**Study the Effect of X-Ray on Users of Ray Devices in Hospitals of Holy Najaf Governorate**

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**ABSTRACT**

Of important areas in the field of scientific research study the effect of radiation on the body various physiological criteria. Some studies focused on the role of x-ray status, while others concentrated on lipid disturbances or even oxidative stress disorders in the users of x-ray devices, which selected 15 subject (study group) attending the in Al-Sadder Teaching City, Al-Hakeem and Al-Manathera hospitals in holly Al- Najaf governorate, and a group of 30 apparently healthy subjects were included as a control group. The study was carried out from January 2015 to April 2015. The age of control& study groups were range of 21-53y.

The results have been shown an significant increase (p>0.05) cholesterol , LDL & a significant increase (p<0.05) TG levels in study group as compare with control group ,also the results show significant decrease (p<0.05) HDL level in study group as compare with control group.

The results have been shown a significant positive correlation (p>0.05) among age with cholesterol, LDL and a significant correlation (p<0.05) between age with TG in study group. Also the results have been shown an significant negative correlation (p>0.05) among age with HDL in study group. The results have been shown a significant positive correlation (p>0.05) among duration work in x-ray with cholesterol, LDL and a significant correlation (p<0.05) between duration work in x-ray with TG in study group. Also the results have been shown a significant negative correlation (p>0.05) among duration work in x-ray with HDL in study group.

The present study concluded that lipid profile levels were effect with x-ray user ,age & duration work in x-ray.

**الخلاصة:**

من المجالات المهمة في حقل البحث العلمي دراسة تأثير ألاشعاعات على معايير الجسم الفسلجية المتنوعة، إذ ركزت بعض الدراسات على دراسة حالات التعرض لأشعة اكس, بينما ركزت بحوث اخرى على دراسة المتغيرات المختلفة على الدهون والجهد التأكسدي.

 اجريت هذه الدراسة على 15 شخص من مستخدمي اجهزة ألأشعة (مجموعة الدراسة) في مستشفيات والفرات ألأوسط الحكيم ومدينة الصدر التعليمية في محافظة النجف الاشرف 30 شخص سوي كمجموعة سيطره للمدة من كانون الثاني عام 2015 نيسان عام 2015 وكان اعمار (مجموعة الدراسة) والسيطرة من21-53 سنة.

 اشارت النتائج الى وجود زيادة غير معنوية(p>0.05) في معدل الكلسترول وLDL ووجود زيادة معنوية(p<0.05) في معدل وTG في مجموعة الدراسة مقارنة بالسيطرة ونقصان غير معنوي (p>0.05) في معدل HDL في مجموعة الدراسة مقارنة بالسيطرة، اشارت النتائج وجود علاقة موجبة غير معنويه ( P > 0.05) بين العمر والكلسترول، العمر وLDL ووجود علاقة موجبة معنوية (p<0.05) بين العمر وTG في مجموعة الدراسة كما اشارت النتائج وجود علاقة غير معنوية سالبة(p>0.05) بين العمر و HDL في مجموعة الدراسة.

 اشارت النتائج وجود علاقة موجبة غير معنويه ( P > 0.05) بين مدة العمل في الاشعة والكلسترول، مدة العمل في الاشعة وLDL ووجود علاقة موجبة معنويه (p<0.05) بين مدة العمل في الاشعة وTG في مجموعة الدراسة كما اشارت النتائج وجود علاقه غير معنوية سالبة(p>0.05) بين مدة العمل في الاشعة و HDL في مجموعة الدراسة نستنتج من الدراسة ان صورة الدهون في الدم تتأثر بوجود اشعة اكس والعمر ومدة العمل في الاشعة.

