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Research article

Effect of oxytocin and clitoris massage on the pregnancy rate of Saanen goats

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Abstract

In this study, the effects of oxytocin injection and post-insemination clitoral massage on pregnancy rate in Saanen goats were investigated. Goats were assigned to the control group (G1 = 20), oxytocin applied group (G2 = 20) and clitoral massage group (G3 = 20). The control group (G1) received only 1 ml of saline for the placebo effect after insemination. The second group (G2) injected 1 IU of synthetic oxytocin into the muscle 30 seconds before the insemination. In the third group (G3), clitoral massage was applied for 30 seconds following the insemination. Control of pregnancy in goats was determined by ultrasound 60 days after insemination. Pregnancy rates in control, oxytocin and clitoris massage groups were 55%, 55% and 50% respectively. The difference between the groups in terms of pregnancy rate was found to be not significant (P>0.05). In control, oxytocin and clitoris group, the number of offspring at birth was 2.09, 2.00 and 2.00 respectively. There was no statistically significant difference between the groups in terms of the number of kids (P>0.05). Finally, the difference between the groups was found to be significant in terms of control, oxytocin application and clitoral massage in artificial insemination applied in Saanen goats.

Keywords: Pregnancy rate; saanen goat; clitoris massage; oxytocin treatment

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Introduction

The rapid transport of live or dead sperm to the upper oviduct within a matter of minutes infers the importance of smooth muscle contractions (Leboeuf et al., 1998; Karaca et al., 2001). In the natural breeding, sperm are deposited during estrus at least 10 to 12 hours before ovulation, and the rate of sperm transport may be a critical factor for determining the conception rate (Abiaezute and Nwaogu, 2015). In the case of artificial insemination, particularly when this forms a part of an estrous synchronization and/or gonadotropin treatment program, the rate and efficiency of sperm transport to the site of fertilization are of fundamental importance (Hafez, 2000; Gunduz et al., 2010). Immediately after insemination, sperm penetrate the micelle of the cervical mucus where some are quickly transported through the cervical canal. This phase takes 2 to 10 minutes and may be facilitated by sperm motility as well as increased contractile activity of the myometrium and mesosalpinx during courtship and coitus. Some sperm reach the *internal os* of the cervix within 1.5 to 3 minutes after insemination. Thus, some sperm can reach the site of fertilization rapidly (Ptaszynska, 2006). Whether the first sperm entering the oviduct participate in fertilization of the ovum is not known, it has been proposed that fertilization occurs only when a minimal number of sperm reach the site of fertilization (Aral et al., 2010).

Oxytocin is a hormone which is produced by the supraopthic nuclei in the hypothalamus and deposited in the caudal part of the pituitary gland. At the time of copulation, oxytocin is released from the caudal part of the pituitary gland in response to the vaginal

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stimulation and causes the smooth muscle contraction of the genital tract (King et al., 2004). The consequences of this contraction are the enhancement in the sperm transport rate in the reproductive tract (Hamali et al., 2011). Langendijk and coworkers (2003) in a study on the sows indicated that the external oxytocin administration or internal releasing of oxytocin by stimulation of the flanks or dorsal parts of sows cause an increase in contraction of uterine muscles. In another study, Rodriguez et al. (1987) by administration of oxytocin in different periods of estrus cycle in the cows indicated that the internal uterine pressure (I.U.P) increases in response to oxytocin administration at all periods of the estrous cycle. Therefore, according to the previous research and present study, it seems that oxytocin administration causes an increase in uterine contraction and enhances the sperm and ovum transport in the genital tract (Longendijk et al., 2005).

The stimulating of the vagina at coitus causes a reflex release of oxytocin, which in turn leads to contraction of the genital tract smooth muscles and increases the rate of sperm transport (Perry et al., 2010). On the other hand, clitoral stimulation at the time of artificial insemination causes oxytocin release from the caudal pituitary gland, which has a positive effect on the sperm transported into the female genital tract (Bozkurt et al., 2007). The aim of this study was to determine the effect of clitoral massage and oxytocin administration at the time of artificial insemination on the pregnancy rates for Saanen goats.

