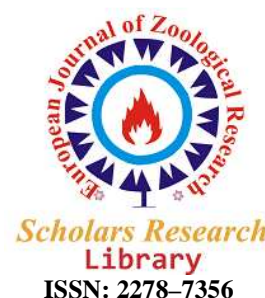




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Evaluation of fertility rate due to CIDR + Heat synch treatment method in anestrus dairy cows

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ABSTRACT

Reproduction is one of the most important issues in the dairy farms. So, there are some standards to reach the ideal production. In this survey we aimed to evaluate the combined treatment method of "CIDR+ heat synch" in the dairy anoestrus cows. In present study, which carried out in a dairy farm, we selected 150 anestrus cows that had same body condition. Then, cows were divided into the 3 groups of 50. Cows of group1 received 5ml gonadorelin. Cows of group 2 received CIDR on day 0; CIDR was removed on day7 and after 24-hours received 0.5ml estradiol benzoate. Cows of group3 received CIDR on day 0 concomitant with 5ml gonadorelin, 7days later, CIDR was removed and were received 3ml prostaglandin at the same time and after 24 hours were received 0.5ml estradiol. At the end, whole cows were underwent artificial insemination. Finally, conception and pregnancy rate were recorded and analysed statistically. Results showed that the fertility rate was 44.44%, 35.7% and 40.9% in group1, 2 and 3, respectively. Statistical analysis showed that there was significant difference between groups1 and 2 also between groups1 and 3 ($p<0.01$) from estrous point of view. From fertility rate aspect, there was no significant difference between groups. Our results showed that estrous rate was better in CIDR than gonadorelin, but there was no difference between these methods fertility rate. Thus, we can conclude that use of CIDR is better than gonadorelin.

Keywords: Pregnancy, Estrous, CIDR, Gonadorelin, Artificial Insemination, Cow.

INTRODUCTION

Infertility in cows is one of the common disorders in the animal husbandry in the world and especially in Iran, which causes significant damages to the farmers due to killing of the animals. Indeed, in all countries, fertility is affected because of genetic selection since fertility and milking are like two sides of a balance(2).

Fertility used for cow indicates tendency and power of mating, fertility and growth of fetus and finally power of leaving healthy calve and fetus membranes (3).

Reproduction in dairy cows is important. For this reason special standards have been defined for ideal reproduction on dairy cows. It can be referred to interval of calving (365 days), normal days (85 days), fertility level (% 50-55) and insemination per fertility (1.8-2). In order to achieve these standards different hormone therapies are employed (11). Researchers estimated that in any time interval, 10% of the suffering cows encounter with disorder in reproduction. In a study conducted in Kansas (USA) 22% of the cows were omitted due to reproduction disorder. Low production was the second reason for omitting of the cows (5). Leech et al., (1960) found that 3.7% of the cows were omitted

due to reduction of fertility. Different factors cause to infertility and anestrus in the cows (10). It can be referred to management, reproduction system functions, anatomic and genetic factors that management factors play an important role (11).

Several therapies have been employed in order to improve fertility such as hormones like progesterone in CIDR and PRID forms and administration form (4). Gonadorelin is offered in concentration of 10 and 20 ml with commercial names of vetarolin, sinarolin and gonadorelin. Researchers administered progesterone daily for estrous control and ovulation for the first time and gradually it was improved and finally CIDR was proposed for different application (12).

True anoestrus is one of the main challenges leading to imbalance in these standards in the high productive dairy cows and cows with insufficient nutrition (2). Different therapies have been proposed for treatment in dairy cows. This article tries to investigate fertility level resulted from CIDR + heat synch therapy and offer propositions for veterinarians and managers of the farms.

MATERIALS AND METHODS

Drugs

Gonadorelin is synthetic form of hormone GnRH and imitates this hormone function. As before said releasing hormone gonadotrophin is secreted from hypothalamus and exerts effect on pituitary by binding to of mediated gonadotrope specific cell and increase intracellular calcium that causes to production and secretion of luteinizing hormone and follicular stimulating hormone.

