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Effect of Ascorbic Acid Supplement on Hematological Parameters and some enzyme activities of Male Rabbits

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Abstract

The water-soluble micronutrient Ascorbic (vitamin C) is an essential for several biological activities. Ascorbic acid has a long history of usage in conventional processes that regulate the production of free radicals with antioxidant effects. Free radical levels in cancer cells have been documented to be high. The research aimed at studying hematological of the adult male rabbits. ascorbic acid (40mg/kg/BW/day for 12 weeks). The influence of ascorbic acid at the termination of a 12 week clinical cycle on complete counts of erythrocytes (CBR), hemoglobin (HB), cell-packed volume (PCV), total WBC, MCV, MCHC, mean plasma glutathione-s-transferease (GST), acetyl cholinesterase (AChE), and thiobarbituric acid-reactive substances (TBRS). Ascorbic acid therapy resulted in a substantial improvement ($P<0.05$) in RBC and WBC, while Hb, PCV, MCV, MCH, MCHC, GSH, AChE behavior were not changed in contrast with regulation. Compared to control community, the TBARS are considerably decreased ($P<0.05$). This search concludes the addition of a vitamin C supply to food will boost anemia and suppress free radicals in adult male rabbits for a long period.

Keywords: hematological parameters, free radical, acetylcholinesterase and ascorbic acid**.**

INTRODUCTION

A vitamin C is also available as a dietary substitute and a vitamin present in a range of foods. Vitamin C is also known ascorbic acid and used for scurvy prevention and recovery. It is often seen as one of the essential vitamins for human and animal health as it tends to repair tissues and create neurotransmitters. Vitamin C is also required for the performance of many enzymes required for the immune system function. It also works as an antioxidant. [1, 2]. as the recognized name of the vitamin C. It is present in different foods and acts as a nutritional supplement[1]. It is a nutrient. The first vitamin to be chemically developed was vitamin C found in 1912, was extracted in 1928, and in 1933[3]. It is the maximum powerful then safest medicine wanted in a condition system [4].

Vitamin C foods contain citrus, kiwifruit, broccoli, sprouts from Brussels, raw bell peppers, and strawberries[5, 6], respectively. Longer storage or cooking in foods may reduce the amount of vitamin C[5]. For normal physiological processes, the body needs vitamin C. It promotes tyrosine, follic acid then tryptophan metabolism[7].

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It help to reduce blood saturated fatty acid and to synthesize amino acids that control nervous system carnitine and catecholamine [8]. It is essential to develop tissues and treat wounds. It promotes neurotransmitter formation and improves iron absorption Darkness [9]. It prevents the group from the detrimental impact of the free radical and toxin [6, 9], becoming an antioxidant [10].

Biological pathways, exogenous stimuli and regulation of different enzymes and antioxidant compounds are used to generate free radicals in the body. Oxidative stress arises as the potential of free radical development to defend against it exceeds the potential to avoid it, contributing to trauma, inflammatory actions and chronic situations like atherosclerosis, degenerative diseases and cancer[11].

It has been proposed to mitigate oxidative harm to humans and thus to minimize the likelihood of specific chronic diseases through, vitamin C, vitamin E and β-carotene, also labeled "antioxidant vitamins." In cardiovascular trials, low L-ascorbic acid, tocopherol, and β-carotene plasma are correlated with cardiovascular disease [12, 13]. It can function as an antioxidant in vivo [14, 15] owing to the chemical and biological characteristics of ascorbic acid.

The lack in Vitamin D also has to do with numerous medical conditions such as bone softening, anemia, infections and bleeding gums, scurvy, poor wound healing, haemorrhage, degeneration of organs, atherosclerotic plaques and neurotic disorders. To fix deficiency, vitamin C is also made use of and may not contribute to problems. The research was intended to establish whether vitamin C supplementation has some impact on hematological parameters and amount of serum free radicals in adult male rabbits over a prolonged period of time.

MATERIAL AND METHOD

Ten adult male (White rabbits) were randomly split into a group of couples and each group had 5 representatives. Community II: Rabbits were provided with vitamin C.

Ascorbic acid continued injected in doses of 40 mg /kg BW once each day for 12 weeks at the end of the time, all rabbits in the community were slaughtered by ether anesthesia. The blood samples were obtained in different centrifuge tubes. Plasma was isolated by centrifugation at 3000 revolutions a minute for 10 minutes and then rapidly frozen at -20 degrees centigrade for antioxidant enzymes and free radical study.

Blood parameters and Enzyme Activities

The blood sample was collected in two tubes: EDTA (anti-coagulant) and Heparin (anti-coagulant) (anti-coagulant). Non-coagulated blood was tested for total leucocyte numbers (RBC), total erythrocyte counts (WBC), hemaglobin(HB), paced volume of cells (PCV), mean cell volume (MCV), medium hemoglobin (MCH) and mean cell haemoglobin concentration (MCHC) shortly after sampling by the particles counters (from ERMA INC.-Tokio. Model PCE-210) (MCHC). Plasma development activities are computed for Glutathione S-transferase (GST; EC 2.5.1.18) by [16].

The operation of acetylcholinesterase was estimated based on [17] the method was assessed for the plasma-thiobarbituric acid-reactive substances [18].

