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Weight changes and sexual behavior in Ghezel intact and castrated male lambs

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ABSTRACT

Castration of male animal's leads to a reduction in aggressive behavior, which animals will avoid wasting energy resulting to economic production of the animal, grows. It also reduces damage and bruising animals and increases normed meat producing at slaughter. In this study, 20 lambs Ghezel breed in four age groups, group 1: one month (n = 4), group 2: two months (n = 4) Group 3: three months (n = 4), Group 4: four months (n = 4), were selected and by the surgical procedure were castrated. For comparing the effects of castration on fattening capacity and frequency of sexual behaviors, group 5: one month (n=4) was used as a control group. The GLM procedure of SAS in unbalanced design was used. Five groups of lambs were fed with a same diet of fattening for 270 day. Lambs weighing was done after 12 hours of starvation every month. A significant difference was observed between control group and other castrated groups ($P<0.0001$). The control group lambs showed a higher final average weight (46.125 kg) than the other castrated groups, group one: (41.6071 kg), group tow: (41.205 kg), group three (40.2823 kg) and group four (40.962 kg). Daily average gain for all groups was similar (Group 1 (133.024 g), Group 2 (120.307 g), Group 3 (113.48 g), Group 4 (113.154 g) and control group (152.068 g)) which was not a significant difference between castrated groups with control. Body condition score at the end of period were measured for all groups and no significant difference was observed. Each of sexual behavior decreased significantly between the castrated and control group. The results showed that castration depressed aggression and reproductive behavior of animals. Weight of castrated group was lower than the control, in which the lamb that had been castrated at younger ages due to the low stress and get away from castration were better at slaughter time.

Keywords: Castration, Fattening Lamb, Ghezel lamb, Sexual behavior

INTRODUCTION

Male livestock are commonly castrated to improve meat quality, reduce aggressive behavior, and improve ease of management. Undesirable color, less-desirable quality grades, lower palatability, market biases, and poor consumer acceptance of carcasses of intact males are other reasons for castration of farm animals (Seideman et al., 1982). However, castration requires additional labor, increases stress, reduces

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feed efficiency, and decreases rate of gain. Immunization of male lambs against GnRH may be a viable alternative to physical or surgical castration. Reducing aggressive behavior increases the economic return to the cattle producer by reducing the incidence of injury to both animals and their handlers, reducing bruised and dark-cutting meat at the time of slaughter (Romans et al., 1994; Jones, 1995), reducing damage to pastures, fences, and to feeding and handling equipment (Seideman et al., 1982), while conserving energy to enhance growth. These days castration is done by plastic loops, Burdizzo apparatus ,castration by surgical method and making secure against GnRH, which the non- offensive method of using GnRH antagonist does not have painful and tension causing of offensive methods. Testosterone, the primary male hormone, is responsible for male characteristics of bulls such as superior growth and production efficiency (Field, 1971; Seideman et al., 1982; Cosgrove et al., 1996) and sex related behavior (Dykeman et al., 1982; Katz and McDonald, 1992). An increase in testosterone secretion from the testes occurs before puberty, after which secondary sexual characteristics typical of the species are expressed. Presence of sexual storied (estradiol in female and testosterone in male) is necessary for appearance of sexual behaviors. For example, castration of males considerably decreases the sexual behaviors. Disappearing of sexual behavior in castrated males depends on the interval between removing the testicle and engendering the conditions to mate. If this interval is much, sexuality reduce much and sometimes it won't appear again, similarly, injection of steroids to orchidectomy males establishes sexual behaviors for them(Zamini ,2008). Testosterone influence food absorption in male mammals. The male rats whose orchidectomies have been removed show a decrease in food absorption and this effect is returnable by the care through testosterone. The researches which were done on pigs by Jan et al in 2003 for 32 days show that injection of androgens increased the body weight in pigs. On the other hand, testosterone and α-5 di hydro testosterone are responsible for increasing nourishment behavior, which aromatization of testosterone and changing it to estrogen is responsible for increasing the level of activity injection of testosterone propionate ,which is on oily and injection steroid and is considered one of the esters of testosterone ,stimulate the food absorption , increase the weight ,and high dose of TP decreased weight gain(if be cared with TP for a long period of 2-6 weeks). This is because of TP aromatization to estrogen (Davari et al., 2012). Castration is a common action in developed countries .Exogenous testosterone has been shown to improve rate of gain and feed efficiency of lambs (Andrews et al., 1949; Pope et al, 1950; O'Mary et al., 1952; Jacobs et al., 1972); However, testosterone may not be the only testicular hormone that improves performance of the growing-finishing animal. Hafs et al. (1971) emphasized that anabolic effects in ruminants could be derived from both androgens and estrogens. Jacobs et al. (1972) Found intact rams and testosterone-treated withers similar in carcass traits; however, rams gained faster than treated withers. These data suggest that testicular hormones in addition to testosterone are needed to maximize growth performance of young lambs. Castration of male domestic species with the aim of controlling sexual and aggressive behavior and to facilitate handling and utilization for work, dates from the earliest times of domestication. Surprisingly, the effects of such intervention on aggressive behavior and fear reactions has, until recently, received little or no attention.

