulatory concentration of P₄ sensitizes the hypothalamic-pituitary system (Singh 2003). Moreover, GnRH injection before insemination (day 9) may cover the insufficient GnRH released after 7 day CIDR insertion period, induce ovulation at the appropriate time and stimulate luteinization, thereby improving the chances of successful fertilization and embryo survival (Herbert and Trigg 2005, Pawson and McNeilly 2005).

Out of 6 buffaloes treated 3 (50%) conceived at induced estrus whereas 1 buffalo conceived at first spontaneous estrus. The overall pregnancy rate was 66.67%. Contrary to our studies, higher pregnancy rate 85.71% (6/7) was reported by Zaabel *et al.* (2009). This variation in pregnancy rate may be due to difference in breed and geographical location.

The present study revealed that CIDR protocol offers an opportunity to induce fertile estrus in anestrus buffaloes and thus can be helpful in improving fertility and reducing intercalving period.

SUMMARY

The aim of this study was to evaluate the effect of CIDR protocol in anestrus buffaloes on resumption of cyclicity, fertility and reduction of intercalving interval. The study was conducted on 12 anestrus buffaloes divided into groups 1 and 2, each having 6 buffaloes. Group 1 buffaloes were given no treatment (control), whereas group 2 animals were treated with CIDR protocol and timed insemination 12 and 24 h after second GnRH injection. The buffaloes were frequently observed for estrus after PGF_{2 α} injection. In group 2 the estrus induction response was 100% and mean time required for onset of estrus was 58.62 ± 3.19 h. First service conception rate was 50% and overall pregnancy rate was 66.67%. Thus, it could be concluded that the use of CIDR protocol is an alternative to restart the ovarian activity, improve fertility and reduce intercalving interval in anestrus buffaloes.

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