

Therapy of Human Chorionic Gonadotropin (hCG) Hormone in Dairy Cattles that Have Repeat Breeder on Pregnancy Rate in Tulungagung, East Java, Indonesia

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Therapy of Human Chorionic Gonadotropin (hCG) Hormone in Dairy Cattles that Have Repeat Breeder on Pregnancy Rate in Tulungagung, East Java, Indonesia

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Abstract

This study aimed to prove that giving hCG injection at the time of artificial insemination and five days after artificial insemination in dairy cows with repeat breeder can cause pregnancy. This study employed 30 dairy cows with repeat breeder. All samples of dairy cows were divided into two treatments, P1 using hCG at a dose of 100 IU given intramuscularly at the time of artificial insemination and P2 using hCG at a dose of 100 IU intramuscularly given five days after artificial insemination. The results were analyzed using the Chi-Square test. Analysis using Chi-Square showed that all treatment caused pregnancy (100%). In summary, hCG injection at the time of artificial insemination and five days after artificial insemination in dairy cows experiencing repeat breeding can cause pregnancy.

Keywords: Artificial Insemination, Dairy Cows, hCG, Pregnancy, Repeat Breeder

Introduction

Most of the dairy cows kept in Indonesia are FH cows, the production of FH cow milk can be increased, among others, by increasing reproductive efficiency^{1,2,3}. Reproductive efficiency is very important for raising dairy cows. Reproductive efficiency is also a parameter that shows the ability of livestock to become pregnant and produce offspring⁴.

Low reproductive efficiency in dairy cows indicates reproductive problems, one of which is repeat breeder with cases of ovulation failure on day 21 and cases of implantation failure on day 28. Cows that experience repeat breeders are generally characterized by long calving intervals (18-24 months), low conception rates (<40%), and high service per conception (>3)^{5,6,7}.

Repeat breeder is the occurrence of female cows that are mated more than 2 times and do not experience pregnancy with an average age of 3-7 years who have

given birth with the cow healthy, sexually mature, normal lust cycle and not experiencing pregnancy⁸. The factors that cause repeat breeders are fertilization failure and early embryo death⁹. KUD Tani Wilis is one of the largest KUDs in Indonesia with good management in managing the business/main unit of dairy cows. In 2018, there was the latest data from the Reproductive Engineering Assistant (ATR) in the KUD Tani Wilis, the number of repeat breeder cases was 20%, a decrease of 10% from the previous year, which means that there were 1,385 cows that experienced repeat breeders or around 115 cows per month. The high number of repeat breeders that occurs in the KUD Tani Wilis area can cause losses to breeders. Therefore, in this study continued the handling of these reproductive disorders, namely repeat breeders with cases of ovulation failure on day 21 and cases of implantation failure on day 28, by administering the hormone human chorionic gonadotropin (hCG) at IB and five days after AI, to treat ovulation failure. on day 21 and failure of implantation on day 28 in order

to cause pregnancy events in the KUD Tani Wilis area, Tulungagung, East Java, Indonesia.

Method

Materials

This study used a sample of 30 female Friesian Holstein (FH) dairy cows with an average age of 3-7 years who have had children. The cows are healthy, sexually mature, normal short and long lust cycles, do not experience pregnancy, 15 cows as treatment during artificial insemination with cases of ovulation failure on day 21 and 15 as treatment five days after artificial insemination with cases of implantation failure on day 28. Treatment using the hCG hormone which is injected intramuscularly at a dose of 100 IU 1 mL/head/im.

Selection of FH Cows

Selection of cows in lust, reproducing actively and not experiencing pregnancy. Cows in the 2nd AI (repeat breeder) who still show symptoms in the normal heat cycle with cases of ovulation failure on day 21 and cases of implantation failure on day 28.

Artificial Insemination (AI)

Artificial insemination is carried out on cows that have repeated heat breeder using a straw owned by the inseminator, namely the Friesian Holstein cow. Insemination is carried out once after a dairy cow is in heat.

