2011 International Conference on Asia Agriculture and Animal
IPCBEE vol.13(2011) © (2011)IACSIT Press, Singapore

Comparison of Estrus Synchronization by PGF2α, CIDR and Sponge with PMSG in Kalkuhi Ewes on Early Anestrous Season

Jafar Yadi[1] [+], Mehran Farhoudi Moghaddam[2], Saeed Khalajzadeh[1], Amir Ali Solati[1]

[1] Department of Veterinary, Saveh Branch, Islamic Azad University, Saveh, Iran

[2] Department of Veterinary, Karaj Branch, Islamic Azad University, Karaj, Iran

Abstract. The present study aims at finding the best synchronization method in early anoestrous season in ewes. The study was performed on 60 Kalkuhi ewes. Fifteen Kalkuhi rams were also used in the study. The ewes were randomly divided into 3 equal groups. In group A intra vaginal sponge (Spongovet/ Hipra) containing 60 mg of MPA was left in the vagina for 14 days. In group B intra vaginal CIDR (Pfizer) was left for 12 days. Immediately after removal of the Sponge and CIDR, PMSG hormone at the doses of 500 IU was administered intramuscularly in both groups. Group C received two injections of prostaglandin (Lutalyse 3 cc) 11 days apart. After the treatment, 5 fertile rams were released among each group for 4 days. This practice was then repeated after 15 days to detect the estrus ewes. The percentage of gestation of the ewes in all groups was then recorded to compare the effect of the treatments. The results showed that while %45 of the ewes (9/20) in group A and %35 (7/20) in group B were gestated, the statistic for group C was %70 (14/20). Moreover, only one ewe in groups A and B (approximately %11) had twining. The twining rate in group C was %42 with 6 ewes having twining. Another finding of the study is that the numbers of lambing in groups were 10, 9 and 21 respectively. These included 7 females in group A. The female lambs in groups B and C were 2 and 12 respectively. The maximum pregnancy and parturition in group B was observed in ewe lambs. However, maximum pregnancy and parturition in group A was observed in 3rd and 4th parturient ewes and in group C no difference was observed between groups parturient ewes. The study suggests that in transitional period from estrus to anestrous, synchronization with PG yields better results than other methods in Kalkuhi ewes.

Keywords: Synchronization, sponge, anoestrous, pregnancy, lambing

1. Introduction

Sheep are polyestrous animals dependent on seasons in terms of features of breeding (11, 20). Breeding season of sheep shows regional changes. The breeding estrus term in Turkey is the end of summer and months of fall, when daytime begins to shorten and sunlight begins to reduce its effectiveness. When circumstances of seasons are kept in view, the best suitable time for servicing and mating is the period from October to December (20). To increase fertility in sheep and thus to benefit more from facilities, melatonin, PGF2α and progestogens are used to stimulate and synchronize estrus. Progestogens can be used alone or with FSH and PMSG (11). Alaçam et al. (2) have shown that the ovarian activity in sheep, which are in breeding season and in anestrus term, can be initiated at a rate of 80% following application of vaginal sponges containing progesterone. Their study also suggested that application of PMSG can be effective to initiate the estrus earlier than in control animals after the sponges were taken out. Some researchers (1, 16, 19) reported that using different doses of FGA given intravaginally and PMSG administered via injection to ewes in the breeding season varies the extents of estrus and pregnancy rates. Miljkovic et al. (19) reported that estrus and pregnancy occurred in 90% and 85% of animals, respectively. Ainsworth and Wolynetz (1) and Langford (16) have obtained pregnancy rates of 98% and estrus of 76%. Following the application of

