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EFFECTS OF HUMAN MENOPAUSAL GONADOTHROPHIN (PERGONAL)$^{(R)}$ ON TESTICULAR MORPHOLOGY OF THE MALE REPRODUCTIVE ORGAN OF RABBITS

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Abstract

This study examined the effects of Human Menopausal Gonadotrophin (Pergonal$^{(r)}$) on testicular morphology of the male reproductive organ of rabbits. Twenty four (24) male rabbits between the ages of 5 – 8 months were used for this study. These male rabbits were divided into four treatment groups, with six bucks in each group. The four treatment groups were identified as: T_1M (control), administered with 0.00ml Human menopausal gonadotrophin (HMG); T_2M administered with 0.03ml HMG; T_3M administered with 0.06ml HMG; and T_4M administered with 0.09ml HMG injections. The animals were randomly assigned to the four treatment groups of HMG in a completely randomized design (CRD). Each group was further replicated three times, giving two animals per replicate. The injection was administered intramuscularly for 3 consecutive days. The testicular morphometry and reproductive organ weights were collected five days after the administration of the drug (HMG) by dissecting 2 bucks from each treatment group. The organ weights of the male reproductive organs were obtained using the sensitive weighing balance. The result showed that the male reproductive organ weight increased as level of pergonal increased and the values obtained showed that their were variations among the treatment groups. The result of this study showed an increase in the testicular organ weights of the buck. Thus care must be taken in administration of this drug to mature bucks to avoid development of certain disease such as cancer on the male reproductive organ of animals.

Keywords: Effects, Human Menopausal Gonadotrophin, (Pergonal$^{(r)}$), testicular morphology, male, reproductive organ, rabbits.

INTRODUCTION

Rabbits are short framed animals with an average weight of 2 – 3kg (Morrow et al., 2000). They are generally bred at the maturity periods of about 5 – 8 months after birth (Morrow et al, 1998). Domestic rabbits thrive on different kinds of grasses, herbs and discarded scraps and subsequently convert them into useful animal products such as meat, fur, skin and manure (Gomez, et a,. 1998).

Rabbits play an important role in research works among students and teachers (Tohman and Massanyi, 1997). Rabbits are reared by most farmers because of their fast growth. All these have prompted most farmers to go into rabbit production even though its production is faced with some problems. These have made reproduction efficiency among domestic rabbits to be low in developing countries like Nigeria, despite the advances made in the increased use of livestock for specialized production. This however calls for the need for more practicable and better control methods of breeding of rabbits.

Thus certain drugs can be used to boost reproduction in animals (rabbits). Among the drugs is Human Menopausal Gonadotrophin (HMG) (Pergonal$^{(r)}$) (HMG).

The HMG is a fertility drug that contains 1:1 ratio of follicle stimulating hormone (FSH) and luteinizing hormone (LH) (Dixon and Hopkins, 1996). These hormones play vital roles in reproduction of male and female animals. For instance, the follicle stimulating hormone (FSH) play vital role in the initiation of spermatogenesis in males (Abu et al., 2006). Looking at these, it has not been determined if the administration of the hormonal drugs for formulation of sperm would induce any growth on the male reproductive organ. Thus, the purpose of the study is to determine the effects of HMG on the morphological parts of male reproductive organ of rabbits.

MATERIALS AND METHODS

Experimented Site

This study was carried out at Abia State University Research and Teaching farm at Umudike, Umuahia. This area is characterized with luxuriant grasses and is quite suitable for raising rabbits. This area lies within latitude 5^0 and 6^0N and longitude 6^0 and 7^0E with a mean annual temperature of 35^0C.

Methods

In this study, twenty four sexually matured male rabbits aged between 5 – 8 months were used to evaluate the effects of human menopausal gonadotrophin (HMG) on the testicular morphology of matured rabbit. Healthy rabbits were collected from local farms and research institutes around the environment of the experiment. The animals were given two weeks pre experimental periods to get them acclimatized to the environment and to the experimental procedures as well. Each animal was kept in a single hutch measuring 50cm x 50cm and each hutch was labeled for easy identification of the animal. Routine inspections were carried out on daily bases. The animals were dewormed two times within the experimental period. The HMG used for this study was bought from Blessed Pharmacist Shop, Umuahia.

The experimental rabbits were fed with fleshly cut forages made up of grasses and legumes such as *Centrocema pubescence, Panicum maximum, Pennisetum perpureum*. The proximate composition of these plants was determined through chemical analysis. The fleshly leaves of these plants were randomly collected from the experimental surroundings. Twenty five centimeter (25cm) cuttings from the apical portions of each of these plants were taken and labeled (A, B, C). The collected portion of each of the plants were then cut into pieces of about 2 – 5cm and was oven dried at 60 – 70^0C and ground through 1mm screen for subsequent analysis at Science Laboratory Technology Laboratory of Federal Polytechnic, Oko. Proximate analysis determined includes: the dry matter content, moisture content, crude protein, ether extract, nitrogen free extract, crude fibre, ash content in accordance with AOAC (1990).