**Key word : X-ray ,cholesterol ,TG,HDL and LDL.**

**INTRODUCTION**

 Researchers have reported some seemingly contradictory or inconsistent findings of radiation health effects risks for exposed populations (1) which may be due to applied methods, differences in sensitivities or even epidemiological analysis of those populations, (2). One persistent notion in many reviews of low-dose effects is the hypothesis of reduced biological effectiveness of fractionated low-dose exposures, compared to that of the same acute dose (3). Evidence abounds that environmental and artificial magnetic fields which will include X-rays and ionizing radiations have significant impact on cardiovascular systems of animals and humans (4, 5). (6) reported some damage to the coronary arteries in patients receiving and in experimental animals leads to increased risk of cardiovascular diseases, possibly as a result of confounding factors (7).(8) also reported changes in cholesterol concentrations associated with long term radiation in Japanese atomic bomb survivors, also in various occupationally-exposed groups (9, 10), this they assumed was due to liver metabolism changes (11) associated exposure to ionizing radiation with mortality from circulatory system disease which is not consisten with any simple causal interpretation. (12), reported that stroke and heart diseases are associated with elevated exposures (above 0.5 Gy) leading to death as seen in many survivors of atomic bombs and cancer (13) reported a strong positive association between radiation doses at means whole body radiation dose was 8.6 mSv for men and 1.2 mSv for women and the risk of CVD mortality. also reported a measurable increases in cardiovascular disease mortality and arterial endothelial damage from both neutron and, to a lesser extent, gamma exposures at doses greater than 0.5 Sv. (14) had argued that While cardiovascular risks associated with high level of ionizing radiation are well-established, long-term effects of low and medium levels of exposure, between 0 and 5 gray (Gy), on the cardiovascular system are debated. On the other hand, beneficial effects of extremely low frequency electromagnetic fields (ELF-EMF) have also been reported (15). In diet-induced hypercholesterolemic rabbits, pulsed of EMF lowers total cholesterol and triacylglycerols levels (16); similar results have been found in rats (17) and mice (18) both fed on control diets. The likely mechanisms for such effects of low dose and/or chronic radiation exposures on cardiovascular disease are not clear but has suggested endothelial cell damage leading to some inflammatory response, inflammatory diseases like atherosclerosis can lead to myocardial infarction. (19) (2010) in a recent paper proposed a monocyte cell killing in the intima and some form of somatic mutation giving rise to more inflammation (20) (2009) had argued that given the multifactorial origin of cardiovascular diseases and the lack of a clear pathophysiologic mechanism, epidemiological results have to be carefully interpreted. Further research should be conducted in this area to deduce more biological evidence that will give a better understanding of course of events leading to theses damages, as such it is important to understand the time course effects of X ray radiation on serum lipid levels in biological models, exact knowledge of pathophysiological mechanisms if any of radiation induced cardiovascular damage after radiotherapy which might be useful for the detection of abnormal values and their early management especially in the asymptomatic patients. (21) this is because radiation therapy continues to pose a risk for delayed-onset cardiovascular disease (22).

**MATERIALS AND METHODS**

**study and healthy groups**

 This study was conducted on selected 15 subject (study group) attending the in Al-Sadder Teaching City , Al-Hakeem and Al-Manathera hospitals in holly Al- Najaf governorate , and a group of 30 apparently healthy subjects were included as a control group. The study was carried out from January 2015 to April .

**Collection of blood samples**

 Five milliliters of venous blood samples were drown using a disposable needle and plastic syringes from each patients and controls subjuct. Blood was left at room temperature for 10 minutes for clotting, centrifuged 6000 rpm for 10 minutes, and then serum was separated and transported into new disposable tubes.

 **Measurements**

**Measurements of total cholesterol (TC)**

 Total cholesterol kit for quantitative determination of total cholesterol in human serum was supplied by Biolabo SA, France .Enzymatic method described (23)

**Calculation**

 Calculate the result as follows:

Result = Abs(Sample)/Abs(Standard ) × Standard concentration

**Measurements of HDL- Cholesterol (HDL-C) (23)**

 Serum HDL-Cholesterol level was measured by HDL-Cholesterol phosphotungstic acid (PTA) precipitant kit (Biolabo SA, France) .

**Calculation**

Calculate the result as follows:

Result = Abs(Sample)/Abs(Standard ) × Standard concentration

**Measurements of Triglycerides** (24)

 Triglycerides kit for quantitative determination of triglycerides in human serum was supplied by Biolabo SA, France.

**Calculation**

Calculate the result as follows: Result = Abs(Sample)/Abs(Standard ) × Standard concentration

**LDL-cholesterol**

Plasma LDL-cholesterol was determined from the values of total cholesterol and HDL- cholesterol using the fried Wald's formula (1972) (25), LDL-C = TC–(HDL-C)–(triglyceride/5).

**Statistical Analysis**

 The data are presented as the mean ± standard error of mean (SEM) for the individual groups. Normally distributed data were analyzed using parametric tests, i.e. Student’s paired t-test and analysis of variance (ANOVA), a value of p<0.05 was considered significant. All statistical analyses were performed using the computer program Graph pad.