Cloprostenol: Cloprostenol is synthetic form of PGF_{2α} and involves its all functions. This hormone quickly causes to decomposition of active luteinizing and rapid decline in progesterone. This luteinizing property of PGF_{2α} leads to a new follicular growth and back to estrus and normal ovulation.

CIDR: A piece of plastic containing a 1.9 g of progesterone prepared by Aboureihan pharmaceutical company was applied by a special applicator into the vagina. Progesterone is secreted by the luteum and it is necessary for continuity of pregnancy. Progesterone controls the action of FSH and prevents follicular development and ovulation.

Estradiol benzoate: Estradiol benzoate causes to onset of estrus symptoms in females as well as growth of the uterus, breast, cervical mucus increase, expansion of the cervix and increase the sensitivity of the uterus to respond to oxytocin.

Methods: This study was conducted in a farm with 1000 dairy milch cows in the North West part of East Azerbaijan and north of Shabestar located on the temperate climate with cold winters and hot and arid summers. All cows were from Holstein and held in open shield system with feeding system of TMR and cows were fed by Feeder. The food used for feeding consists of forage and concentrate that forage includes alfalfa and maize, and corn, barley, soybean meal, cottonseed meal, fish meal, fat powder, bran, vitamin supplements, minerals and other additives are concentrated. Milking is done three times in day and night by average production of 30+1. In this farm, heavy pregnant cows are held in special boxes and they are transferred to close up boxes fifteen days before delivery and then they are transferred to delivery room and examined by the herd veterinarian weakly. Thirty days after delivery they are also examined. In the mentioned farm inoculation is done by fixed inoculators with frozen sperm and the cow is tested for pregnancy by sonography in 30th day. In this farm, 150 anestrus healthy cows with similar production and body status were randomly divided into 3 groups each with 50 cows.

Group one: the cows received gonadorelin 5 ml as treatment. Group two: in day zero CIDR were implanted and after 7 days CIDR were removed and they received estradiol benzoate 0.5 ml, 24 hours later. In group three cows at zero-day CIDR was placed and simultaneously received gonadorelin 5 ml and after 7 days the CIDR was removed and simultaneously cows received prostaglandin 3 ml and after 24 h the mentioned cows received estradiol 0.5 ml. All studied cows were inoculated one week after end of the last treatment after observation of estrus. Finally, all estrus and inoculated cows and level of fertility resulted from inoculation were investigated.

RESULTS

In the first group 50 cows were injected gonadorolin (vetaroline) 5 ml. Eighteen cows were estrous after fourteen days. These estrus cows were inoculated artificially and after 30 days using ultrasound 8 cows were diagnosed pregnant and 10 cows healthy by fertility rate %44 and the mean of inoculation in this group is %2.25 respectively.

In the second group 50 anestrus cows were treated by CIDR. Forty two cows were estrous after fourteen days. These estrus cows were inoculated artificially and after 30 days using ultrasound 15 cows were diagnosed pregnant and 27 cows healthy by fertility rate %35.7 and the mean of inoculation in this group is %2.8 respectively.

In the third group 50 cows were treated by CIDR +Heat synch. Forty four cows were estrous after fourteen days. These estrus cows were inoculated artificially and after 30 days using ultrasound 18 cows were diagnosed pregnant and 26 cows healthy by fertility rate 40.9% and the mean of inoculation per fertility in this group was 2.44%.

Table 1: Number of estrus cows and fertility rate in the three studied groups

Group	No of treated Cows	No of estrous cows	No of pregnant cows	No of non-pregnant cows	Fertility rate (%)
1	50	18	8	10	44.44
2	50	42	15	27	35.7
3	50	44	18	26	40.9

The results were analyzed by Instat statistical software with chi-square statistics. The results of this analysis showed that the difference between estrous in the anestrus cows treated with gonadorolin (group one) and anestrus cows treated with CIDR (group two) is significant ($p < 0.01$). The difference between estrous in the anestrus cows treated with gonadorolin (group one) and anestrus cows treated with CIDR + Heat synch (group three) is significant ($p < 0.01$). The difference between the estrous in the anestrus cows treated with CIDR (group two) and anestrus cows treated with CIDR + Heat synch (group two) is not significant ($p = 0.77$).

