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EFFECT OF INJECTION OF DIFFERENT LEVEALS OF EQUINE CHORIONIC GONADOTROPIN (ECG) ON SEMEN QUALITIES IN SHAMI GOATS

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Abstract

This study has been conducted for the purpose of investigating the effect of injection sexually adult Shami male goats with eCG serum outside the reproductive season on reproductive qualities. In the current study, 36 male goats aged 1.5-2 years have been divided into three months and by 12 animals per month, as well as the animals have been divided into three treatments of four replicates for each month separately. Whereas the first treatment was T1 control without injection and the second and third treatments T2 and T3 in which males were injected with 250 and 500 IU of eCG hormone respectively. The injection was done at the beginning, middle and end of each month after the injection and semen was collected. As a result, the injection process resulted in a highly significant increase in individual and collective movement and sperm concentrations in Shami goats in Iraq as well as a highly significant increase in sperm abnormalities. Therefore, an inject of eCG hormone in Shami male goats outside the reproductive season recommended to stimulate them sexually. Where a highly significant effect of injection appears at rang ($p < 0.05$) on the individual movement of sperm whereas treatment at a dose of 500 and 250 exceeded the control treatment (90.43, 87.75 and 76.25), respectively. The current study also reveals a highly significant effect of injection appears on the collective movement of sperm. As well, treatments at a dose of 500 IU and 250 IU outperformed the control treatment (89.75, 88.25 and 77.50) respectively. A highly significant effect of injection appears sperm concentrations while treatment of injection at a dose of 500 exceeded the treatment of injection at a dose of 250 as well as control treatment. Where the 500 injection treatment outweighed the 250 injection treatment and control (3.60, 2.80 and 1.35) $\times 10^9$ respectively and the 250 treatment outperformed the control treatment. Although, live sperm ratio at 500 IU injections exceeded 250 IU injections and control (91.75, 88.67 and 78.33), respectively, and 250 IU treatment outperformed the control. A highly significant effect appears in dead sperm ratio where treatment with a dose of 500 IU exceeded the treatment of 250 IU and control, and treatment of 250 IU outperformed control (8.25, 11.3 and 21.67), respectively. A highly significant effect also found on the deformed sperm ratio.

Key words: semen qualities - Equine chorionic gonadotropin - Shami goat.

Introduction

It is known that the artificial insemination process accelerates the genetic improvement, which aims to increase high productivity in animal production projects. Good sperm specifications considered as the basis for successful Artificial Vaccination process and genetic improvement (Chandler *et al.*, 1984). Several researches have shown that environmental factors have a significant effect on the reproductive efficiency of farm animals such as increasing the daily light period and high temperatures (Walkden-Brown *et al.*, 1993). Several researches have revealed that environmental factors have a significant effect on the reproductive efficiency of farm animals such as increased daily light period and high temperatures (Walkden-Brown *et al.*, 1993). Since goats are considered as seasonal reproduction and multi-estrus (Palmer *et al.*, 2018). of the seasons (Migaud *et al.*, 2006). This is influenced by environmental factors, especially the length of the daily lighting period Therefore, several studies have been conducted aimed at improving the quality of semen in goats (local, shami and beater) during the period of sexual inactivity to decrease its quality by injecting certain hormones such as Kisspeptin, GnRH and hCG into Cypriot goats outside and inside the reproductive season (AL-amire, 2015) in addition to Testosterone (Angel-Garcia *et al.*, 2015). Also stimulate

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male goats by artificial lighting (Pellicer-Rubio *et al.*, 2007). Research has shown that the use of eCG hormone is important in male sexual stimulation, where eCG is important in the process of sperm formation and stimulation of testosterone secretion because it contains the Hochereau- Interstitial cell stimulating hormone (ICSH), eCG hormone contains Interstitial cell stimulating hormone (ICSH) and Spermatogenesis stimulating hormone (SSH) that act on male sexual stimulation (Cupps *et al.*, 1953). Due to the lack of studies demonstrating the effect of eCG hormone injection on shami male goat, this study has been conducted to investigate the effect of injecting various concentrations of eCG hormone in equine chorionic gonadotropin on changes in semen characteristics.

Materials and Methods

This study has been conducted in the farm of Agriculture College / University of Diyala, (36) Shami sexually matured male goats have been used in this experiment aged at (1.5-2) years and the weight ranged between (30-40) kg. Aimed at the purpose of studying the effect of eCG hormone injection on semen qualities. The animals have injected with hormone and the semen collected from goats by using the artificial vagina for sheep and goats once a month from each animal in the presence of a female in estrus injected with estradiol by 2.5 mg 36 hours before collection. The animal samples were divided into 12 Shami male goats into three months by three treatments :

T1: control treatment without injection

T2: eCG hormone injection at a dose of 250 IU.

T3: eCG hormone injection at a dose of 500 IU.

The collective movement of sperm was assessed as reported by Evans and Maxwell (1990), and the individual movement was estimated as reported by Chemineau *et al.*, (1991). The sperm concentration was calculated using a red blood cell count slice and a dilution solution consisting of 0.9% sodium chloride, 0.01% mercury chloride and 2g/L eosin dye (water soluble) was used to distinguish sperm under the microscope. Thus the dilution ratio was 1: 200, Live and dead sperm based on what was stated by Chemineau *et al.*, (1991). Deformed sperm was calculated by Chemineau *et al.*, (1991). data were subjected to statistical analysis using Randomized Complete Blocks Design (RCBD) were used in the analysis of experiment data to Study the effect of the treatments studied and compared the differences between the test averages (Duncan, 1955) polynomial and use the program (SPSS, 2011) in the statistical analysis.