[+] Corresponding author. Tel.: + 98 9123602531; fax: +98 2144234456.
E-mail address: Jafaryadi@ iau-saveh.ac.ir

intra-vaginal sponges containing 30-40 mg of FGA for 12-14 d, administration of 500 IU of PMSG to the sheep in mating season resulted in ratios of estrus and pregnancy of 80% and 95% (14), respectively. Langford et al. (17) reported 87% estrus rates after administration of 500 IU of PMSG in sheep treated in mating season with 40 mg of FGA in order to synchronize estrus, compared to the estrus rate of 48% in the control group. Intramuscular administration of 400 IU and 500-700 IU of PMSG at day when intravaginally applied sponges were removed increased the ratio of ovulation and twinning (4, 9). According to some studies (13, 21), it is suggested that there are differences in terms of pregnancy period between sheep treated with progestagen-PMSG and sheep used as control. There is no information regarding synchronization efficiency and fertility induced by administration of hormones in Kalkluhi ewes during anoestrous season. This issue requires further researche as the PMSG+FGA treatment in Kalkluhi ewes during breeding season could be different. Thus, the purpose of this study was to investigate the influences of intravaginally applied FGA and intramuscular injection of different doses of PMSG on pregnancy period, pregnancy rate, and estrus synchronization in Kalkluhi.

2. Material and Methods

The study was conducted in the Research Animal Farm in Saveh University during early anoestrous season. The study was performed on 60 Kalkuhi healthy ewes, and 15 rams, 2-5 years old .The animals that were medium sized, weighing between 35 to 50 kg, were tagged for identification, housed in well ventilated stalls and fed 1 kg hay and 0.5 kg concentrate ration twice a day. Water was also provided twice a day. The ewes were randomly divided into 3 equal groups. For each ewe in group A an intravaginal sponge, containing 60 mg of MAP was left in the vagina for 14 days. In the ewes in group B CIDR (Pfizer) was left intravaginally for 12 days. Immediately after removal of the sponge and CIDR, PMSG hormone at the doses of 500 IU was administered intramuscularly in both groups. Group C received two injections of prostaglandin (Lutalyse 3 cc) 11 days apart. After the treatment, 5 fertile rams were released among each group for 4 days. This practice was then repeated after 15 days to detect the estrus ewes. The raw data was fed into Microsoft excel-2003 spreadsheet for descriptive statistics and analysis of variance was performed. The ANOVA test was used with a confidence interval of 95% and $p \leq 0.05$ was considered to be significantly different.

3. Results

The percentage of gestation of the ewes in all groups was then recorded to compare the effect of the treatments (Fig. 1). As Fig. 1 shows, while %45 and %35 of the ewes in group A and B were gestated respectively, the statistic for group C was %70 (P≤0/05). Moreover, only one ewe in each of the groups A and B had twining (approximately %11). The twining rate in the group C was %42 with 6 ewes having twining. Another finding of the study is that the number of lambing in groups were 10, 9 and 21 respectively. Of these, 7 lambs were female in group A. Female lambs in groups B and C were 2 and 12 respectively.

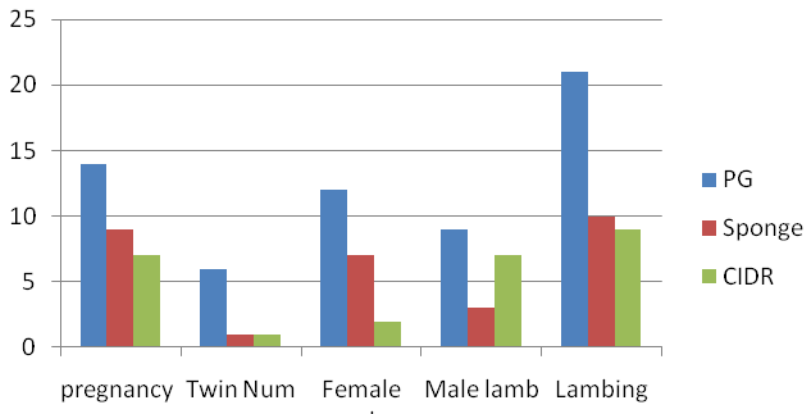

Fig. 1: Reproduction index

The maximum pregnancy and parturition in group B was observed in ewe lambs. While the maximum pregnancy and parturition in group A was observed in 3rd and 4th parturient ewes, there was no difference between parturition in group C (Fig. 2).

