THE IMPACT OF EXPOSURE FOR GAMMA-RAY ON LIPID PROFILE AND HEMATOLOGICAL CRITERIA IN FEMALE ALBINO RATS

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Abstract - Electromagnetic wave has completely various impacts on the a few lipid profile and medical specialty criteria. In present study, the impact of the low dose rate of electromagnetic wave from 137Cs source at doses of 0.055 Gy, 0.11 Gy and 0.165 Gy was estimated on some blood factors of female albino rats. The result shows that all blood factors such as AST (aspartate aminotransferase), ALT (alanine transaminase), Alk. Ph. (alkaline phosphatase), MDA (malondialdehyde), cholesterol, triglyceride, HDL (High-density lipoprotein), Blood urea and blood sugar were increased with the increase of the gamma dose rate which was noticed to be significant at $P < 0.05$ with respect to the control group corresponding results. While, the outcomes acquired when increments of gamma beam dosages of rodents caused critical ($p \leq 0.05$) decline in the T. protein and LDL (Low-density lipoprotein) separate controls. These discoveries on a few lipid profile and hematological criteria propose that the adjustments in blood parameters of the treated rodents were because of the introduction of low dosages of gamma-beam.

Keyword - Hematological Criteria, Lipid Profile, Gamma-Beam, Female Albino Rodents

I. INTRODUCTION

Ionizing radiations, by and large, can prompt a comparable harm at the cell level. Notwithstanding, because of that alpha and beta particles are generally named non-infiltrating radiations, the outside presentation to such sort of radiation can brings about just confined harm to incorporate radiation consumes to the skin for instance [1]. Conversely, the gamma radiation and neutrons are most infiltrating when contrasted and alpha and beta radiations, at that point causing a diffuse harm in the body [2]. The gamma-beam can be characterized as electromagnetic radiation with an amazingly high recurrence and subsequently of high vitality. For the most part, it is ionizing radiation; consequently it is naturally unsafe radiation. Gramm beam is created, traditionally, by means of the rot of flimsy cores of particles as they are encountering a progress from the high vitality to a lower vitality express that known as gamma-beam deterioration/rot. In any case, gamma-beam may likewise be created through different procedures. The discharge of a molecule from the core with an energized state, gamma-beam is transmitted. The gamma beams are conveying the abundance vitality of the halfway energized core after a deterioration occasion happens.

These beams are with discrete vitality and this is normal for the particular nuclide considered. Thus, these energies can be utilized for motivations behind component portrayal. The gamma-beams are charge less; this implies they don't communicate with electrostatic powers as in that of charged particles, which lead to ionization of molecules straightforwardly along their way of movement [3]. The primary proof concerning the dangers of individuals presented to radiation is originating from epidemiologic examinations that inspect the rate of malignant growth in people groups who were presented to various dosages of radiation. The essential verification concerning the perils of people exhibited to radiation is beginning from epidemiologic assessments that examine the pace of dangerous development in social orders who were introduced to different doses of radiation [4]. Likewise sensible the opposite side of effects (negative) impacts that accomplish in illness of illumination in warm blooded creatures and winged animals when radiation portion over the basic levels [5].

The pointer of blood are overwhelmingly utilized to discover the wellbeing status in rodent, mice and fish while platelet check is a primary marker to advance the capacities of body's resistance. The finding and treatment of radiation infection is irksome and long range. The general well – known mischief marker to the living things are the periphery blood regards which variable inside and out bring down after low level segment of light [6]. Impact of gamma shaft on the tissue of natural addition with increase the announcement of imperativeness in the tissue which can incite variable in compound structure of the cell. Right when the imperativeness of ionizing radiation is by and large more than energies of commitment of various particles and can provoke hemolytic security parcel and yielding of discretionary electro [7]. It is seen the ionizing radiation effect on the tissue with obviously confining particles following their

excitation and ionization or by recommendation with accomplish of free radical, for example, hydrogen peroxide in the water of body [8], and moreover the peril of effect higher with segment of radiation and bit rate and furthermore the danger of effect higher with bit of radiation and bit rate [9]. Numerous analysts have considered the impact of ionization radiation on blood parameters in rodents by utilizing gamma-beam [10-14]. The aim of the present study is to impact of gamma ray that product from ^{137}Cs source on some lipid profile and hematological criteria such as AST, ALT, Alk. Ph. , MDA, T. protein, Cholesterol, Triglyceride, HDL, LDL, Blood urea and Blood sugar respective controls in female albino rats.