Treatment

Cows that experience repeat breeder will be given hCG hormone at a dose of 100 IU 1 mL/head/im to cows that have repeat breeders. The cows will be divided into two groups P1 and P2, each group consisting of 15 FH cows. Group P1 was injected with 100 IU hCG 1 mL/head/im at the time of artificial insemination with cases of ovulation failure on day 21 and group P2 was injected with 100 IU hCG 1 mL/head/im at five days after artificial insemination with cases of failure of implantation on day 28.

Pregnancy Examination

Pregnancy examinations are carried out by inseminator officers who have PKB certificates and veterinarians on duty at KUD Tani Wilis, Tulungagung, East Java, Indonesia. PKB will be carried out 90 days after IB, the goal is that the enlarged uterine cornua containing placental fluid is palpable and prevents miscarriage.

Data Analysis

The data obtained were tabulated, to analyze the incidence of pregnancy the Chi-Square test was presented.

Results and Discussion

This study was conducted to determine the success of giving the hCG hormone during artificial insemination and five days after artificial insemination given to FH dairy cows with repeat breeder with cases of ovulation failure on day 21 and cases of implantation failure on day 28 at KUD Tani Wilis, Kabupaten Tulungagung. The samples were divided into 2 types of treatment, namely 15 FH dairy cows that were treated with the hCG hormone injection during artificial insemination and 15 FH dairy cows which were given the hCG hormone injection treatment five days after artificial insemination.

The incidence of pregnancy in FH dairy cows that experienced repeat breeder cases and were injected with the hCG hormone at the time after artificial insemination and five days after artificial insemination by rectal palpation method examination can be shown in Table 1 below.

Table 1. Percentage of Pregnancy in Friesian Holstein (FH) Dairy Cows with Repeat Breeder that has been Injected with the hCG Hormone.

Treatment	N	Pregnancy (%)
P1	15	15 (100%)
P2	15	15 (100%)

Note:

P1: Administration of the hCG hormone when IB 100 IU 1mL/head/im.

P2: Administration of the hCG hormone for five days after IB 100 IU 1 mL/head/im.

¹⁰ The results of the test using the Chi-Square 2x2

show that the Chi-Square test cannot be done because pregnancy is constant. This is because the first treatment and the second treatment showed a rate of 100% at the time of pregnancy examination. From these results, it shows that the hCG hormone can increase the incidence of pregnancy in dairy cows that experience repeat breeders.

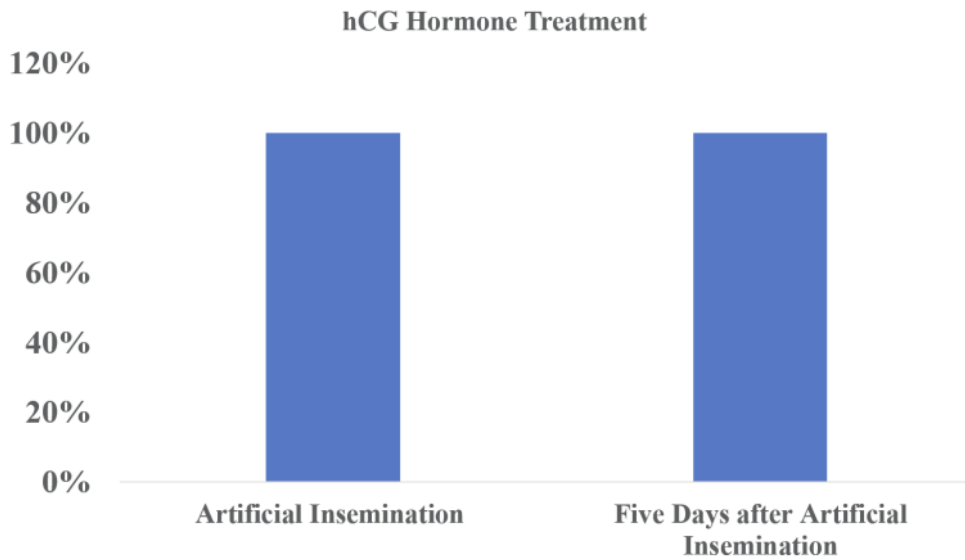


Figure 1. Pregnancy diagram of FH Dairy Cows experiencing repeat breeders who have been injected with the hCG hormone.