Materials and Methods

This research was carried out on Saanen goats in İzmir (west of Turkey) province. Sixty Saanen goats in the same nutrition and management conditions were chosen and categorized into 3 groups (G1:control, G2:Oxtocin and G3:clitoral massage; 20 goats in each group) randomly. After spending the voluntary waiting period (VWP=60 days), all of the goats were examined by rectal palpation for detecting any uterine infection. Goats with abnormal reproductive problems were excluded from the experiment. Goats were inseminated after observed for estrus by a professional artificial insemination technician and then 1.I.U oxytocin (Oksitosin, Vetaş®) were injected to the goat groups in the G1 group (control). Clitoris massage for G3 was applied for 30 seconds after insemination. Pregnancy examination was performed through ultrasound goats of three groups. Data were analyzed by using the Statistical Package for the Social Sciences. Chi-squared test was used to compare pregnancy rate and litter size (SPSS 11.5).

Results

The pregnancy rate was recorded as 55% (11 goats out of 20 goats) in G1 (control), 55% (11 goats out of 20 goats) in G2 (oxtocin group) and 50% (10 goats out of 20 goats) in G3 (clitoral massage). The results of the three groups were analyzed by Instate program and Fisher's exact test. There were no significant differences between three groups (P>0.05) (Table 1).

The result of litter size of Saanen goats is given in Table 2. Litter size in G1, G2 and G3 groups were 2.09, 2.00 and 2.20, respectively. General average for litter size was 2.09. There were no significant differences between groups (P>0.05).

Table 1: Number of insemination and pregnant goats and pregnant rates for groups

Groups	Number of İnsemination goat	Number of pregnant goat	Pregnant rate (%)
Group 1(Control)	20	11	55.0
Group 2(Oxtocin)	20	11	55.0
Group 3 (Clitoral massage	20	10	50.0
General	60	32	53.3
P			0.990

Table 2: Number of kidding goats and least squares means and standart errors of litter size for groups

Groups	Number of kidding goats	Litter size
Group 1(Control)	11	2.09±0.21
Group 2(Oxtocin)	11	2.00±0.23
Group 3 (Clitoral massage)	10	2.20±0.20
General	32	2.09±0.12
P		0.988

Discussion

Intra-cervical insemination is usually used as artificial insemination in goats. In this study, the rate of obturation in the control group was 55%. Similar results were reported by Ritar et al. (1990), Leboeuf et al. (1998) and Salvador et al. (2005). However, there are no studies on the effects of artificial insemination and oxytocin injection on pregnancy and fertility rates. Pereira et al. (1998) observed that oxytocin injection did not increase survival in embryos. There are conflicting findings about the injection of oxytocin hormone in sheep. Although Sayre and Lewis (1996, 1997) did not mention a positive effect, Stellflug et al. (2001) and King et al. (2004) found that oxytocin injection had a decisive effect on fertility. In the study, the depth of storage was increased by injecting the oxytocin hormone injected into the uterine body of the cervix with a dose (1 ml) of the amount of sperm that was left in the uterine portion. However, the pregnancy and the effect on the fertility rate were not significant.

In particular, frozen sperm, which are placed deep into the reproductive tract, have also been expressed in previous studies (Salvador et al., 2005), which showed similar results with the study of Ankara goats (Ritar et al., 1983; Kershaw et al., 2005).

The increase in fertility is also directly related to the depth of sperm released in the genital tract. In other words, if the semen is kept close to the uterus, the rate of pregnancy and the rate of fertility increases accordingly. This is due to the difficulties encountered during transport of the frozen sperm in the cervic after cervical insemination. During this journey, prostagens may be relatively less active in the cervical mucosal fluid (Quinlivan and Robinson, 1969, Pearce and Robinson, 1985; Khalifa et al., 1992).

The pregnancy rate was 50% in the clitoral massage group after artificial insemination in the study and the number of the kids at the birth was 2.20. Lunstra et al. (1983) reported that the rate of pregnancy in the first insemination in dairy cattle treated with massage for 3 seconds immediately after insemination, 74% and 59%, respectively, and clitoral massage increases pregnancy rate up to 15%.

Segura and Rodrigez (1994) found that the rate of pregnancy was increased by 12% in those who had 10 times clitoral massage after artificial insemination compared to those who did not. It should not be ruled out that clitoral massage in animals increases the pregnancy rate, but the response to this increase can also vary according to the age of the animal and the skill of the insemination (Viudes-de Castro et al., 2009).

In this research, the difference between the groups was found to be insignificant in terms of control, oxytocin application and clitoral massage in artificial insemination applied in Saanen goats. However, it would also be useful to examine the injection of oxytocin at different doses with a higher number of goats.

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