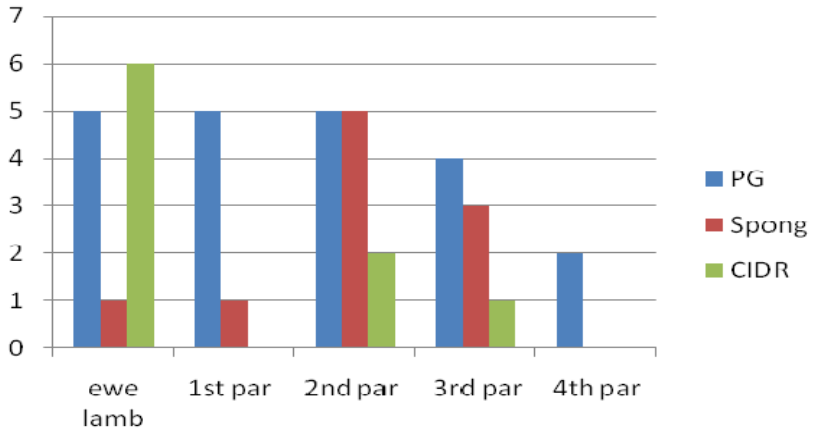

Fig. 2: Reproduction index according the parity

The study showed that percentage of pregnancy and twining in PG group was better than the other groups (Table 1).

Table3. Pregnancy and twining

Group	% Pregnancy	%Twining
PG	70	42
Sponge	45	11
CIDR	35	14

4. Discussion

Progestogens and PGF 2α or their analogues are generally used in order to condense parturition and estrus of the ewes in the breeding season. Hormones such as GnRH, PMSG, FSH, and LH may be used to increase pregnancy rate and number of lambs (20). Injection of 500 IU of PMSG following the treatment of ewes in the breeding season with vaginal sponges containing 30-40 mg of FGA resulted in 90% and 85% estrus and conception rates, respectively (19). Pregnancy rates in ewes receiving the same dose of PMSG and FGA were higher than in the controls, but there was not significant effect on estrus rate (6). The conception rate was comparable to those reported by Miljkovic et al. (19). The different reproductive performance may be associated with using animals of different breeds and age, nutritional factors or type of insemination. In the present study, the percentages of estrus and pregnancy rate in group C (PG) was better than the other groups. The estrus response rate was similar to the findings of the previous studies by Krajınovic et al. (15), Gokcen et al. (7), and Domıngues Fdez-Tejerina et al. (5) where the animals were treated with same dose of PMSG and FGA. Pregnancy rate was also similar to that reported by Horoz et al. (13). Whereas the pregnancy rate was lower than that reporeted by Krajınovıc et al. (15), it was higher than that reported by Dominguez Fdez-Tajerina et al. (5) and Gokçen et al. (7). This discrepancy in the results reported by different researchers on pregnancy and estrus response rate can be explained by the differences in body condition, breed, and management systems. It was reported that percentage of estrus and pregnancy rates in ewes treated with 30 mg of Cronolone (FGA) + 700 IU of PMSG were 90% and 76.4% respectively (23).On the other hand, in ewes treated with 40 mg of FGA+750 IU of PMSG the percentage of estrus and pregnancy rates were 100% and 96%, respectively (10). It is also reported that the ewes exhibit estrus within 5 d after treatment with 60 mg of MAP+750 IU of PMSG (7, 10). Pregnancy rate was in the study was in agreement with that observed by Gulyuz and Kozat (10), but higher than that found by Fukuı et al. (7). The conception rate in group C was higher than that in groups A and B ($P<0.05$) and the group A enjoyed a higher

