

Hematological Study to Effect Androgen Anabolic steroid (Dianabol) in Female Albino Rats

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ABSTRACT

The present study on the Albino female rats show the effects on blood parameters induced by repeated administration of three doses of androgenic anabolic steroid (dianabol). The animals were divided in to four groups (6 animals for each group). The first group is considered as a negative control treated with diet and water only. Second, third and fourth treatment groups gives orally pendent dianabol (10, 30 and 50) mg/kg/day respectively, and all groups quaff for 6 weeks. The result showed that significant increase ($P < 0.05$) in RBC, WBC count, HB, HG, PCV, lymphocyte, platelet count, and percentage of lymphocyte in treatment groups compared with control. The results refer that significant decrease ($P < 0.05$) in mean corpuscular Hemoglobin and concentration (MCHC), while the mean of corpuscular hemoglobin (MCH) and corpuscular volume (MCV) show significant increase ($P < 0.05$) compared with control group.

Keywords: Dianabol, Hematological, Female Albino Rats

INTRODUCTION

Anabolic androgenic steroids are group of synthetic compounds related to testosterone structurally¹. Androgens play a central role in the biology on medical practice in status as muscle wasting or debilitation to stimulate erythropoiesis in some anaemia and in the treatment of hypogonadal status². In addition The most important androgen secreted is testosterone It is both an active hormone and a prohormone for the formation of a more active androgen the 5 α -reduced steroid dihydrotestosterone (DHT), which acts in the cell nucleus of target tissues, such as skin, male accessory glands, and the prostate, exerting predominantly androgenic, but also anabolic, effects³. Testosterone and its synthetic derivatives are responsible for the development and maturation of male secondary sexual characteristics (i.e. increase in body hair, masculine voice, development of male pattern baldness, libido, sperm production and aggressiveness⁴. Testosterone is 19-carbon steroid formed from cholesterol via a series of enzymatic reactions in the Leydig cells of the testes and adrenal cortex in men, while in woman the primary site is the adrenal cortex⁵. Testosterone is secretion under the control of luteinizing hormone (LH) which is produced by the pituitary gland. Synthesis and release of LH is under control of the hypothalamus through gonadotropin-releasing hormone (GnRH) and inhibited by testosterone via a negative feedback mechanism⁶.

The aim of this research is to evaluation the side effects of dianabol in rats through the study of Blood parameters

including, RBCs, WBCs count, platelets, lymphocyte, platelet, PCV and Hb.

MATERIALS AND METHODS

Experimental animals

Healthy adult albino female rats weighing between 250-350 gm were used in this experiment. They were housed in separated plastic cages at Faculty of Science / University of Kufa/ Iraq, and kept in controlled environment of 22-25 °C. Commercial food (pellets) and tap water were provided to animals ad libitum. Rats were left to acclimatize for at least two weeks before the start of the experiment.

Experimental design

Twenty four mature female rats were randomly distributed into four groups (6 rats each). All experimental rats, except normal control animals (negative group), were given orally by gavage daily with dianabol (5 mg) /This dose was used according to the previous study⁷.

The treated animals were subdivided into three groups were received different concentrations of methandrostenolone (dianabol) (10, 30 and 50 mg/kg/day) respectively. The methandrostenolone (dianabol) was obtained from the pharmacy and their equipment from company of british dispensary as a tablets in concentration 5 mg/kg. Each tablet dissolved in 10 ml of physiological normal saline depended on body weight. The concentration of experiments were done according to the doses for human⁸. The period of treatment with was continued for six weeks.

Blood samples

Table 1: Changes in some blood parameters in rats primed orally by dianabol for 6 weeks.

Criteria	Mean \pm S.E.			
	WBC	RBC	LYMPH	PLT
Control	7.220 \pm 0.445 a	7.160 \pm 0.326 a	77.300 \pm 4.319 a	475.80 \pm 17.99 a
T1	7.760 \pm 0.747 a	7.4460 \pm 0.1429 a	78.060 \pm 1.956 a	690.40 \pm 18.35 b
T2	7.260 \pm 0.482 a	8.560 \pm 0.125 b	83.620 \pm 0.441 b	783.00 \pm 48.48 c
T3	7.480 \pm 1.102 a	9.860 \pm 0.024 c	86.560 \pm 1.167 c	970.20 \pm 5.50 d

WBC: White blood cell

RBC: Red blood cell

LYMPH: lymphocyte

PLT: platelet

a = significant differences ($P \leq 0.05$) between T1 and control group.b = significant differences ($P \leq 0.05$) between T2 and T1 group.c = significant differences ($P \leq 0.05$) between T3 and T2 group.

