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Effect of Double dose PGF2α on Conception Rate in Repeat Breeding Dairy Animals under Field Conditions

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ABSTRACT

Repeat breeding is considered as one among the major reproductive disorder among dairy animals that hinders productivity. Incidence of repeat breeder cows in Haveri district is around 25 per cent. The present study aimed to determine the effect of double dose Prostaglandin F2α (PGF2α) at 11 days interval and GnRH injection at the time of artificial insemination (AI) on the conception rate of repeat breeding cows. Twenty repeat breeding HF crossbred cows selected randomly from field and divided into two groups. Group-I (n=10) animals inseminated during normal estrus cycle without any hormonal therapy and kept as control. Group-II (n=10) treated with two doses of 20 **µg** of PGF2α injection at 11d interval and at the time of artificial insemination treated with 0.02mg GnRH injection. Pregnancy diagnosis was performed per rectally at 45th to 60th day post insemination. The conception rate was significantly ($p<0.05$) higher in Group II cows (70 percent) when compared with conception rate of Group I cows (30 percent).90 percent of Group II cows have shown estrus within 48hrs. But only 60 per cent of untreated cows (Group I) showed estrus with in 48hrs.In conclusion double dose PGF2α with GnRH injection may serve as an excellent treatment for improvement of conception rate in repeat breeding cows under field conditions.

Key Words: Repeat breeding, Prostaglandin F2α, Artificial Insemination, Conception rate, Crossbred cows.

INTRODUCTION

Milk production enhancement along with decline in fertility has been observed in dairy animals in recent decades. The poor reproductive performance of dairy cattle has become a major challenge in dairy industry (Lucy, 2001 and Walsh *et al,* 2011). Fertility is the most complex measures of reproduction and it is influenced by genes and environment in dairy animals. These two components act synergistically and mask the contribution of the other factor like selection strategies for fertility, ultimately affecting reproductive performance (Beever, 2006).

Repeat breeder is defined as any cow that has not conceived after three or more services. It is a major reproductive disorder in dairy cattle and its incidence varies among different management systems, environment and regions. The culling rate of repeat breeder dairy cattle can be reduced by improving their conception rate through careful handling of genitalia during insemination to avoid acquired abnormalities, appropriate treatment of uterine infections, administering hormone therapy to improve fertilization success and lower embryonic mortality, and ensuring insemination of dairy cattle after proper clinical examination by a Veterinarian (Singh *et al,* 2017).

The causes of the repeat breeding are multifactorial. It may be due to inadequate estrous detection resulting in errors in timing of insemination in relation to the onset of standing estrus or insemination of cows not in estrus. Other potential factors include quality of semen and insemination technique (Morrell, 2006 and Gustafsson, 1998), uterine and/or cervical/vaginal infections, endocrine disorders, ovulation failures, obstructed oviducts, defective ova anatomical

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defects of the reproductive tract and early embryonic death. However, the specific causes of the repeat breeding are not clear. Since several factors affect the incidence of repeat breeding in dairy cows, it is difficult to make generalizations regarding predominant causes (Yusuf *et al*, 2010).

There is a failure of conception even in normal cyclic cows and this has led to an increase in calving interval and hence reduces the annual birth rate of calves (Tiwari *et al,* 2019). When the calving interval increases beyond the end of lactation, there is a sharp decrease in the milk yield but the investment in health, management, and feeding of such repeat breeding cattle still persists. The costs of herd management and rearing are increased due to the increment expenses on repeated unsuccessful artificial inseminations, culling costs and replacement of those animals that can't conceive. Hence this causes heavy economic losses to the livelihood of farmers (Savalia *et al,*2014 and Thangadurai *et al,* 2016).

Oestrous synchronization and artificial insemination (AI) can be used to maximize the reproductive potential of cows by incorporating superior germ plasm into their operations (Leitman *et al,* 2009).

In the present study, improving fertility of repeat breeding cows by administrating double dose PGF2α with GnRH in pleuriparous dairy cattle was carried out in Haveri district of Karnataka.

MATERIALS AND METHODS

Selection of repeat breeding cows for study

Cows which have normal or nearly normal oestrus cycles with apparently no palpable abnormalities of the reproductive tract but fail to conceive in three or more AI at an interval of around three weeks were selected randomly from different villages of Rattihalli and Hangal taluka for the present study.

Rectal Palpation Technique was applied for clinical examination of repeat breeding cows. The suspected repeat breeders were examined for any abnormalities like cystic ovary, persistence of Corpus Luteum (CL). The cows with 2 to 6 parity and the average milk production of 2500 to 3000 l/ lactation were preferred for the study. The animals were categorized on the basis of body condition score (BCS) in Holstein cows given by Ferguson *et al* (1994). BCS above 3 were selected for the trial.