Results and Discussion

Effect of eCG hormone injection on individual and group movement and concentration of sperm

Table 1 shows a significant effect of injection at rang ($p < 0.05$) on the individual movement of sperm, where treatment at dose 500 and 250 was superior to control treatment (90.43, 87.75 and 76.25), respectively, and there were no significant differences between injection 500 and 250. The table also shows a high significant effect of injection in the collective movement of sperm where the treatments at 500 IU and 250 IU surpassed the control treatment (89.75, 88.25 and 77.50)%, respectively, and there was no significant difference between treatment at dose 500 and 250 IU.

This finding was consistent with Ángel-García *et al.*, (2015) as the vitality and sperm motility increased after testosterone injection. Correspondingly agreed with what reported by De Santiago *et al.*, (2018) who found an increase in sperm motility while injecting with testosterone outside the reproductive season. A highly significant effect of injection appears in sperm concentration where the injection 500 treatment was superior to the 250 injection treatment and control (3.60, 2.80 and 1.35) $\times 10^9$ respectively and the treatment 250 outperformed the control treatment.

Table 1: Effect of eCG hormone injection on individual and group movement and concentration of sperm (mean ± SE).

Individual movement %	group movement %	concentration of sperm x10^9 sperm	Treat-ment
76.25±0.82 B	77.50±0.82 B	1.35±0.07 C	T1
87.75±1.11 A	88.25±1.04 A	2.80±0.14 B	T2
90.43±0.383 A	89.75±1.06 A	3.60±0.17 A	T3

***A.B.C* – statistical differences ($P < 0.05$).**

This finding was consistent with what Ángel-García *et al.*, (2015) found, where sperm concentration increased as a result of testosterone injections with goats outside the reproductive season. The reason for the improvement of semen qualities is due to high increase of testosterone. The reason for the improvement of semen qualities is due to high testosterone. The increased sperm concentration is due to the increase in the number of Sertoli cells. These cells nourish, support and develop sperm by secreting a carbonate and potassium-rich liquid (Gado, 1996). The reason may also be attributed to the high concentration of testosterone which improves vitality and sperm motility (Angel-Gareia *et al.*, 2015). By increasing the production of fructose, which is of great importance in sperm metabolism and thus increasing its

Table 2: Effect of eCG hormone injection on live, dead and deformed sperm ratio(mean ± SE).

Deformed sperm %	Dead sperm %	Live sperm %	Treat-ment
22.42 ± 0.49 C	21.67 ± 0.83 C	78.33 ± 0.83 C	T1
17.00 ± 0.64B	11.3 ± 0.65 B	88.67 ± 0.65 B	T2
15.17 ± 0.29 A	8.25 ± 0.37 A	91.75 ± 0.37 A	T3

mobility (Dirawi, 1995). It is also due to the correlation of sperm concentration and movement with the increase in testicular size (AL-Saadi, 2001).

Effect of eCG hormone injection on live, dead and deformed sperm ratio

Table 2 shows a significant effect of eCG serum hormone injection at rang ($p < 0.05$) on live sperm ratio, where live sperm ratio at 500 IU injection was superior to 250 IU injection and control over (91.75, 88.67 and 78.33)% Respectively. The treatment of 250 IU outperformed the control treatment. This finding differed with that found by Ángel-García *et al.,* (2015) where there was a decrease in live sperm rate when goats injected testosterone outside the reproductive season in Mexico. There was a highly significant effect on the dead sperm ratio where treatment of 500 IU exceeded the treatment of 250 IU and the control, and treatment of 250 IU out-performed the control (8.25, 11.3 and 21.67), respectively. This finding was consistent with what reported by Ali (2005) when the study found that injecting prostatelandin F2α into local Iraqi goats for four consecutive weeks at different concentrations. The significant effect of the injection was found on the deformed sperm ratio. Treatment at 500 IU was superior to treatment at 250 IU and the control at the percentage % (15.17, 17.00 and 22.42), respectively while the treatment with 250 IU dose exceeded the control treatment.

***A.B.C* – statistical differences ($P < 0.05$)**

The increase in the number of live sperm and its vitality is due to the effect of eCG injection, which has the effectiveness of FSH and LH (Cupps *et al.,* 1953) and These hormones play an important role in improving sperm characteristics through their effect on Sertoli cells, Lidech cells and spermatogonea cells, thus, improving sperm characteristics and producing more sperm (Brunet *et al.,* 2012). The low sperm distortion may be attributed to its increased testicular dimensions (Hussain, 2012). The reason for improved semen qualities is also the high testosterone that plays an important role in spermatogenesis (Gado, 1996). The reason for the improvement of semen characteristics is also due to the increase in the size of the testicle for the close relationship between volume and quantity of semen produced (soder and Petersen, 2006). There was also a positive relationship between the dimensions of the testicle in general and the amount of semen produced (Elamaz and Demil, 2007).

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