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Research Article

Efficacy of $PGF_2\alpha$, CIDR and Ovsynch treatment on estrus induction and fertility in postpartum buffaloes – A field study

T. SATHIAMOORTHY[1], R. PARTHASARATHY[1] AND M. KATHIRCHELVAN[1]

Department of Animal Reproduction, Gynaecology & Obstetrics,
Madras Veterinary College, Chennai 600 007
Email: sathiaog@yahoo.co.in

ABSTRACT

A total of forty five postpartum buffaloes were equally divided into group I, II and III. The group I animals were treated with $PGF_2\alpha$ after palpation of corpus luteum. The group II animals were treated with CIDR and removed after 9 days. The group III animals were treated with GnRH analogue and 6 days later they were administered with $PGF_2\alpha$. A second injection of GnRH analogue was administered after 48 hours of $PGF_2\alpha$ treatment. Percentage of induced estrus were 66.6%, 86.6% and 60.0% in group I, II and III, respectively. Mean onset of induced estrus were 54.4 ± 7.6, 42.2 ± 6.6 and 47.4 ± 8.4 in group I, II and III, respectively. First service conception rate was 50.0%, 46.1% and 66.6% in group I, II and III, respectively. From this it may be concluded that Ovsynch protocol is giving fertility rate upon fixed-time breeding in estrus synchronized buffaloes at field level.

Key words: Estrus induction, Fertility, Buffaloes

INTRODUCTION

Artificial insemination(AI) made a significant contribution to genetic improvement in cattle has failed to do likewise in buffaloes due to the relatively low expression of estrus behaviour, difficulty in predicting the time of ovulation and long postpartum intervals. Therefore, increased rates of estrus detection would ideally increase pregnancy rates. Synchronization of estrus has been helpful in solving of these problems and can remove the neccessity of estrus detection thereby making it possible to provide AI in the predicted time. Ideally, protocols to synchronize estrus and ovulation in Buffaloes should be effective in both cyclic and non-cyclic animals and should yield high pregnancy rates to fixed-time AI (Neglia *et al.* 2003). The present investigation was carried out with the objective to evaluate the $PGF_2\alpha$, CIDR and Ovsynch treatments on estrus induction and fertility rate in buffaloes.

MATERIALS AND METHODS

The present study was conducted in forty five postpartum buffaloes owned by the rural women located in various villages of the Tiruvarur District, Tamilnadu from March 2003 to March 2005. Forty five buffaloes after 60 days of postpartum were equally divided into three groups, viz Group I, II and III. The group I [($PGF_2\alpha$) (n=15)] buffaloes were selected based on the rectal palpation of the corpus luteum(CL) in any one of the ovary and were treated with 25 mg of $PGF_2\alpha$ (5 ml lutalyse, Upjohn pharma) intramuscularly. The group II (CIDR) animals were selected on the basis of absence of palpable CL in any of the ovaries and they are treated with CIDR [(Controlled internal drug release device) (EAZI BREED CIDR TM, Inter Ag,

[1] Assistant Professor(s) Farmers at Training Centre, Tiruvarur, TANUVAS

Hamiltion, New Zealand)], intravaginally and removed after 9 days. Group III (Ovsynch) animals were selected at random and treated with 8 µg of GnRH analogue (2.0 ml Receptal, Unichem), intramuscularly. Six days later, 25 mg of $PGF_2\alpha$ administered intramuscularly. A second injection of GnRH analogue 8µg was administered after 48 hours of $PGF_2\alpha$ treatment. All the treated cows were observed for estrus signs. Rectal palpation was done at every 12 hrs to confirm oestrus. The intensity of estrus was studied and scored as described by Rao and Rao (1981) with slight modifications. The blood samples were collected on day 0 and 3, day 0, 6 and 9 and day 0, 9 and 11 in $PGF_2\alpha$, Ovsynch and CIDR treated animals respectively. The progesterone concentration in the serum was estimated using progesterone Radio Immuno Assay Kit (Coat a count, Diagnostic products corporation, USA) employing solid phase Radio Immuno Assay Technique.

RESULTS AND DISCUSSION

Statistical analysis (Table1) revealed that group II animals had significantly higher percentage (86.6%) of induced estrus than group I (66.6%) and III (60%). The results of the present study concurred with the results of Shrivastava *et al.* (1997) in buffalo cows treated with CIDR for 9 days. Similarly, percentage of induced estrus obtained in group III (60%) is higher than the earlier report of 41.66% of Ravikumar (2003). Among the three groups, comparatively lower rate of estrus induction in Ovsynch treated animals (group III) might be due to the fact that the effect of GnRH in animals with inactive ovaries depended on the stage when the follicular wave was arrested. Cows with static ovaries bearing follicles smaller than 8.5 mm may not respond to GnRH (Wiltbank *et al.*2002).