MATERIAL AND METHODS

Twenty Ghezel male sheep were used in this study: group 1: one month age (n=4),group 2: two month(n=4), group 3:three month (n=4),group4 :four month (n=4).The surgery was done by the veterinarian. After disinfection of the place the lambs become sedation by injection of 0.5 Xylazine and by the use of Lidocaine the operation place was numbed. Then by a linear cutting scrotal layer were cut and the testis were separated from testicular sac. The cuttings were stitched carefully and general antibiotic and Flunixin Meglumin were injected to the lambs for five days. Group 5 belonged to four one

month entire Ghezel lambs that were selected as control group. All the groups were fed with the same ration under the interior conditions of the stable for 270 days. The consumed ration by the lambs included the available items in table 1 which were completely mixed were given to animals during two meals according to their appetite.

Table 1: Composition of feedlot diets (percentage of dry mater).

Ingredient	% DM
Alfalfa hay	41
Cracked corn	30.9
Alfalfa (dehydrated pellets)	26.8
Sodium tripolyphosphate	0.8
Trace minerals in NaCl	0.5
Vitamin premix	0.4
CP	14.7
TDN	65.1
ME, Mcal/kg	2.3

The lambs were weighted monthly that each month before weigh they deprived of water and nutrition for at least 12 hours and they were weighed with scale. Sexual behavior was assessed during a 30-min test period that began when lamb was placed in a test pen (2.3 ×4.6 m) containing two estrous ewes. Prior to testing, lambs were maintained behind a solid fence to prevent visual contact with ewes. Estrus was induced by injection 2cc estradiol benzoate (Vetastrol®) was muscularly to two non-pregnant ewes. Estrus was confirmed prior to the behavior trials by exposing the ewes to two mature rams. Body condition score (BCS)determination was done by the use of hand touch and by giving marks of 1 to 5 for 9 months lambs at the end of course. In this way mark 1 was given to the animal which was so lank and fatty tissue was not distinguishable between skin and bone. For mark 2 back out growth, were still swelled and there was a little fat on sirloin muscle tissue. Mark 3 -3.5 was considered as the average fat thickness. Mark 5 was for the animals which was very fat. Data were analyzed by the GLM procedures of SAS in unbalanced design. BCS, and body weight and behavior data, main effects included in the model were treatment, time, and the interaction of treatment × time. Where significant treatment or time effects were noted, differences among means were tested by Fisher's protected LSD procedure (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Average birth weight, final weight, daily weight gain and body score amount among castrated animal and control group in table 1 and lamb weight in different month are shown in figure1. There was no significant difference in mean birth weights. Average final weight for control and castrated lambs were 46.125 and 41.126 respectively. This deference was significant ($p<0.0001$). This results confirmed other ones(3,5,7,8,10,12,13,14). Figure 1 shows the weight difference between male and castrated started from 17^{th} week of experiment and increased by continuing the course. Average daily weight gain between control and castrated was significantly different ($p<0.0001$). On average, this value was 152.068 g for control and 119.991 g for castrated. Which controls had more increase in weight, 32.077 g , than castrated . In an experiment done by Vayginz et al ,this difference was 10 g in a day which was not significant .In another experiment done by Ghorbani et al difference was significant which conformed the other results(2,12,19,20,21).

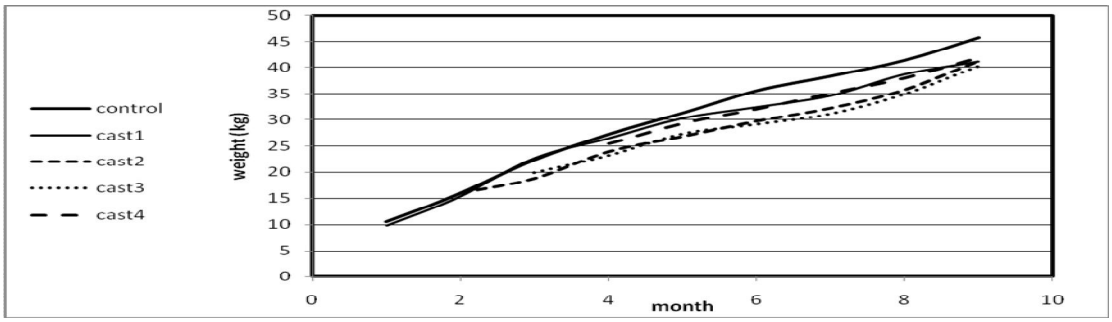
Table2. The average of at least mean-squares fattened ability and BCS for male intact and castrated lambs.