There was no significant difference between fertility in anestrus cows treated by gonadorolin (group one) and anestrus cows treated with CIDR (group two) ($p = 0.31$). Difference between fertility in anestrus cows treated with gonadorolin (group one) and anestrus cows treated with CIDR + heat synch (group three) ($p = 0.77$) was not significant. There was no significant difference between fertility in anestrus cows treated by CIDR (group two) and anestrus cows treated with CIDR+ Heat synch (group three) ($p = 0.56$).

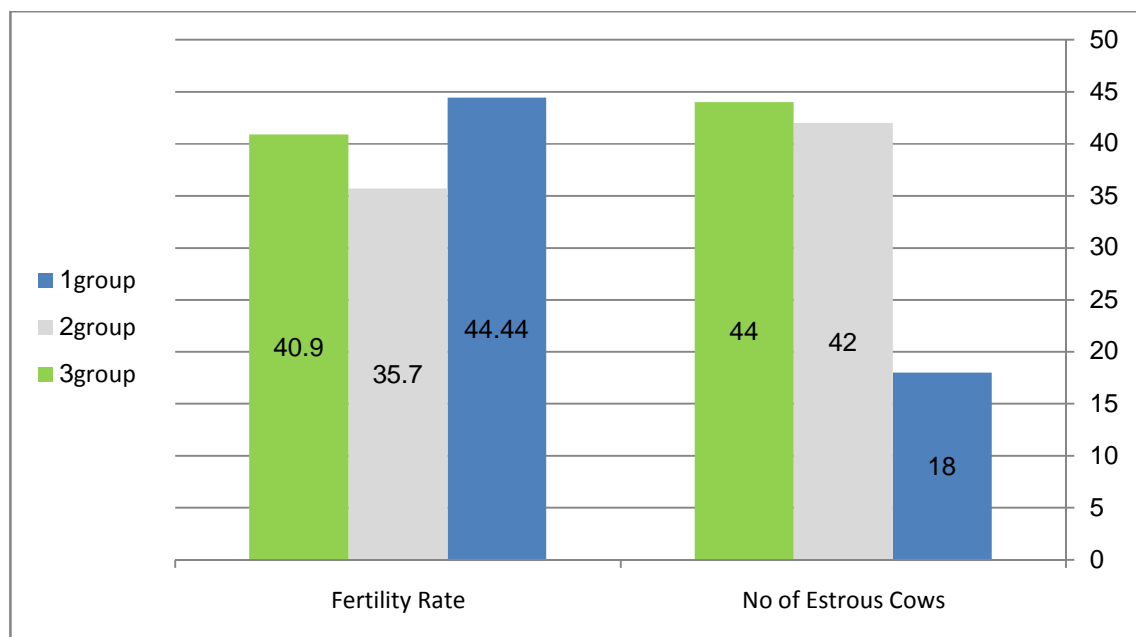


Figure 1: Comparison of estrous cows and their fertility rate in the three studied groups

There was significant difference in inoculation in each fertility in anestrus cows treated by gonadorelin (group one) and anestrus cows treated with CIDR (group two). Difference in inoculation in each fertility in anestrus cows treated with gonadorelin (group one) and anestrus cows treated with CIDR + heat synch (group three) was significant. There was a significant difference in inoculation in each fertility in anestrus cows treated by CIDR (group two) and anestrus cows treated with CIDR+ Heat synch (group three).