conception rate than that in group B (P<0.05). Pregnancy rate in ewes receiving PG was higher than other groups. However, estrous response in this study did not differ significantly between control and treated groups. These results were in agreement with those reported by Zeleke et al. (24) and Dumitrescu et al. (6). It was pointed out that administration of PG increases the number of follicles and therefore raises the twinning and triplet rates (10). Toteda et al. (22) reported 1.66 and 1.11 the mean litter size in ewes treated with 400 IU PMSG and the control group, respectively. Cruz et al. (4) demonstrated that there was a difference between the group treated with 300 IU of PMSG (2.1) and the control group (1.63) in mean litter size. Horoz et al. (13), on the other hand, observed no significant difference between the control group (1.43) and the group treated with 600 IU of PMSG (1.44). In the present study however, mean litter size in group A was higher than that in group B (P<0.05). Regarding the effect of administering PMSG on litter size, these results are consistent with those reported by some researchers (4, 22). The mean litter size obtained in group B was in agreement with that reported by Zeleke et al. (24). As for the control group, the mean litter size was very similar to the results obtained by Toteda et al. (22), but lower than the that reportede by Cruz et al. (4) and Horoz et al. (13). Safranski et al. (21) reported that pregnancy period in control ewes and ewes treated with melengesterol acetate (MGA) + PG-600 (400 IU of PMSG+200 IU of HCG) was 163.8±4.9 and 157.2±2.8 d, respectively. Horoz et al. (13) reported that gestation period in control Kivircik ewes and those treated with medroxyprogesteron+PMSG was 164±12.03 and 155±7.33 d, respectively. Average pregnancy period in ewes treated with FGA+ PMSG was reported as 147.53 (ranging from 144 to 152 d) (5). In ewes inseminated in breeding season, the pre4gnancy period was 145±0.31 d (18). It was seen that with regard to gestation period there were significant differences between the treated (P<0.05). These results are consistent with the results of some other studies (13, 21), but, seem to be higher than those reported by Domingues Fdez-Tajerina et al. (5) and Mekonnen et al. (18). In conclusion, administration of progestogens (FGA), using intravaginal sponges and PMSG to Kalkuhi ewes in the breeding season appear to be effective in the synchronization of estrus and parturition and in increasing mean litter size and pregnancy rate but in anestrus season PG is more effective than sponge and CIDR.

5. References

[1] Ainsworth L., Wolynetz M.S.: Synchronization of estrus and reproductive performance of ewes treated with synthetic progestogens administered by subcutaneous ear implant or by intravaginal sponge pessary. J Anim Sci 1982, 54, 1120-1127.

[2] Alacam E., Guler M., Dinc D.A., Eroz S., Sezer A.N.: Control of ovarium functions in ewes at late anestrous season by medroxyprogesteron acetate (MAP) and PMSG hormones. U U J Faculty Vet Med 1986, 5-6,103-110.314

[3] Crosby T.F., Boland M.P., Gordon I.: Field trials in fixed time sheep AI in Ireland. Anim Breed Abstr 1984, 52, 5834.

[4] Cruz D.G., De La Castaneda M.J., Rocha C.G.: Effects of estrus synchronization by means of FGA-impregnated sponges on the fertility and prolificacy of partly housed pelibuey ewes. Anim Breed Abstr 1991, 59, 1052.

[5] Domingues Fdez-Tejerina J.C., Miro-Roig J., Carbajo Rudea M.: Induction and synchronization of estrus during seasonal anestrus in improved Ripollesa ewes by means of FGA-impregnated vaginal sponges and PMSG injections. Anim Breed Abstr 1991, 59, 1797.

[6] Dumitrescu I., Stoica A., Culea C., Ristea P.: Induction of estrus in ewes treated with synthetic hormones. Anim. Breed Abstr 1985, 53, 7605.