Statistically there was a significant difference in the mean time taken for the onset of estrus between groups I and II and I and III. But the reduced variability in the onset of estrus (24 to 72 hrs) in Ovsynch treated animals (GroupIII) was due to the presence of matured follicle in most of the buffaloes at the time of $PGF_2\alpha$ administration that resulted in the synchronous onset of oestrus. This result substantiate the fact that administration of GnRH 6 days prior to $PGF_2\alpha$ treatment improves the precision of estrus as reported by Pursley *et al.* (1995) in a similar study. Statistically there was no significant difference in the duration of induced estrus in all the groups as reported by Pawshe *et al.* (1991). Most buffaloes in the present study showed intermediate signs of estrus except those of CIDR treated (group II) in which most buffaloes showed intense estrus. This is concurred with the findings of Ravikumar (Loc.cit) in a similar study.

The animals included in this study were inseminated at 72 and 96, 48 and 72 hours after $PGF_2\alpha$ injection/CIDR removal in group I and II respectively and at 72 hours after $PGF_2\alpha$ injection in group III animals as suggested by Twagiramungu. *et al.* (1995).

The conception rate was significantly higher ($P<0.01$) in group III (66.6%) than group I (50%) and II (46.1%). The overall conception rate obtained in this study was similar to the results of Twagiramungu *et al.* (Loc.cit) and higher than the results of Ravikumar (Loc.cit) in a similar study.

Comparatively higher conception rate in group III (66.6%) might be due to the influence of GnRH analogue on follicular turnover and synchronized ovulation upon second GnRH injection in the Ovsynch protocol as suggested by Pursley *et al.* (1997) and Thatcher *et.al.* (1996). The lower conception rate obtained in group I and II was due to the very early onset of estrus in some animals, that is around 24 hours after the $PGF_2\alpha$ treatment / CIDR removal but these animals were inseminated only at 48 (or) 72 hours.

Progesterone assay revealed that the mean progesterone values (Table 2) showed an increasing trend from the day of treatment in group II and III. This might be due to the formation of accessory corpus luteum by GnRH administration in group III animals as reported by Schmitt *et.al.* (1995). In all the three groups the progesterone level attained lower level on the day of estrus in response to the administration of $PGF_2\alpha$. / CIDR removal.

Hence it may be concluded from this study that Ovsynch protocol is giving better fertility rate in estrus synchronized buffaloes upon fixed-time breeding compared to $PGF_2\alpha$ and CIDR treated animals at field level.

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Table 1: Distribution, duration of induced estrus and conception rate in different groups.

Groups	Percentage of Induced estrus %	Mean onset of Induced estrus	Distribution of onset of estrus (No. of animals)				Duration of estrum (Hrs)	Conception Rate %
			Hrs after $PGF_2\alpha$ injn/CIDR removal					
			0-24	24-48	48-72	72-96		
Grp I $PGF_2\alpha$	66.6^{b} (10)	$54.4^{b} \pm 7.6$	-	2	5	3	18.4±3.1	$50^{a}.0\%$
Grp II CIDR	86.6^{a} (13)	$42.2^{a} \pm 6.6$	4	8	1	-	20.4 ±6.2	$46^{a}.1\%$
Grp III Ovsynch	60.0^{b} (9)	47.4 ± 8.4	-	2	6	1	16.2±4.2	$66^{b}.6\%$

Table 2 : Mean progesterone concentration at different days of estrus synchronization treatment in postpartum buffaloes

Days of experiment	Progesterone Concentration (ng)		
	Group I $PGF_2\alpha$	Group II CIDR	Group III Ovsynch
0	-	$3.24^{b} \pm 1.2$	$3.74^{b} \pm 0.57$
6	$5.12^{b} \pm 0.78$	-	$5.01^{b} \pm 0.63$
9	$0.47^{a} \pm 0.14$	$4.82^{b} \pm 3.4$	$0.51^{a} \pm 0.12$
11	-	$0.98^{a} \pm 0.18$	-

Means bearing different superscript differ significantly ($P<0.01$)

* Day 6 is the day 0 in group I
** Day 9 is the day of estrus in group I and III
*** Day 11 is the day of estrus in group II

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