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Efficacy of GnRH treatment in repeat breeder cattle

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Abstract

A study was conducted to evaluate the efficacy of GnRH treatment in repeat breeder cattle as single dose at the time of AI (T-1), single dose after 12 days of AI (T-2) and two doses, both at the time of AI and 12 days after AI(T-3) as compared to the no treatment group (T-4). Out of 158 animals screened, 32 healthy animals in the age group of 6 to 8 years with atleast 2 to 3 calvings were selected. Repeat breeder animals with history of more than three services were selected and White side test (for subclinical infection) was performed on the day of estrus to rule out any subclinical infection. GnRH [6] injection (Gynarich, 2.5 mL, i/m) was administered in the study. Blood samples were collected on day of insemination, day 12th, day 20th and day 40th for assay of progesterone to ascertain pregnancy. The highest conception rate was observed in T-1 group (75%) followed by T-3% (62%) with T-2 and T-4 showing same conception rates (37.5%). The study revealed that single dose of GnRH at the time of AI is best and economical to treat the repeat breeder syndrome in cattle.

Highlights: Single dose of GnRH at the time of AI is economical for treating repeat breeder cattle.

Keywords: Artificial Insemination (AI), Repeat breeder, GnRH (Gonadotrophin releasing hormone)

1. Introduction

India is the highest milk producer in the world with 209 M.T. of milk being produced in year 2020-21, from 302.3 million bovines (Economic survey, 2021-22). Agriculture and allied sector contributes 20% of the total GDP and the dairy sector contributes more than 25% of this. The dairy sector contributes more than 5% of the GDP (Economic survey,21-22). For profitable the dairy farming the animal should calve regularly at an interval of 12 months and animal which fails to conceive after several inseminations are a source of economic loss. One of the major constraints of profitable dairy farming was low conception rate, which made such animals to be a liability (Alam and Ghosh, 1994; Mehedi, 2002, Sarder, 2008) [1].

“Repeat breeders” are the sub fertile animals, without any anatomical defects or infections of reproductive tract, which exhibit normal or nearly normal estrous cycle and estrus period and has been bred thrice or more times to a fully fertile bull, but still fail to conceive and come to heat (Roberts, 1971; Levine, 1999) [3]. Reproductive disorders such as repeat breeding can lead to economic losses in terms of reduced fertility, low life time production, longer service period, longer calving interval and increased culling in dairy cows.

There are several potential causes of repeat breeding, including fertilization failure (29 to 41%), embryonic mortality (21 to 35%), defective luteal secretion of progesterone and other hormonal imbalances, errors in heat detection, various defects in sperm or egg function, and nutritional imbalances (Kim *et al.*, 2007) [2]. The two major causes are the fertilization failure and early embryonic death.

Losses incurred due to repeat breeding in Indian condition ranged between Rs 2,902.32 to Rs 3,101.70 per cycle. Value of milk losses from repeat breeding was estimated to be Rs. 366 million per year in north-eastern states alone (Paul, Chandel, & Ray, 2013) [4]. Repeat breeding remains the biggest problem of the dairy industry. Therefore, the present study in repeat breeder cattle was undertaken with the objectives to; Study the efficacy of GnRH injection on different days in repeat breeder cattle and to find out the economy of GnRH treatment in repeat breeder cattle.

2. Material and Methods

The present study was conducted during year 2017-18 at the different State Veterinary Institutes and different dairy farms of Bidar district of Karnataka state.

158 healthy animals in the age group of 6 to 8 years with atleast 2 to 3 calvings, with history of more than three services were selected for screening to which white side test was performed on the day of estrus. Only the animals with negative results of white side test were inseminated. GnRH [6] injection (Gynarich, 2.5mL, i/m) was given immediately after the insemination. Blood samples were collected on day of insemination, day 12th, day 20th and day 40th. Follow up was done upto third cycle (if animal does not conceive). Totally 32 cattle were divided into four groups randomly and were assigned to different treatments randomly as following; Group I (T-I) 08 animals were injected with 2.5mL Gynarich (Buserelin acetate) intramuscularly immediately after insemination. Group II (T-II) 08 animals were injected with 2.5mL Gynarich (Buserelin acetate) intramuscularly on 12th day after AI. Group III (T-III) 08 animals were administered with double dose of Gynarich (Buserelin acetate), one at the time of estrous and another on 12th day after AI @ 2.5mL intramuscularly. Group IV(T-IV, Control group) 08 animals were inseminated normally without any hormonal injections when presented for AI. The animals were followed up to three cycles after treatment and were re-inseminated.

3. Statistical analysis

The data was analyzed by standard statistical procedures as

described by Snedecor and Cochran (1987). ANOVA was performed for statistical analysis of the data by using SAS software.

4. Results

The highest conception rate was observed in T-1 group (75%) followed by T-3%(62%) with T-2 and T-4 showing same conception rates (37.5%). The study revealed that single dose of GnRH at the time of AI is best and economical to treat the repeat breeder syndrome in cattle, Single GnRH treatment was most economical treatment of repeat breeder cattle, as one dose of GnRH (Rs. 125/-) can save costs (Rs. 2500-2700/-) incurred on the repeated cycle.

5. Discussion

The above results shows that it was economical to treat the animal with repeat breeder syndrome by injecting 2.5ml GnRH at the time of AI as it helps in reducing the Early embryonic mortality by helping in maintaining the required progesterone level by means of an accessory corpus leuteum. The accessory CL helps in inhibiting the early embryonic death and also helps in correcting the hormonal imbalances and deficiencies of progesterone hormone at the time of nedation and early embryonic development.

Table 1: Showing results as % of animals conceived after receiving different treatment protocol

| Group | No. of animals treated on day 0 | No. of animals conceived before follow-up cycle | Follow-up cycle | | | | | | Total no. of conception | Total % of conception |
|-------|---------------------------------|---|--|----|-----|--|----|-----|-------------------------|-----------------------|
| | | | No. of animals inseminated in follow up cycles | | | No. of animals conceived in follow up cycles | | | | |
| | | | I | II | III | I | II | III | | |
| T-IV | 8 | 2 | 6 | 5 | 5 | 1 | - | - | 3/8 | 37.5 |
| T-I | 8 | 6 | 2 | 2 | 2 | - | - | - | 6/8 | 75 |
| T-II | 8 | 2 | 6 | 6 | 5 | - | 1 | - | 3/8 | 37.5 |
| T-III | 8 | 3 | 4 | 3 | 3 | 1 | - | - | 5/8 | 62.5 |

Note: T-I (single dose of GnRH at the time of AI), T-II (single GnRH at 12th day after AI), T-III (Double dose, one after AI and another 12th day of AI), T-IV (no GnRH, control group)

6. Conclusion

The study revealed that the GnRH treatment on the day of AI (conception rate of 75%) was most effective in the improving conception rate of repeat breeder cattle followed by the double GnRH treatment (conception rate of 62.5%).

Whereas GnRH on 12th day was not effective in improving CR. Single GnRH treatment was most economical treatment of repeat breeder cattle, as one dose of GnRH (Rs. 125/-) can save costs (Rs. 2500-2700/-) incurred on the repeated cycle.

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