II. MATERIALS AND METHODS

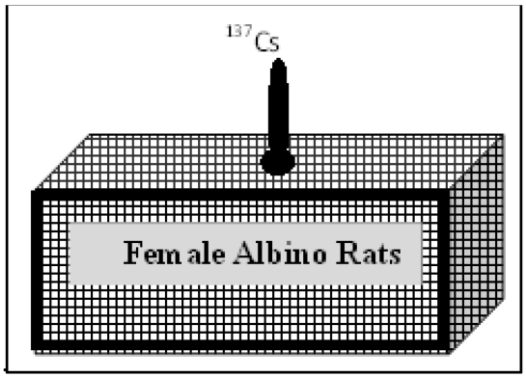


Fig. 1: set up experimental

Female albino rats were used in this examination that range between 2-3 months of age and 25-30 gm of weight. Sound these rodents were gained from the Faculty of Science, science office in were utilized in this examination that range between 2-3 months of age and 25-30 gm of weight. Wellbeing these rodents were obtained from the Faculty of Science, science office in University of Kufa. They were kept in plastic pens gave metal tops (20x30x30 cm estimations) steps were taken to ensure extraordinary neatness. Both the control and the gamma radiation presentation get-togethers' incorporating temperature and sogginess all through the examination were kept up 26oC ±2 and 35% ± 5%, separately, and changing the sawdust without fail. Supporting mix which contain 35% wheat, 34% corn 20% soybean, 10 % protein and 1% dried milk. They were in like manner gave water along the hour of experimentation [15]. In this examination, 12 blood tests were gathered from female pale skinned person rodents and put in EDTA tube from eyehole with 0.6 ml by hair like cylinder fittingly named. 12 rodents were separated into 4 gatherings with 3 rodents (R1) First gathering as control bunch didn't get any radiation, (R2) was lit up with 0.055Gy, (R3) was lit with 0.11Gy and (R4) was lit up with 0.165Gy. Animals were housed under composed conditions for light and temperature. An industrially arranged eating regimen and clean drinking water were given not indispensable. Light was performed using Cesium-137 source with 5 µCi from the International Atomic Energy Agency in a near to structure. The Cesium-137 radiation was normal in position was utilized with the objective that three animals could be simultaneously lit. The source put around a couple of centimeters from rodents confines in any portion got these mice in any trial as in figure 1. Toward the finish of exposition time, each gathering of creatures was anesthetizes with ether, and afterward blood tests were assembled by heart cut on heparin containing tubes One piece of blood was taken for entire blood consistency estimation.

2.1 Statistical Analysis

The statistical analyses of the results with graphing were obtained by using the programs [M.S. Excel and Minitab 17] for windows 7. These analyses include the following data: mean and standard deviation ANOVA and Independent test, comparisons between the results were carried out by their mean.

III. RESULTS AND DISCUSSION

Parameter		Female Albino Rats			
		Control	R1	R2	R3
Lipid profile	Cholesterol (mg/dl)	140±3.0	160±3.2	188±3.5	200±3.7
	Triglyceride (mg/dl)	133±2.75	140±2.85	177±3.75	199±4.05
	HDL (mg/dl)	44±1.90	100±2.93	144±3.66	177±4.20
	LDL (mg/dl)	39±1.88	37±1.08	35±1.07	30±1.00
Hematological criteria	AST(U/L)	40±1.90	99±3.11	120±4.91	133±5.22
	ALT(U/L)	30±1.10	44±1.78	.0056±2	99±2.18
	Alk.Ph.(U/L)	70±2.80	200±6.83	233±7.75	255±8.11
	MDA(mmol/ml)	11±0.93	20±1.08	25±1.18	33±2.00
	T. protein (g/dl)	8±0.70	7±0.60	5±0.50	5±0.45
	Blood urea(mg/dl)	33±1.7	77±3.17	80±3.79	87±4.47
	Blood sugar(mg/dl)	80±3.00	133±4.70	140±5.21	155±6.07