DISCUSSION

Negative energy balance resulted from high milk production rate and other causes in post calving period cause that the cow could not meet its needs and suffer anestrus (6). Negative energy balance causes to reduction of blood glucose and IGF-1 level and suppression of LH and reduction of dominant follicle diameter and size. Negative energy balance also leads to reducing BCS and weight loss and as a consequence anestrus (11). In this state GnRH secretion from the hypothalamus is suppressed and gonadotropin (FSH, LH) hormones are not released. Thus, the dominant follicle could not grow enough and when systemic IGF-1 is reduced it causes to adhesion within the follicle (13). All these factors lead to inability of dominant follicular in secretion of sufficient estradiol and as a result anestrus in the animal. Also, estradiol production is not enough to reach the peak and positive feedback effect on the secretion of GnRH and LH release. So, the dominant follicle does not ovulate. When a CIDR is injected in the vagina of the cow progesterone in CIDR is absorbed from vaginal into circulation and as a result progesterone level is increased enough and exerts negative feedback effect on the secretion of GnRH from the hypothalamus and releasing FSH and LH from the anterior pituitary. Thus, FSH and LH secretion is stopped and these hormones are reserved in the anterior pituitary. With the removal of CIDR vaginal hormone progesterone is reduced within 6 hours and reaches to the concentration of the base and as a consequence the negative feedback effect is removed on the upper nerve centers. Therefore GnRH is secreted and release of LH and FSH begins that leads to follicular growth and formation of dominant follicular and its secretion activity (7). Administration of estradiol benzoate causes to LH peak to do ovulation. In a study the CIDR treatment and GnRH was compared with CIDR and estradiol benzoate. It is stated that ultrasonography has significant effect on diagnosis of symptoms of estrus after CIDR removal. The level of appearance of symptoms in this study is acceptable compared to similar researches in Newzeland and other countries and also the level of fertility is completely acceptable compared to published reports (14).

In the USA researchers studied 371 cows in Florida and 331 cows in Texas and they synchronized the cows with intramuscularly injection of 25mg PGF2 α . Their method was based on a GnRH injection of 10 mg on day zero after 7 days in cows treated with a dose of PGF2 α injection. After PGF2 α injection in the first method, the cows received GnRH after 48 hours. The treated cows were inseminated 16-24 hours after the last injection. In the second method after injection of PGF2 α they were injected ECP 1mg IM, after 24 hours PGF2 α injection and finally they were inseminated after 48 hours. In Florida fertility rate was 37.1 ± 5.8 with Ovo synch and it was the 35.1 ± 5 in Heat synch. It was found that the fertility rate of the Ovo synch method is more than Heat synch but in Texas, fertility rate in Ovo synch was 28.2 ± 3.6 and and it was 29 ± 3.5 in Heat synch respectively (8, 9).

In the second experiment estrus and time of ovulation in dairy cows and estrus synchronization protocols were implemented and evaluated. Estrous was repeated 75.7 and 86.5 after ECP respectively estrus was observed after 28 ± 1.8 hours. It was advice that every estrus cow after 24 h after injection of ECP should be inseminated until 24 hours and all remaining anestrus cows should be inseminated until 48 hours. Since, 75 of ovulation is done in interval of 48 hours to 72 hours after ECP.

The other method to fertilize of the cows is Ovo synch method. So that at day zero a dose equivalent to 5 ml gonadorelin is injected in anestrus animal 7 days later the treated animal receives 3ml PGF2 α gets. Then 48 hours later 5 ml gonadorelin is injected 16 hours after the last injection the treated animal is inoculated. This method was applied in 2004 by Islampour in 5 farms on 50 dairy cows with fertility rate of 36%.

Alternatively, CIDR is also used that at zero day each cow receives a dose gonadorelin 5ml and concurrently CIDR is placed in the vagina, 7 days later cloperosontol 3ml is injected simultaneously CIDR is removed from vaginal and 48 hours after the last injection without seeing signs of estrus the cows are inseminated (2). This method was employed synchronously with the research by Heat synch on 50 dairy cows by Ali Mohammdi and he obtained 40 fertility (1). By comparison of the results of this research with other researches it can be inferred that the fertility level of Heat synch is high relative to ovulation synchronizing with Ovo synch and CIDR.

CONCLUSION

The results of this research showed that estrous level of anestrous cows is better in CIDR than using gonadorelin but there is no difference between applications of CIDR with gonadorelin. It is concluded that using CIDR for treatment of anestrous cows is better than using gonadorelin. Also, the results showed that anestrous cows treated by CIDR(group two) and CIDR+Heat synch(group three) do not show significant difference from estrous and fertility level; so, CIDR method is cost effective and needs to less time relative to CIDR+Heat synch.

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