Table 2: changes in MCHC, MCH, MCV in female rats treated with dianabol for 6 weeks.

Criteria	Mean \pm S.E.		
	MCHC	MCH	MCV
Control	34.500 \pm 1.437 a	17.780 \pm 0.344 a	57.600 \pm 0.443 a
T1	34.040 \pm 0.808 a	18.700 \pm 0.497 a	57.660 \pm 3.237 a
T2	31.220 \pm 0.448 b	18.960 \pm 0.461 a	59.400 \pm 3.785 a
T3	30.860 \pm 0.361 c	20.340 \pm 0.098 b	59.400 \pm 1.559 a

MCHC: mean corpuscular haemoglobin concentration

MCH: mean of corpuscular haemoglobin.

MCV: mean corpuscular volume.

a= significant differences ($P \leq 0.05$) between T1 and control group.b = significant differences ($P \leq 0.05$) between T2 and T1 group.c = significant differences ($P \leq 0.05$) between T3 and T2 group

At the end of the experimental period, all rats were weighed. They were anesthetized, using a mixture of ketamine and xylazine i.m., and then they were sacrificed⁹. The blood samples were collected directly from rats by heart puncture. One day after the last dose, the small amount of blood samples were kept in sterile tubes containing anticoagulant (heparin) AFM-DISPO and placed in refrigerator at 4 c in order to the measure some haematological parameters.

Haematological assays

For haematological tests, blood samples were collected to measured RBC count, WBCs count platelet count and the percentage of PCV were measured done according to the^{10,11} while the concentration of haemoglobin (Hb) was estimated according to the¹²

Statistical analysis

The consequence for experiences were analyzed by using statistical programme SPSS version 17, using one way Anova, mean and standard errors as well as multiple comparisons in average of animal groups by using least (significant difference L.S.D) and the probability (0.05)

RESULTS

Result showed that the female rats treated by dianabol has resulted a significant increase ($p < 0.05$) in WBCs count, RBCs, LYMPH, platelets count, in all treated groups in comparison with control group.

This study show the a significant increase in concentration in three treatment groups of WBC, RBC, LYMP and PLT which reached 7.480 \pm 1.102, 9.860 \pm 0.024, 86.560 \pm 1.167 and 970.20 \pm 5.50 gm/dl respectively compared with

control group (7.220 \pm 0.445, 7.160 \pm 0.326, 77.300 \pm 4.319 and 475.80 \pm 17.99 gm/dl respectively).

This study show the a significant decrease in concentration in three treatment groups of MCHC ($p \leq 0.05$) which reached 30.860 \pm 0.361g/dl compared with control group 34.500 \pm 1.437g/dl. While there was significant increase ($p \leq 0.05$) in concentration of MCH and MCV which reached 20.340 \pm 0.098, 59.400 \pm 1.559gm/dl compared with control groups 17.780 \pm 0.344, 57.600 \pm 0.443 g/dl respectively.

This study show that the presence of a significant elevation in the concentration of HG of three treatment groups which reached 13.420 \pm 0.955, 14.680 \pm 0.441 and 15.580 \pm 0.049 gm/dl compared with control groups 12.980 \pm 0.757 gm/dl respectively.

This study show that the presence of a significant elevation in the concentration of PCV of three treatment groups which reached 41.880 \pm 2.305, 45.980 \pm 1.394 and 48.680 \pm 0.1298 gm/dl compared with control groups 40.860 \pm 2.204 gm/dl respectively.