Table 1. Results lipid profile and hematological criteria in present study

After gamma irradiation measured and blood collection ,the lipid were achieved positive result, there were significant rise($p<0.05$) in lipid profile such as cholesterol as compared with control ,the results showed a significant high value($p<0.05$) of serum (TLC, TG, HDL), while LDL showed significant reduction in irradiated animals ,as compared to those of control animals ,high value of lipid profile is considered one of the most risk factors that caused different disease [16] such as cardiovascular disease and insulin resistance and diabetes [17] ,this is concurrence with prior reports that exhibited hyperlipidemia is as a result of entire body illumination [18].to a high portion of gamma - light induces dyslipidemia by virtue of raised serum triglyceride and cholesterol levels, diminished degrees of low-thickness lipoprotein (LDL) particles and expanded degrees of high-thickness lipoprotein (HDL),We thusly watched the lipid profiles of the 3 gatherings of creatures. Then again, serum levels of triglycerides and cholesterol were on a fundamental

level higher in illuminated rodents than in the benchmark gathering [19]. The light prompted hyperlipidemia may be caused changes in liver lipid handling and serum lipoproteins and might be because of backhanded impact of radiation through the arrival of various incendiary mediators [20]. The enzyme activity seen in table (1) indicated that AST, ALT and ALk.PH values were elevated in the blood serum of rat, this could be owing to spillage of the enzymes into the serum because of harm to the trustworthiness of the heart and liver. Raised serum movement of these catalysts has been accounted for to be pointers of determined danger of cardiovascular illness [21] ,the elevation of these enzymes in serum is demonstrative of hepatocyte damage prompting increment in cell film penetrability that encourage the entry of cytoplasmic mixes to blood .

Hepatic ALP is accessible on the canalicular and luminal zone of the bile epithelium and levels climb by temperance of expanded affiliation and following discharge into the spread because of biliary check [22]. In the present study it has been found that MDA was essentially increased ($p<0.05$) in rats that deal with irradiation, while showed significant decreased ($p<0.05$) in Total protein as compared to control. These results are consistent with those reported by [23]. Raised degree of MDA because of the over the top arrangement of free radicals and initiation of lipid peroxidation framework. The radiation-instigated Reactive Oxygen Species and lead to provocative reactions [24].radiation prompted DNA harm, lipid peroxidation and protein oxidation, for the most part started by radiation-incited ROS receptive oxygen species , are among the effects that could incite the cell unfriendly effects of gamma radiation [25]. The radiation-incited Reactive Oxygen Species and lead to red hot responses [24].radiation impelled DNA hurt, lipid peroxidation and protein oxidation, generally began by radiation-started ROS open oxygen species , are among the effects that could provoke the phone unfavorable effects of gamma radiation Protein carboxylation has been demonstrated to be a marker of protein hurt due to activated oxidative weight ,whereby carbonyl social events are added to the neighborhood protein provoking change in the protein structure and achieving loss of protein work [26]. Lipid peroxidation is the oxidative debasement of lipids as a result of radiation provoked oxidative weight. As a biomarker of radiation hurt, radiation-actuated ROS react with the polyunsaturated unsaturated fats in the phospholipid film bilayer, inciting loss of layer smoothness and adaptability, realizing cell layer hurt and over the long haul cell butchering [27]. There were significant increase ($p<0.05$) in blood urea and sugar ,height in urea level may result from gamma radiation incited cell layer harm pursued by the arrival of intercellular particles to the circulation system , The adjustments in urea may show kidneys failure[28]. Blood glucose increased ($p <0.05$) in rat exposer to gamma radiation ,this elevation in blood glucose to compensate the rise in insulin level to control on hyperglycemia .Induction Hyperglycemia caused early and sever the of B-cells dysfunction, elevated glucose level caused apoptosis of B-cells [29].

IV. CONCLUSION

In conclusion ,the gamma ray (Cesium-137) could have dangerous on lipid profile and hematological criteria or blood of female rat .Gamma-ray has produced a significant critical reduction in T protein and LDL separate controls and a noteworthy increment in AST, ALT, Alk. Ph., MDA, Cholesterol, Triglyceride, HDL, Blood urea and Blood sugar. Besides, considers are prescribed to demonstrate different issues of gamma-beam can represent the laborers in radiation branches as the therapeutic and counterfeit fields.

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