[7] Fukui Y., Sotto W.L., Ono H.: Synchronization of estrus and ovulation in ewes by means of a progestin treatment combined with either PMSG or PGF2α. . Japn J Anim Reprod. 1983, 29, 48-53.

[8] Gokcen H., Unal E.F., Tumen H., Nak D.: Investigation on the oestrous induction synchronization and the fertility of ewes during anestrous and breeding season. UU J Faculty Vet Med 1992, 2, 71-79.

[9] Gonzalez Lopez, J., Espejo Diaz, M., Serrano Garrido, A., Alvarez Martinez, J.: Increasing lambing frequency by means of techniques for controlling the oestrous cycle in Merino and MerinoXRomanov ewes. Anim Breed Abstr 1987, 55, 5038.

[10] Gulyuz F., Kozat S. : Synchronization of oestrous in sheep and the effect of PMSG dose on lambs number. YY U J Faculty Vet Med 1995, 6, 64-66.

[11] Hafez E.S.E.: Reproductive cycles. In : Reproduction in Farm Animals. Hafez E.S.E (Ed), Lea & Febiger, Philadelphia. 1993, pp. 94-113.

[12] Hayran M., Ozdemir O.: Computer statistics and medicine. Physicians Publishing unity, Ankara, 1996, pp. 320-355.

[13] Horoz H., Kasikci G., Ak K., Aklan S., Sonmez C.: Controlling the breeding season using melatonin and progestagen in Kivircik ewes. Turk J Vet Anim Sci 2003, 27, 301-305.

[14] Kasztelan R.: Estrus synchronization in Polish Lowland ewes during the breeding season. Anim Breed Abstr 1987, 55, 5034.

[15] Krajinovic M., Stancic B., Naq E.: Fertility of ewes treated with PMSG and vaginal sponges containing progesterone (during the breeding season). Anim Breed Abstr 1985, 53, 1405.

[16] Langford G.A.: Influence of PMSG and time of artificial insemination on fertility of progestogen-treated sheep in confinement. J Anim Sci 1982, 54, 1205-1211.

[17] Langford G.A., Marcus G.J., Batra T.R.: Seasonal effects of PMSG and number of inseminations on fertility of progestagen-treated sheep. J Anim Sci 1983, 57, 307- 312.

[18] Mekonnen G., Boland M.P., Crosby T.F., Haynes N.B.: Fertility in rams following chronic GnRH treatment or exposure to different photoperiods. Anim Breed Abstr 1990, 58, 2792.

[19] Miljkovic V., Petrujkic T., Vujosevic J., Mrvos P., Mihajlovksi P., Predojevic M., Naumov N., Tanev D., Stanojevic T., Jovanovic V.: Contemporary aspects of physiology of reproduction and artificial insemination in small ruminants. Vet Glas 1989, 43, 875-882.

[20] Monika P.: Ovine reproduction. In: Compendium of animals reproduction. Monika P. (Ed), İntervetInternational. B.V. Holand, 2001, pp. 125-145.

[21] Safranski T.J., Lamberson W.R., Keisler D.H.: Use of melengesterol acetate and gonadotropins to induce fertile estrus in seasonally anestrous ewes. J Anim Sci 1992, 70, 2935-2941.

[22] Toteda F., Facciolongo A.M., Manchisi A., Martemucci G.: Effects of PMSG dose and presence of the male on the estrus in cyclic ewes. Anim Breed Abstr 1991, 59, 344.

[23] Tumen H., Gokcen H., Dogan I.: Field trials on estrus synchronization and artificial insemination in sheep I. The effect of cronolone containing vaginal sponges or prostaglandin F2 alpha on synchronization and fertility. U U J Faculty Vet Med 1992, 3, 113-119.

[24] Zeleke M, Greyling J.P.C., Schwalbach L.M.J., Muller T., Erasmus J.A.: Effect of progestagen and PMSG on oestrous synchronization and fertility in Dorper ewes during transition period. Small Rumin Res 2005, 56, 47