Apart from this, concentrate feeds (Top growers feeds) of ½kg were given to the animals as supplementary feed per day. These animals were fed three times daily. Water was made available always for the animals and multivitamins drugs were given to them through drinking water, for resistance against infection or disease.

Experimental Design: The experimental bucks were divided into four treatment groups. The animals were randomly assigned to four treatment groups identified as T_1M, T_2M, T_3M, T_4M in a completely randomized design (CRD). Each group was further, sub-divided into 3 replicates of 2 mature male rabbits. These bucks were housed in individual cages. The four treatment groups received four levels of human menopausal gonadotrophin (pergonal$^{(r)}$) as treatment. The levels of pergonal$^{(r)}$ were 0.00ml, 0.03ml, 0.06ml and 0.09ml, represented as T_1M, T_2M, T_3M and T_4M. T_1M served as the control group and did not receive any pergonal$^{(r)}$ treatment. Human menopausal gonadotrophin (pergonal$^{(r)}$) was administered intramuscularly (1m) at the buttocks near the hindlegs using insulin syring with 0.1 graduation. Each group was administered with pergonal for 3 consecutive days. After the fifty day of the administration of the drugs, the testicular organs of the male rabbits were collected and measured.

Dissection of Animals: At the end of five days, after the administration of pergonal$^{(r)}$, 3 male rabbits from each treatment group were dissected making use of surgical blade, forceps, scissors, cotton wool, gauzel and anesthetic injection. Incisions were made gradually on the layers and tissues covering the testis, until the testis was fully seen and cut off from the animal body. The cut open was immediately stitched after the collection of the male sex organ, and 3ml of analgesics and antibiotics were respectively administered to each of the castrated bucks.

The primary male sex organ and its different parts that have been taken were then weighted with the sensitive weighing balance.

Testicular Organ Measurement: The testicular organs parts that were measured included: the full male reproductive organ, left and right testis, paired testis, left and right epididymis, paired epididymis, left and right vas deference, paired vas deference of bucks from each treatment group. At the end of the experiment the mean average results of the testicular organ weights from each treatment group was determined and their weights were recorded.

Data Analysis

Data collected in this study was subjected to the analysis of variance (Steel and Torrie, 1980), while significant treatment means were separated using the new Duncans New Multiple Range Test (SAS, 1990).

Results

The results obtained from the effect of Pergonal(r) injection on the testicular morphometry of mature male rabbits are shown in Table 3 of this study. In rabbit bucks treated with pergonal(r) of volume 0.03ml, 0.06ml and 0.09ml respectively showed that their full reproductive organ weight were higher than that of the control group. In all the treatment groups, T_4M, had the highest value on full reproductive organ weight (6.08g), followed by T_3M with 5.31g and T_2M with 4.15g. The right vas deference weight value ranged from 0.11 to 0.23g with group T_3M having the highest value, while the left vas deference weight value recorded, ranged from 0.10 to 0.40g with T_4M group having the highest value. The weight value of the right epididymis obtained ranged from 0.23 to .40g, while that of the left ranged from 0.23 to 0.65g. On the other hand, the result obtained from the paired testis ranged from 3.32 to 4.40g (Table 1).

Table 1: Effect of Pergonal$^{(r)}$ on the Testicular morphometry of matured male rabbit

Parameters	Treatment				Sem
	R1M	R2M	R3M	R4M	
Full reproductive organ wt(g)	3.99^{d}	4.15^{c}	5.31^{b}	6.08^{a}	0.50
Right vas deference wt (g)	0.11^{d}	0.14^{c}	0.28^{a}	0.23^{b}	0.04
Left vast deference wt(g)	0.10^{d}	0.13^{c}	0.30^{b}	0.40^{a}	0.07
Paired vas deference wt(g)	0.21^{d}	0.27^{c}	0.58^{b}	0.63^{a}	0.11
Right epididymis wt(g)	0.23^{d}	0.27^{c}	0.36^{b}	0.40^{a}	0.04
Left epididymis wt(g)	0.23^{d}	0.26^{c}	0.38^{b}	0.65^{a}	0.08
Paired epididymis	0.46^{d}	0.53^{c}	0.74^{b}	1.05^{a}	0.10
Right testis wt(g)	1.65^{d}	1.67^{c}	2.19^{b}	2.65^{a}	0.24
Left testis wg(g)	3.32^{d}	3.35^{c}	3.99^{b}	4.40^{a}	0.25

