Original Research

Fertility Status in Repeat Breeding Cows Treated with Various Treatment

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Rec. Date:	Dec 17, 2017 17:27
Accept Date:	Feb 20, 2018 15:42
DOI	10.5455/ijlr.20171217052745

Abstract

Present study was carried out on 40 repeat-breeding (RB) crossbred cows to assess the efficacy of a different treatment regimes on pregnancy rate. Cows were randomly assigned to four treatment groups. Group I cows (n = 10) were injected with 1500 IU of hCG at the time of AI, Group II cows (n = 10) were injected with 30 IU of oxytocin at the time of AI, Group III cows (n = 10) were treated with 30 ml of 10% Dextrose I/U two hours before the insemination and Group IV cows (n = 10) did not receive any treatment and served as control. Pregnancy status was diagnosed by uterine palpation at 45 to 60 days of post AI. Pregnancy rates, in group I to IV were 60%, 40%, 70% and 30% respectively. On average, cows treated with different protocols had higher pregnancy rate than control group. However, treatments with intra uterine Dextrose (10%, 30ml) showed higher pregnancy rate (70%) compared to treatment with in hCG (60%) and oxytocin (40%) in repeat breeder cows. Present study concludes that intra uterine flushing with Dextrose (10%, 30ml) two hours before AI showed higher pregnancy rate compared to other treatment regime indicating uterine environment highly determines reproductive efficiency of repeat breeding cow.

Key words: Artificial Insemination (AI), Dextrose (10%), hCG, Oxytocin, Pregnancy Rate, Repeat Breeding (RB) Cow

How to cite: Walikar, A., Honnappa, T., Habagonde, S., Empalli, P., & Shinde, S. (2018). Fertility Status in Repeat Breeding Cows Treated with Various Treatment. International Journal of Livestock Research, 8(7), 116-121. doi: 10.5455/ijlr.20171217052745

Introduction

Repeat breeding is one of the important reproductive disorders in dairy cattle and it results in higher economic losses in dairy herds (Katagiri, 2011). The incidences of repeat breeding have reported to vary from herd to herd and it ranges from 5% to 30% (Yusuf *et al*., 2010). The variable incidence may be attributed to the heterogeneity or multifactorial causes of RB syndrome and the effect of locality and season (Ali *et al*., 2009). Typical repeat breeding (RB) is defined as the animal that did not conceive after three or more consecutive inseminations, despite it comes normally in heat and shows clear estrous signs

with absence of any obvious pathological disorders in genital tract (Perkinson, 2009). Any deviation or prolongation in the breeding rhythm results in a progressive economic loss due to widening of calving interval, lactations loss, increasing culling followed by replacement cost, insemination cost and loosing genetic gain through increased generation interval (El-Khadrawy *et al*., 2011 and Osman-Ergene, 2012). The cause of repeat breeding had been attributed to number of factors including anovulation (Xu and Button, 1996), delayed ovulation (Gustafsson *et al.,* 1986) and low progesterone level in subsequent diestrus (Srivastava and Kharche, 2001). Uterine infection, ovarian pathology, early embryonic mortality and errors in estrus detection are also possible reasons for repeat breeding. Interestingly, deficiencies of coagulation factor IX (FIX) and deficiency of uridine-5-monophosphate synthase are hereditary disorders observed in many mammalian species with history of RB and cause intrauterine mortality thought gestation period (Gurgul *et al.,* 2009).

Low pregnancy rate in RB cow with delayed or anovulatory condition may be attributed to hormonal imbalance together with uterine infection. Consequently, many authors have used different hormones to treat RB cow to enhance the fertility rate. Likewise, hCG have been used to augment the inadequate function of corpus luteum in cattle (Eduvie and Seguin, 1981). It is reported that in the intact animals 2-4 minutes after A.I., administration of oxytocin causes uterine motility which helps in spermatozoa transportation in the genital tract. Intrauterine dextrose treatment in cows with clinical endometritis results in inhibition of bacterial growth locally, increase uterine tone by nurturing endometrial cells and resulted in quicker uterine recovery (Chirife *et al.,* 1983).

Hence in present study, efforts were made to enhance fertility in repeat breeding dairy cows by treating with human chorionic gonadotropin or oxytocin at the time of insemination and 10% dextrose 2 hours before the insemination.

Materials and Methods

Climate and Selection of Experimental Animals

The study was conducted at the Karnataka Veterinary Animal and Fisheries Sciences University and University of Agricultural Sciences, Dairy farm-Bangalore from January to April 2013. Geographically, Bangalore located 12.97^0 North latitude and 77.56^0 East latitude at an altitude of 914.4 meter above the mean sea level located on the Deccan Plateau in the south-eastern part of Karnataka. A total of 40 healthy cyclic crossbred (Friesian x Jersey) repeat breeder cows were selected randomly. Cows that were cycling normally with no clinical abnormalities and failed to conceive after at least three successive inseminations were selected. Age of these cows was ranged from 3 to 10 years and their lactation number varied from 1 to 7. These cows were divided into four groups with 10 cows in each group. Normalcy of genitalia of all

 DOI 10.5455/ijlr.20171217052745

the animals was confirmed through rectal palpation. These all 40 animals were maintained under the same routine feeding and management conditions of the farm.