A total of 20 repeat breeders HF crossbred cows were divided into two groups with 10each in first group (Group I) and second group (Group II).

Treatment Protocols

All the selected animals were dewormed with 3g Fenbendazole (Fentas Plus®)**and** fed with 40g chelated mineral mixture (Minfa Gold®) for one month. All selected repeat breeding cows were treated with 4g Cephalexin (Lixen®**) intrauterine to check the infection if present in any animals.** Group-I (n=10) animals kept as control, inseminated during normal estrus cycle without any hormonal therapy.Group-II (n=10) treated with double dose 20 **µg** Dinoprostone (Pragma®) at 11d intervals and injected with 0.02mg GnRH (Receptal®**) at the time of artificial insemination**. Animals were examined per rectum 45 to 60d post insemination for pregnancy status. Heat duration was also noted in all treated animals. All the data were statistically analyzed by SPSS 16.0 using Chi-Square test.

RESULTS AND DISCUSSION

Estrus was first detected at 72 hours after injection. The animals showed different signs of estrus, like swelling of the vulva, frequent mucus discharge, urination, bellowing, switching of tail, mounting and allowing to be mounted**.** Prostaglandin is a naturally occurring hormone that causes regression of the corpus luteum (luteolysis). Estrus returned within three to five days following injection of prostaglandin. Prostaglandin ameliorate uterine environment which will in turn reduce the possibility of the early embryonic deaths. Injecting GnRH at the time of artificial insemination will improve and increase the duration of luteinizing

Table1. Duration of heat signs in different group of cows.

Treatment	Up to 18-24 h	24-48 h	>48 h
Group I (n=10)	2 (20%)	4 (40%)	4 (40%)
Group II (n=10)	7(70%)	2 (20%)	1 (20%)

Table2.Number of animals conceived.

Treatment	No. of animals conceived	Conception rate (%)	Chi square value
Group I (n=10)	3	30[a]	$\chi 2 = 3.6$
Group II (n=10)	7	70[b]	(p=0.034)

Different superscripts in column (a,b) differ significantly ($p<0.05$)

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hormone secretion. Further it will facilitate ovulation which will improve the conception rate.

Duration of heat signs in different group of cows

In present study, 70 per cent of Group II cows given with PGF2α inj. have shown estrus within18-24h. But only20 per cent of untreated cows (Group I) showed estrus duration between 18-24h and 40 per cent cows showed estrus duration more than 48h. Therefore, results indicate double dose PGF2α brings the animals under estrus. These results were similar with shinde *et al* (2019) findings, they found 85 per cent of cows treated with double dose prostaglandins at 11 days apart have shown the estrus duration between 24-48h. These findings were in agreement with Mughal *et al* (1998) found that second dose of prostaglandin after 11 days of first dose decrease the time required for heat detection and also reduced abrupt estrus period.

Conception rate

The conception rate was significantly ($p<0.05$) higher in Group II cows given with double dose PGF2αinj (70.0%) cows compared to untreated Group I (30.0%) cows (Table 2) ($\chi 2= 4.5$, P = 0.034). These results were in coordination with shinde *et al* (2019) that conception rate was significantly ($p<0.05$) higher in double dose PGF2α treated group (75.0%) cows compared to control (30.0%) cows and elaborated that reason might be action of PGF2α in manipulation of reproductive cycle, involves regression of corpus luteum. Further, administration of GnRH 48–60h after prostaglandin advanced the timing of the LH surge and also advanced the timing of ovulationwhich will increase conception rate

Results were also similar with findings of Mohammadi *et al* (2019) who found that the combination of PGF2α and GnRH inj given animals showed significant increase in the conception rate (78 %) when compared with other groups. Karki *et al* (2018) found conception rate for the cows treated with double dose PGF2α was found to be 76% which was similar to present study. Vijayarajan *et al* (2009) reported conception rate of 56.0 per cent in double dose PGF2α treated repeat breeder cows. The increase in conception rate in the present study may be due to use of intrauterine antibiotic solution to counteract sub clinical reproductive infections.

Butani *et al* (2016) got conception rate 60 per cent which was lower compared to present study, reason might be treating repeat breeding cows with only GnRH inj at the time of AI and not with the PGF2α. Prostaglandin will regress the corpus luteum (luteolysis), decreases progesterone secretion which resulted in a return to estrus and also prostaglandin correct uterine milieu and increases the conception rate by preventing early embryonic mortality.

CONCLUSION

In repeat breeding cows, double dose PGF2alpha inj. with11 days interval and GnRHinj at the time of

AI increased the conception rate from 20 per cent (Untreated control) to 80 per cent. Double dose PGF2α protocol received cows showed the normal estrus period and it certainly correlated with higher conception rate in repeat breeding cows. Thus it can be concluded that double dose PGF2α protocol will result in increasing conception rate of repeat breeding cows under field condition.

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