In the 21st day case, Fertilization failure is the main factor causing repeat breeder, Fertilization failure factors include anatomical abnormalities of the reproductive tract, ovulation abnormalities, abnormal sperm, abnormal egg cells and reproductive mismanagement including factors that can cause fertilization failure^{10,11}. Ovulation abnormalities can be caused by ovulation failure due to hormonal disorders where there is a lack or failure of the release of the LH hormone¹². In the case of repeat breeders, failure to ovulate on day 21 often occurs in the dry season with a delay in ovulation time due to the influence of heat and weather. The administration of the hCG hormone during IB aims to meet the needs of the LH hormone in ovulation disorders and ensure the ovulation process so that there is no repeat breeder in

cases of ovulation failure and also the hCG hormone given in cases of delayed ovulation in order to induce ovulation at the right time so that pregnancy occurs.

In the case of day 28, embryo mortality indicates the death of a fertile embryo until the end of implantation, which is 40 days, factors from premature embryo death include lactation which can be related to ineffective defense mechanisms of the uterus, stress during lactation and imperfect endometrial regeneration Environmental factors can also result in the mother when her body temperature increases, the factor imbalance of the hormones estrogen and progesterone can also cause premature embryo death¹³.The occurrence of early embryonic death is marked by an extension of the cycle

of lust after the last IB. The adverse effects of lactation on embryo development are thought to be related to hormonal imbalances during lactation, particularly the hormone progesterone on embryo life in the uterus. High milk production can cause the embryo in the uterus to not get enough food for its development, besides that the involution process of the uterus that is not yet complete after giving birth is also one of the causes of embryo death during lactation, the uterine wall during the implantation process so that it is easy to die of the embryo¹⁴. In repeat breeder cases with failed implantation on day 28, the most cases occurred because of mild infections or subclinical endometritis which made the uterine temperature uncomfortable, therefore hCG hormone was given to keep the growth of the corpus luteum growing and accelerate the growth of the corpus luteum to produce progesterone, the hormone progesterone functions to maintain pregnancy and prevents contractions in the uterus and the fetus does not abort^{15,16}. The administration of the hCG hormone at five days after IB aims to increase the level of hCG in the blood. On days 5 to 9 after insemination, the concentration of interferon- τ was increased. Interferon- τ causes the endometrium to suppress PGF 2α so that the corpus luteum is not regressed.

Both P1 and P2 treatments are 100% pregnant, this can be caused by several factors such as the right time of insemination, good farmer knowledge of the incidence of lust, good feed management and good cage hygiene management. Understanding livestock management and optimal breeding techniques, including fulfilling the nutritional needs of sterile labor, can maintain fertility. Pregnancy rate can be influenced by the quality and handling of semen, female fertility, time of mating, detection of estrus, and insemination techniques^{17,18,19}. The increase in the incidence of pregnancy obtained is influenced by the increase in the concentration of progesterone. The reduced concentration of progesterone in the blood can affect embryo development.

Conclusion

Based on the results obtained, the administration of

the hCG hormone during artificial insemination and five days after AI in FH dairy cows that experienced repeat breeder short normal heat cycles (21 days) and long normal heat cycles (28 days) caused pregnancy.

Conflict of Interest: The author declare that they have no conflict of interest.

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Ethical Approval: The study approved by the Faculty of Veterinary Medicine, Universitas Airlangga, Surabaya, Indonesia.

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