Treatment and Post Treatment Monitoring

The selected cows were randomly divided into four groups (I to IV) of ten animals in each group. Group I cows were administered with 1500 IU of hCG (Intervet, India Pvt. Limited) intramuscularly at the time of insemination. Group II cows were administered with 30 IU of oxytocin (Evatocin^{R}, Neon Lab) intramuscularly at the time of insemination. Group III cows were infused with 30ml of 10% Dextrose I/U 2 hour before the insemination and the Group IV cows were served as control and did not receive any treatment and double artificial insemination was performed at 6 to 12 hours of interval. Animals were examined per rectum 45 to 60 days post insemination for pregnancy status and data was statistically analysed by using two way ANOVA and Chi-Square test.

Results and Discussion

Present study revealed a significant improvement in pregnancy rate among repeat breeding cows. The overall Pregnancy rate in treatment and control group was 56.67 % and 30.00 per cent respectively which is significantly higher. The pregnancy rates from group I to IV were 60.00, 40.00, 70.00 and 30.00 per cent respectively (Table 1). A maximum of 70.00 % conception rate was obtained in Group-III cows infused with 30ml of 10% Dextrose I/U two hours before the insemination.

Table 1: Conception rate in treated and control groups repeat breeding cows

Group	Treatment	No. of Cows	No. of Cows Pregnant	Conception Rate (%)	Overall Pregnancy Rate
I	hCG 1500IU I/M	10	06	60	56.67^{a}
II	Oxytocin 30IU I/M	10	04	40	
III	10%Dextrose 30 ml I/U	10	07	70	
IV	Untreated Control	10	03	30	30^{a}
X^2 value at 3 $_{d.f}$				20.00**	

Mean with different superscripts in a row (a, b) differ significantly (p<0.05).

Human chorionic gonadotropin (hCG) is the most commonly used exogenous gonadotrophin for treatment of RB in cows. hCG being having LH like activity when treated during insemination, induces ovulation and later leads to fertilization. hCG is a very important treatment option in RB cow with delayed ovulation or anovulation. It has been reported that, treatment of cows with hCG on 5th day post insemination induces development of accessory CL and indirectly helps in achieving higher levels of progesterone for at least 2 weeks (Walton *et al.,* 1990). It has been hypothesized that exogenous dose of hCG enhances embryonic development and suppresses luteolysis ultimately resulting in reduced

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embryonic loss (Peters *et al.,* 1992). In present study, conception rate of 60.00% was observed in cows treated with hCG which is in accordance with the observations of Srivastava and Ahlawat (1998) and Simon (1977) who reported 70 and 57.90% conception rate in repeat breeder Holstein Friesian cows respectively.

Oxytocin is a nanopeptide hormone secreted from posterior pituitary. Oxytocin is now a day's used to increase conception rate in several species as it improves the sperm transport in the female reproductive tract. Some studies have shown that clitoral massage probably releases oxytocin following artificial insemination and it is shown to enhance chances of pregnancy in cows. In present study, in Group-II repeat breeding cows 40.00 per cent conception rate was obtained when treated with 30 IU of oxytocin intramuscularly at the time of insemination. Similarly, it is reported that conception rate in repeat breeder cow was improved with oxytocin administration on 4 and 5 hour post insemination (80%) as compared to that of control animals (20%) (Mahto *et al.,* 2008). Similarly, Gumen *et al.* (2011) observed 31.10 % conception rate in normal lactating cows treated with oxytocin at the time of insemination which is in accordance with the present study.

Several studies on bacteriology and histology of the uterus concluded that the non-specific genital infection is one of the main causes of RB Syndrome and it can be eliminated by intrauterine flushing with sugar solution. Uterine flushing with sugar solution has shown to inhibit bacterial growth locally, increase uterine tone by nurturing of endometrial cells and ultimately results in quicker uterine recovery (Chirife *et al.,* 1983). In Group-III repeat breeding cows 70.00% conception rate was obtained after infusion with 30ml of 10% Dextrose I/U two hours before the insemination. An improvement in conception rate following infusion of 50% dextrose intrauterine to clinical cases of endometritis was previously reported (Brick, 2011). Further, Gorohv (1962) reported 100 per cent conception rate in repeat breeding cows after irrigation of uterus with sugar solution prior to insemination. In Group-IV repeat breeding cows 30.00% conception rate was obtained with double insemination t 6-12 hour interval without any treatment. Similarly, Iftikhar *et al.,* (2009) reported 37.5% conception rate in repeat breeding crossbred cows which did not receive any treatment and it is slightly higher than the observations found in the present study. The probable reason for difference may be attributed to breed type, age and reproductive parameters.

Conclusion

The overall pregnancy rate in treatment (56.67%) groups was higher compared to control (30.00%) group. The conception rate to first AI in repeat breeding group of cows from I to IV were 60.00, 40.00, 70.00 and 30.00 per cent respectively. A maximum of 70.00 % conception rate was obtained in Group-III (30ml of 10% Dextrose I/U 2 Hours before the insemination). The present study concludes that intra uterine infusion of dextrose could improve uterine environment and enhance conception rate in repeat breeding

DOI 10.5455/ijlr.20171217052745

cows when administered before insemination. This treatment protocol is economical compared to other hormonal treatments and it can be easily adopted under field conditions.

Acknowledgement

Authors are thankful to Dean, Veterinary College Bangalore for providing facilities during thesis research. Also we are thankful to farm workers who have co-operated during my course of work.

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DOI 10.5455/ijlr.20171217052745