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Investigation of Reproduction Rate In 3 Treatment Methods of Anestrous Ewes of Breading Season

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ABSTRACT

Background: Reproduction is important in sheep herds. Relatively short term of ewe pregnancy as compared with cow allow to pregnant two times in a year. Handling of luteal phase or follicular phase of estrous cycle is necessary for estrous synchronization. **Objective:** To investigate reproduction rate in anestrous ewes out of breading season (April-May) we used CIDR and PMSG treatment methods. **Results:** Ninety healthy anestrous sheep (60 days after parturition) studied with same age, weight, twin birth history, body status and production. All of sheep are flushing 14 days before and 14 days after treatment. Then the sheep divided to three groups randomly: The first group of sheep: it is prescribed 400 unit (ecG)PMSG hormone to every sheep. In the second group (ecG)CIDR was used in day zero, CIDR has removed at 14th day and prescribed 400 unit PMSG hormone. Third group was received CIDR at day zero and prescribed 1ml cloprocentol (PGF2α) and removed CIDR in 14th day and prescribed 400 unit (ecG)PMSG simultaneously. The results of this study showed that estrous rate of anestrous ewes is better when used CIDR (group2, 3) instead of PMSG, but fertility rate was not different between groups. **Conclusion:** Our data indicated that the second and third treatment groups of anestrous ewes didn't show significant difference in view of estrous rate and fertility rate. Therefore, the second group method is more cost effective than third group. So use of CIDR to treat of anestrous ewes is better than usage of PMSG.

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INTRODUCTION

Assisted reproduction technologies was used increasingly in animal sciences to develop power of animal husbandry (Hashemi *et al*., 2006). Using of these technologies help to increase sheep reproduction. In female goats and ewes, there is more chance to control corpus luteum stage, because the period is longer and animal is more sensitive to treatments (Evans and Robinson, 1980).

Used the strategies that make longer luteal phase by progesterone with external source or can make shorter this phase by premature analyze of corpus luteum(Bilodeau-Goeseels and Kastelic, 2003). The useful techniques not only must make strong estrous but must provide acceptable level of fertility after natural mating (Cognie *et al*., 2003, Hashemi *et al*., 2006). This case performs after usage of Gonadotropins when these conditions present. Estrous synchronization can be base for artificial insemination and embryo transfer programs (Hashemi *et al*., 2006). The ewes have ability to response to handling in reproduction activities process that is due to their seasonal breading trait and multiple ovulations. Relatively short term of ewe pregnancy as compared with cow allow to pregnant two times in a year. Handling of luteal phase or follicular phase of estrous cycle is necessary for estrous synchronization(Gordon, 2004). The results of this study was indicated that it can be plan insemination of livestock by estrous synchronization that decrease time of estrous diagnostics and decrease reproduction season and was classified animals to suitable delivery models. Robinson described usage of natural and artificial intravaginal progesterone compounds along with gonadotropin for ewe mating and then this method used widely in research and commercial herds (Laster and Glimp, 1974). One of the methods that cause slow absorption of progesterone in mucous tissue is intravaginal suppositories like CIDR. This method was

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performed in Newzealand and other world countries' sheep frequently. CIDR was produced from elastic silicon and contains natural progesterone when it is removed, there was not purulent excretion like in sponge.

According to studies the effect of ram caused to GnRH excretion and then FSH, LH discharge and finally ovulation (Laster and Glimp, 1974). In Peri Alp Il-Defrance ewes, off cycle difference increased temporarily at spring. If there is a ram in herd, estrous behavior induced in ewes. So there is two breading season in these strains and when LH prescribed to anestrous ewes in summer, follicles grew and discharge estradiol (Robertson, 1980).

Methodology:

Consumed drugs: Cloprostenol: The drug form was 20ml Cloprostenol vial that made in Abureyhan Pharmacy. Cloprostenol is synthetic form of PGF2α and have all of its effects. This hormone accelerate analyse of corpus luteum and decreased progesterone fast. Luteolitic trait of PGF2α resulted in grow new follicle and returning to estrous state with natural breading.

Sheep CIDR: CIDR is a tool composed of rubber silicon impregnated with natural progesterone. When CIDR placed in vagina, it released regular rate of progesterone that will be absorbed by vagina wall and enters to blood. Sheep CIDR contains 230 mg natural progesterone and placed into vagina by applicator.