^{a,b,c,d} means within rows having different superscripts are significantly different ($p< 0.05$)

T_1M = 0.00ml pergonal$^{(r)}$

T_2M = 0.03ml pergonal$^{(r)}$

T_3M = 0.06ml pergonal$^{(r)}$

T_4M = 0.09ml pergonal$^{(r)}$

SEM = Standard error of the mean

Discussion

From the results of the study, it was observed that as the levels of pergonal$^{(r)}$ increased the reproductive organ weights values also increased among the treated groups (T_2M to T_4M). The full reproductive organ weights values of male rabbits treated with 0.03ml, 0.06ml, 0.09ml of pergonal respectively were found to be higher than that of the control group. In all, higher values were obtained from treatment group T_4M on full reproductive organ weight, which differed significantly ($p<0.05$) from that of the control group. The results obtained from the full reproductive organ weights of the male rabbits in this study varied with the finding of Herbert et al (2002) but agrees with findings of Oyeyemi et al (2007). The highest value obtained from T_4M group (6.08g) on full reproductive organ weights of the male rabbits showed

that pergonal(r) had significant effect on the organ weights of rabbits but care must be taking in the use of this drug as excessive use of it can lead to over weight of the reproductive organ which later become a factor that can cause reproductive failure in animals.

The paired vas deference values which ranged from 0.21 to 0.63g with T_4M group having the highest value (0.63g) showed that the weight values of the vas deference obtained in this study maintained an upward trend as the level of pergonal injection increased. The cause of this is attributed to the effect of the drug on the reproductive organ of the animals. The vas deference values obtained in this study agreed with 0.19 to 0.65g reported by Oyeyemi and Okediran (2007) but differs with the values (3.10 to 4.65g) reported by Lukae et al (2000) in fallow deer.

The average weight value of the epididymis obtained in this study which ranged from 0.46 to 1.05g, differed significantly ($p < 0.5$) among male rabbits treated with varying doses of pergonal(r) injection and from the mean weight value obtained from the control group. The weight value of the epididymis obtained in treatment groups T_2M to T_4M, fell above the range of 0.40 to 0.48g reported by Lukae et al (2000), Chibundu (2005), and within the range reported by Oyeyemi Okediran (2007) and Nuble (2010). The higher value obtained from the paired epididymis (1.05g) obtained from treatment group T_4M showed that pergonal(r) injection at 0.09ml had a significant effect on the epididymis of the rabbit.

It is interesting to note that the treatment of the male rabbit with different doses of pergonal (0.03ml, 0.06ml and 0.09ml) increased the weight of the testis of the bucks (3.35g, 3.99g and 4.40g respectively). The values differed significantly from those obtained from the control group (3.32g). The increase in testicular weight with the administration of pergonal(r) injection is a pointer that the drug enhanced testicular growth and development. This also indicated that pergonal(r) may be harmful to development of male reproductive organ of rabbit if the doses given to them are not checked on time as extra doses may lead to cancer or other disease caused by extra volume of hormone in the body of animal. In this case care must be taken when administering these drugs to the animals. This finding however, agreed with the results (3.30g to 3.43g) of the increased testicular weight of male rabbits fed with soybeans by Oyeyemi and Okediran (2007) and disagreed with the weight values 3.50 to 4.02g reported by Lukae et al (2000) in histological changes in structure of the testis in fallow deer. Even though literature is scanty on the effect of pergonal on the reproductive organ weights of male rabbit, the reproductive organ weights of male rabbits obtained in this study compared favorably with the values reported by Ani (2007) with growing rabbits fed with graded levels of raw bambara nuts.

Conclusion

This study has shown that pergonal(r) injection given at different doses (0.03ml, 0.06ml and 0.09ml) on the male rabbits (buck) has great influence on the growth of the male reproductive organ of rabbits. The study showed that as the level of pergonal(r) injection increased, the organ parts weight value of rabbits also increases with T_4M having the highest value (6.08g) on the full reproductive organ parts weight value of the male rabbits. This indicates that pergonal(r) drug can be administered to male animals for growth of the organ weights of the animal, but care must be taken to avoid excessive growth of the reproductive organ part of the male animal as this can be disastrous to the reproductive organ of the animal, as excessive growth rate of the reproductive organ parts can lead to cancer or blockage of reproductive tube.

Recommendations

Looking at the results obtained in this study, it is therefore recommended that even though the HMG drug administered to the rabbits at levels of 0.03ml – 0.09ml did not have any deleterious effect on the testicular morphology of the bucks, there is still the need to continuously monitor the hormonal profiles of animals under HMG treatment, to avoid tumor or cancer, on this organ.

Apart from this, extra work should be done on this study to ascertain the maximum level of HMG that will positively influence the testicular organ of rabbits and any other animal as well.

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