Groups	birth weight	final weight	daily weight gain	BCS	significant*
Control	5.2	46.125	152.068	3	-
1month castrated	5.325	41.6075	133.024	2.5	0.022
2month castrated	4.925	41.205	120.3075	2.5	>0.0001
3month castrated	5	40.2825	113.48	2.5	>0.0001
4month castrated	4.075	40.9625	113.154	2.5	>0.0001

∗Significant total period between castrated and control lambs.

Among castrated groups, group1 had better average weight increase. But this difference was not significant (Figure 1). It may be related to low age for castration which they less influenced by stress of castration. In recent years it is revealed that leptin plays an important role in increasing basic fuel, thermo genesis and lipolysis in mammals. Blood leptin and testosterone levels are in opposite relation with each other so that testosterone increase in plasma decreases the leptin. Removing ororchidectomies increases leptin discharge of anterior pituitary cells and this increase is reversed by propionate testosterone injection By releasing synthesis and neuropeptide Y discharge in hypothalamus, Leptin decreases food absorption. By existence of leptin receptors on GnRH axis and anterior pituitary of sheep and leptin crossing from blood-brain barrier, it is said that leptin influences on GnRH discharge from hypothalamus. Probably leptin has a diner effect on anterior pituitary gonadotrophic cells for mediation of LH discharge and following that testosterone is produced (Davari et al., 2012). Of course researches which were done by R.Gentey (1976) showed that long-term injection (6 weeks) of propionate testosterone will have an opposite result on body weight and will decrease body weight. We can justify this problem being aromatization testosterone propionate to estrogen. Another research by czaja et al in 2003 showed that injection of androgen to guinea pig for 32 days increased their weight. According to the results of table 1 the average body score for castrated and male lambs were 2/5 and 3, respectively, but this difference was not significant that it agreed with (Davari et al., 2012,.Xu, Wang et al.,2002).

Figure1. Least square mean weight for male lambs and citrated during different periods weighed**.**



The results related to sexual behaviors are shown in table2,Numbers related to each behavior was calculated from behavior average of each group of lambs, which was done weekly within a month at the end of the course(9 months).Expected, castration causes much decrease ($p<0/0001$) on different sexual behaviors . It seems that castration in low ages accompanies with forgetting almost all sexual behaviors .According to results, behaviors(Flehmen, jumping and all ejaculation) have been completely disappeared in one month castrated lambs and in four month castrated lambs slight effects are visible .Yet, castration difference was not significant in different ages. Removing testicles before maturity in most breeds of sheep accompanies with change of hypothalamic, pituitary orchidectomy usual axis, and develops sexual and aggressive behavior for lambs. There is evidence that sheep castration in early parts of life is controlled by permanent changes in mechanism (10).Castration by securing methods against GnRH temporarily decreases sexual behaviors , which is returnable by removing security factor of sexual behaviors in some people , based on duration of care and life process. Disappearing aggressive and homosexual behaviors due to behavior ale valuations in castrated lambs before maturity reported by zaberston et al. 1972.

Table 3.Calculation of average sexual behaviors for castrated and control

sexual behaviors	Control	Castrated at the of age 4
Attempted mounts	6.8	0.3
Mounts	4.3	0
Ejaculations	2.8	0
Investigatory sniffing	13.1	1.325
Foreleg kicks	1.8	0
Head-pushing	2.2	0
Udder sniffing	3.7	0.925
Flehmen	6.3	0

(Comparing average sexual behaviors for castrated with control group shows that with probability of 0.0001 the control is significant than castrate, but there is no significant level among castrated).

CONCLUSION

Finally the research results showed that castration of male animals before maturity , decreases sexual behaviors during period of maturity and therefore, the animals which are castrated in early parts of life lose their sexual behaviors completely which helps to calm the animal. In this case, it decreases aggressive behaviors and received defects to pasture and the animal itself .Comparisons of fattening showed that in comparison to the males, castration in decreases final weight for castrated lambs. While lambs which are castrated in low ages are less influenced by the stress of castration and show less weight decrease.

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