PMSG: Pregnant mare serum gonadotrophin with commercial name of Pregnecol is a glycoprotein that is soluble in water with acidic pH and rich of Sialic acid that is discharge from endometrial layer of mare womb between 40-100 days of pregnancy. Its new name is equine chorionic Gonadotrophin (ecg). Activity of PMSG is the same as FSH hormone and some of its functions are like to LH hormone. PMSG function is inducing of follicle growth and activity of corpus luteum.

In fact PMSG induce the follicle growth and increase ovulation rate .this drug is made in Australia and it is in Lyophilized powder 6000 units form that filled with 30 ml of solvent.

Method: Present research investigated out of breading season (April-May) in one of the Shal sheep herds with 500 heads in Zanjan (40 kilometers far from ghidar).

Ninety heads anestrous healthy sheep with concerning the age, weight and twin birth history was selected. They have similar production and body status and passed 60 days from their delivery. All of sheep were flushing for 14 days before the treatment and 14 days after the treatment and also we take Albendazole antiparasitic syrup (Albendazole). Then the sheep divided to 3 groups (30 heads in every group) randomly:

The first group of ewes: 14 days after flushing, every one of the sheep received 400 IU (ecG)PMSG. The second group of ewes: 14 days after flushing, the CIDR placed at day zero and removed at 14^{th} day and received concurrently 400 IU (ecG)PMSG at same day.

The third group of ewes: 14 days after flushing, CIDR placed at day zero and injected 1ml cloprostenol (PGF2α) at 13^{th} day and at 14^{th} day CIDR was removed and 400 IU (ecG)PMSG injected at same day.

Immediately after treatmen, 18 heads of marked teaser ram enter to herd and estrous ewes are mating naturally for one week. Time of estrous with registered number of estrous ewe was noted to determine the estrous rate in each group. Also we investigate fertility rate of mating ewes. One month after ramming, all of treatment ewes check up with ultrasound system and determined pregnancy rate in every group. To estimate the percentage of pregnancy, counts of pregnant ewes divided by counts of ewes in mating time.

Results:

The results of this study showed that in the group1: number of estrous ewes one week after treatment were 10 heads and they are breading and rammed naturally and after 30 days their pregnancy diagnosed by ultrasound system that 8 heads were pregnant and two of them weren't and the fertility rate was 80 percent.

In the group2: Number of estrous ewes one week after treatment were 25 heads that they rammed and after 30 days their pregnancy diagnosed by ultrasound system that 22 heads were pregnant and three of them weren't pregnant and the fertility rate was 88 percent.

In the group3: number of estrous ewes one week after treatment were 27 heads that they rammed and after 30 days their pregnancy diagnosed by ultrasound system that 24 heads were pregnant and three of them weren't pregnant and the fertility rate was 88.88 percent.

The results analyzed statically and showed that there is significant difference between estrus in first group and second group and also there is significant difference between first group and third group. There isn't any significance difference between second group and third group of ewes.

There isn't any significance difference between the fertility rate in first group of ewes and second one. There isn't any significance difference between the fertility rate in first group of ewes and third group.

There isn't any significance difference between the fertility rate in second group of ewes and third group.

Table 1: results of estrous sheep and fertility level in the three studied groups

Group	No. of treated	No of estrous	No of pregnant	No of non-pregnant	Percent of fertility rate
1	30	10	8	2	80
2	30	25	22	3	88
3	30	27	24	3	88.88

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Discussion:

Nowadays, for sheep fertility out of breading season, CIDR used, especially in Newzealand. This tool made from medical saturated silicon elastomers with progesterone. There are different types of them in ruminants such as S-CIDR and G-CIDR (Inter Ag, Hamilton, Newzeland), the later type is used more to days (Jabbar *et al*., 1994, Laster and Glimp, 1974).

During current decade performed many studies about usage of CIDR and intravaginal sponge to make fertility out of breading season. In spite of dependence of these methods to strain, species, assessment treatments, management and breeding systems, the estrus response and reproduction is widely different (Laster and Glimp, 1974, Moor, 1982, Wildeus, 2000).