DISCUSSION

The outcome of this study showed considerable rise in the mean of, red blood cells (RBC). This can be refer to the influence of dianabol (androgen anabolic steroide) in erythropoiesis processes by elevation of erythropoietin hormone which effect in bone marrow to hyperproduction of red blood cells¹³ (table 1). As well the elevation in red blood cells leads to elevation in packet cell volume (PCV) in (figure 2)^{14,15}. The studies indicated increase in the average of WBCS; this may be return mainly to increase

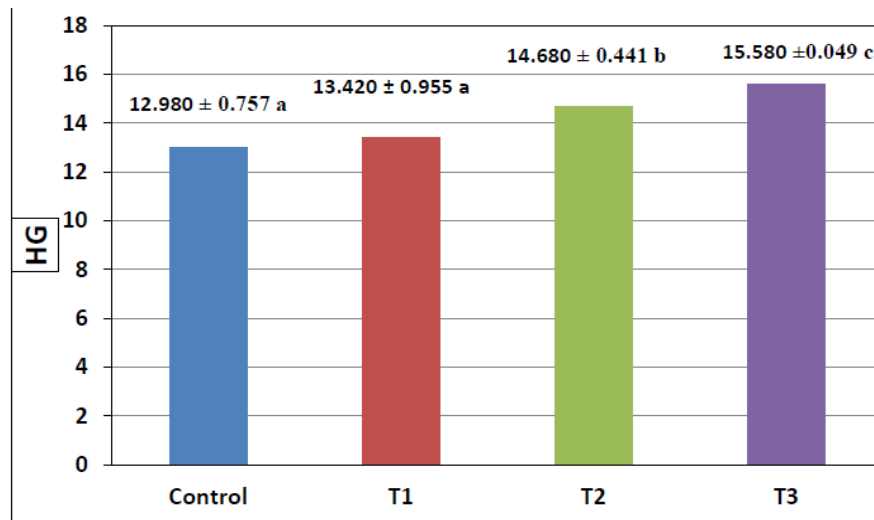


Figure 1: The percentage of HG in rats in three treated groups compared with control group with dianabol for four weeks.

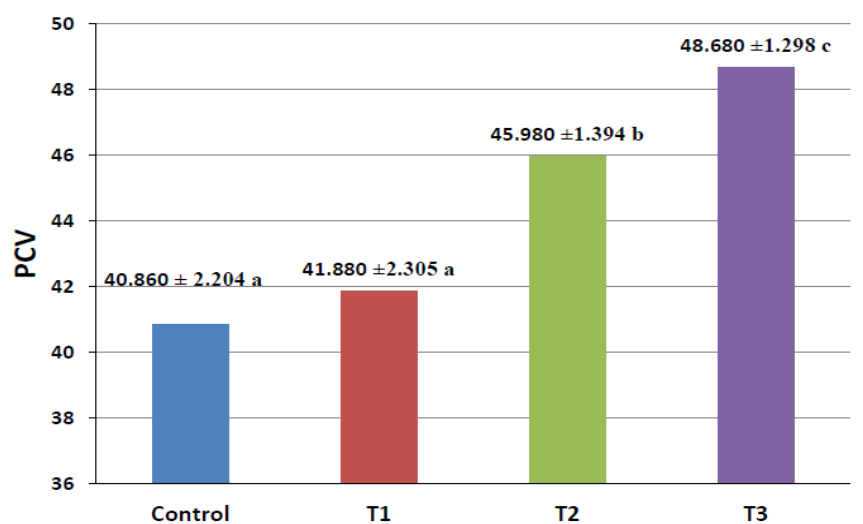


Figure 2: The percentage of (PCV) in rats in three treated groups compared with control group with dianabol for four weeks. A : $P \leq 0.05$.

proportion of lymphocyte type B. The results illustrated there was a significant increase ($p \leq 0.05$) in percentage of lymphocytes, the possible explanation of this results, the androgen anabolic steroids well known to induced inflammatory responses, which lead to increases in lymphocytes¹⁶. Furthermore the current study indicate increase in the total number of PLT count, this finding agree with¹⁷.

our study show Androgens have been involved in the arrangement of thrombopoiesis, harmonic with the noticing that the androgen receptor is expressed in megakaryocytes and adjust by androgens. Thrombocytosis has been reported in abusers of anabolic steroids and increases in platelet counts have been observed in patients receiving androgen treatment for aplastic anemia¹⁸. Testosterone elevation human platelet aggregation responses *via* elevation in human platelet A2 receptor density and it has been think that this may participate to the thrombogenicity of anabolic steroids¹⁹.

The effect of oral administration of dianabol on indicators blood MCHC values was decrease during the administration, the mean decrease in percentage of MCHC in this study than in the control group in association with the increase in PCV□□ESR mean values²⁰. The erythropoietic phenomenon is supported by elevation in RBC and MCV values at the 6week measurement. That was expected, since androgens and especially their 5j3-metabolites motivate erythropoiesis processes²¹.

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