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Statistical Analysis

Where applicable, statistical analysis was carried out in Minitab software; statistical significance was assessed using two samples T- test analysis after detection normal distribution to the data and appropriate $P < 0.05$ consider significant [15].

RESULTS

As shown in Table1 the data were recorded upon the findings of Ascorbic acid on total erythrocyte counts (RBC), hemoglobin (Hb), packed cell volume (PCV), total leukocyte counts (WBC), mean cell volume (MCV), mean cell hemoglobin (MCH), mean cell hemoglobin concentration (MCHC), plasma glutathione-S-transferase (GST), acetyl cholinesterase (AChE) and thiobarbituric acid-reactive substances (TBARS) at end of the 12-week of treatment.

Treatment with Ascorbic acid produced significant ($P<0.05$) increase in RBC and WBC, while did not impact any changes in Hb, PCV, MCV, MCH, MCHC, the action of GST and AChE compared to control. TBARS are marginally ($P<0.05$) decreased compared with control community.

Table-1: The total means of various parameters at end of 12 week of therapy male rabbits with ascorbic acid (40mg/kg BW)

Parameters	Animal Groups	
	Control	Ascorbic acid
Total erythrocyte count (RBC; X 10^6/ mm^3)	5.4 ± 0.15^b	5.8 ± 0.23^a
Hemoglobin (Hb; g/dl)	13.9 ± 0.19^a	13.9 ± 0.21^a
Packed cell volume (PCV; %)	44.7 ± 0.47^a	44.6 ± 0.32^a
Total leukocyte count (WBC; x 10^3/mm^3)	7.1 ± 0.51^b	7.6 ± 0.48^a
Mean cell volume (MCV; fl)	83.2 ± 2.05^a	83.4 ± 2.44^a
Mean cell hemoglobin (MCH; pg)	26.5 ± 0.59^a	27.0 ± 0.59^a
Mean cell hemoglobin concentration (MCHC; dl)	31.1 ± 0.58^a	31.3 ± 0.48^a
Glutathione S-transferase (GST; µmol/hr)	0.88 ± 0.00^a	0.90 ± 0.011^a
Acetylcholinesterase (AChE; µmol substrate hydrolyzed/ min)	3.3 ± 0.09^a	3.3 ± 0.18^a
Thiobarbituric acid-reactive substances (TBARS)	0.30 ± 0.016^a	0.23 ± 0.011^b

Note: Values are means ± SEM of 5 rabbits in each group. Mean with separate letters (a- b) was slightly difference ($p \leq 0.05$). Mean with the same letters was non-significantly variation ($p \geq 0.05$).

DISCUSSION

In the present research, a relative increase in BW of 40 mg / kg of ascorbic acid was observed in 12 weeks following previous trials, but the lower dose of ascorbic acid (10 mg / kg / kg BW) was less potent [19]. Hematological parameters such as RBCs, WBCs, MCV, MCH and MCHC are helpful in monitoring the health condition [20].

Present research has demonstrated substantial ($P<0,05$) rises in RBC and WBC in ascorbic acid therapy, which have not contributed to any Hb, PCV,

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MCV, MCH or MCHC improvement compared with placebo. The results indicated that treatment with ascorbic acid ameliorated its detrimental effect on hematological parameters.

Similar findings have been reported by another research which study the Impact of ascorbic acid supplementation on the hematological parameters in rabbits [21], in common carp (cyprinus carpio l.) [22] and in Broiler chicks [23]. And this result refers to the absorption of about 80-90 percent ascorbic acid in the gastrointestinal tract[24].

The ingested acid circulates freely in the sperm, leukocytes and red blood cells, achieving a median plasma concentration of 68-86 μmol/l, with oral intakes of 90-150 mg per day. The body uses it within 2 hours and typically is bloodless in 3 to 4 hours [25]. In detoxifying many chemical substances, GST has been noted as having a significant role [26]. In innervated tissues, AchE is present where its role is to stop the propagation of nerve impulses. The red blood cell membrane also includes it [27].

Compared to control, couple enzymes are not handled ascorbically. These findings have been revised[28]. Free radicals and oxidants are both dangerous and beneficial since they may be hazardous or useful for the body. They are produced either by usual in situ metabols (pollution, smoke of tobacco, radiation, medication) or by external factors (pollution, smoke of cigarette, radiation, medication) (pollution, cigarette smoke, radiation, medication). When free radicals cannot consistently multiply, they can induce a condition called oxidative stress to concentrate throughout the body.

The human body continuously develops free radical and reactive oxygen species (ROS)[29]. The reactive lipid (LPO) thiobarbituric acid (TBAR) substances are considered to be oxydative stress markers[30]. LPO was assessed by measuring TBARS concentrations in plasma of ascorbic acid processed by male rabbits. The substantial decrease in TBARS in rabbits the treatment with ascorbic acid was in accordance with the previous studies [31]. These experiments were found the rabbits treated with ascorbic acid (20 otherwise 40 mg/kg B.Wt) shows rise in hematological parameters and decrease in TBARS in plasma.

CONCLUSIONS

Ascorbic acid is an antioxidant that preserves the body from the harm incurred by free radicals. It is seen in a number of health ailments. The ascorbic acid concentration of 40 mg kg was found to be optimal to boost the hematological parameters and decrease the free radical level in male rabbits in an experiment.

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