According to a study, 80 heads Sanjabi ewes in age of 2 to 5 years old investigated, they produced last year and have lambs and they were lactate, divided to four groups (3 treatment groups and a control group), late of April (anestrous season) CIDR was inserted to three treatment groups. CIDR was allocated 10, 12 and 14 days in ewes vagina and then after removed from their body and all of treatment groups situated along with a healthy ram. Twenty four hours after removal of CIDRS, GnRH (100 microgram/IV) was injected to half of above groups of ewes. Estrous rate in control group was 10% and in the three treatment groups were 95, 75 and 85 percent, respectively. There is a quite significant difference between three groups that used CIDR as compared with control group ($p\leq0.01$) but there wasn't significant difference in estrous rate between three treatment groups ($p\geq0.05$), and pregnancy rate in GnRH received groups was significantly higher than control one ($p<0.05$). Also there was no significant difference between pregnancy rate in groups that was not receive GnRH and control group ($p\geq0.05$). General result showed that use of CIDR to accession estrous in non-breading season for 10, 12 and 14 days is accompanying with suitable estrous and usage of GnRH in have a suitable effect on reproduction (Hashemi *et al*., 2006). Our results showed that usage of CIDR result to increasing of estrous. Robertson (1980) and MacNatty (1988) reported that the most estrous rate is 36 h after treatment with progesterone –PMSG and most ovulation rate is about 27h after initiating of estrous, and their results in consistent with the current research results (Macnatty K. P. *et al*., 1988, Robertson, 1980). In a research, three methods of estrous synchronization examined by implanted progesterone under the ear and intravaginal progesterone (CIDR or sponge) for 14 days with 400 IU, PMSG hormone at the end of treatment (progestron removal) and all of sheep mate naturally 54h after end of ramming. Estrous rate in treatment groups with sponge, CIDR and norgestomet were 78, 65 and 71 percent, respectively and fertility in that groups (in out season reproduction) was respectively 17, 18 and 10 percent. Our results indicated that the fertility by CIDR is more than the other two methods and we used CIDR in this research for 14 days. In another study, 69 Zandi ewes divided randomly to three groups: the first group fed in free grazing and the two other groups fed manually in corral. For estrous synchronization, in vagina of three groups ewes CIDR was used for 13 days and after removal of CIDR inject 400 IU PMSG to first group and one of the groups that fed manually. Then introduce two Zandi ram to every group. Estrous rate in first, second and third groups were 100, 87 and 96 percent, respectively and there is significant difference between first and third group with second group. Delivery in first, second and third group were 91, 83 and 87 percent, respectively and these differences was not significant.

Twin birth in first, second and third group were 29, 37 and 15 percent, respectively and there is significant difference statically. The results of current study showed that usage of PMSG has resulted to decrease period of delivery season and production of uniform lambs in view of weight and age and decreased probability of disease and loss. Also, use of hormones to induce ovulation as compared with conventional methods (flushing) increased twin birth (Zarkawi *et al*., 1999). According to a study on Avasi ewes in Syria on April demonstrated that 82 percent of ewes after removal of impregnated sponge with progesterone showed estrous signs after 36-48 hours (Zarkawi *et al*., 1999). These differences due to breading season and type of tools used to synchronize the estrous, because the estrous in synchronization of livestock in breading season is faster than out of season breading. CIDR performance is better than sponge method because CIDR has natural progesterone (Fukui *et al*., 1999). Nonetheless, some of references confirmed the better performance of artificial progesterone. According to another study that used CIDR on Safulak ewes in breading season, all of ewes showed sign of estrous after 20-25 hours after removing of CIDR (Fukui *et al*., 1999). In a study on Merinus ewes, delivery percentage difference was with usage of 3 methods of estrous synchronization: Medroxy progesterone acetate (MPA), FluoRogeston Acetate (FGA) and CIDR was not significant. Production rate for MPA, FGA and CIDR were 64.6, 72.1 and 71,7 percent, respectively (Hill *et al*., 1998). In given study, low production rate is due to artificial insemination, because the fertilty in result of insemination with frozen sperm is lower (about 20%) than the natural breading.

Conclusion:

The results of this study showed that estrous rate in anestrous ewes with use of CIDR (group 2 and 3) was better than PMSG method (first group) but there was not any difference between 3 groups in view of fertility rate. So we concluded that use of CIDR to treat the anestrous ewes is better than PMSG method. Also these results presents that anestrous ewes of second and third groups showed that there was no significant difference

in view of estrous rate and reproduction rate. Therefore, method of the second group is cost effective as compared with the third group method.

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