**Results**

 The results of table (1) indicate is a significant increase (P<0.05) in serum Triglyceride level in study group (70.37 ± 12.22) comparing with control group (39.77 ± 6.69)  , an significant increase (P>0.05) in serum cholesterol and LDL-C   level in study group (169.9± 26.61 and 92.04 ± 20.57 ) respectively comparing with control group (125.8 ± 21.4 and 92.04 ± 20.57) respectively, and an significant decrease (P<0.05) in HDL-C level in study group (29.29± 2.37 ) comparing with control group ( 48.21 ± 11.47)  .

Table (1): Serum level of lipid profile components in study and control groups.

|  |  |
| --- | --- |
|  GroupsCriteria  | Me ±SD |
|  Control | Study group |
| n=30 | n=15 |
| Cholesterol mg/dl |  125.8 ± 21.4  |  169.9± 26.61 |
|  TG mg/dl | 39.77 ± 6.69  |  70.37 ± 12.22 \* |
|  LDL-C mg/dl  |  92.04 ± 20.57 | 128.9± 22.95 |
|  HDL-C mg/dl | 48.21 ± 11.47   | 29.29± 2.37 |

 The results of correlation and linear regression between age and Cholesterol in study group are indicated, the presence of an significant positive correlation at the level of (p =0.06),figure (1).

Figure (1):Correlation between age and cholesterol in study group.

The results of correlation and linear regression between age and TG in study group are indicated, the presence of a significant positive correlation at the level of (p=0.05),figure (2).

Figure (2):Correlation between age and TG in study group.

The results of correlation and linear regression between age and HDL in study group are indicated, the presence of an significant negative correlation at the level of (p =0.41),figure (3).

Figure (3):Correlation between age and HDL in study group.

The results of correlation and linear regression between age and LDL in study group are indicated, the presence of an significant positive correlation at the level of (p =0.4),figure (4).

Figure (4):Correlation between age and LDL in study group.

The results of correlation and linear regression between duration work in x-ray and cholesterol in study group are indicated, the presence of an significant positive correlation at the level of (p =0.65),figure (5).

Figure (5):Correlation between duration work and Cholesterol in study group.

The results of correlation and linear regression between duration work in x-ray and TG in study group are indicated, the presence of a significant positive correlation at the level of (p =0.03),figure (6).

Figure (6):Correlation between duration work and TG in study group.

The results of correlation and linear regression between duration work in x-ray and HDL in study group are indicated, the presence of an significant negative correlation at the level of (p =0.44),figure (7).

Figure (7):Correlation between duration work and HDL in study group.

The results of correlation and linear regression between duration work in x-ray and LDL in study group are indicated, the presence of an significant positive correlation at the level of (p =0.47),figure (8).

Figure (8):Correlation between duration work and LDL in study group.

**DISSECTION**

 Serum lipid is common in critically ill patients undergoing radiation therapy. Although multiple disease states and medication may be responsible for the development of these disorders, the aim of this research study the effect of total body radiation utilizing the sequential changes in the serum lipids.

 The results show that there is an significant increase in serum cholesterol , LDL-C,a significant increase in TG and an significant decrease in HDL-C in x rays group comparing with control group as presented in figure (1, 3,2 & 4) respectively.

 Our results is in agreement with Kula *et al*. (1999) (26) reported a reduction in serum total lipids in human with increased exposures. This results indicate that the applied ionization radiations exposure may induce alterations serum lipids profile of human. The mechanisms for the effects of these ionizing radiations on serum lipid profile are not well understand yet, we suggest that the changes could be due to some nonspecific stress reaction.

 The results of our study establish the association of elevated TG/HDL ratio, similar to the study of Kannel *et al*. (27) Currently, when discussing because early identification will prevent the development of any chronic diseases with which it interacts.

 The results have been shown an significant positive correlation (p>0.05) among age with cholesterol , LDL and a significant correlation (p<0.05) between age with TG in study group in figures (1, 4 &2 respectively). Also the results have been shown an significant negative correlation (p>0.05) among age with HDL in study group in figure (7). This results in agreement Bhagya *et al* (2011) (28) Triglycerides & cholesterol level in plasma increased with age as HDL decreases and LDL cholesterol increase. There is a tendency in humans to see LDL,TG & cholesterol levels increase gradually with age, but there are exceptions, of course. Because our metabolism slows down as we age, our bodies no longer need that amount of fuel, in the form of food .

 The results have been shown an significant positive correlation (p>0.05) among duration work in x-ray with cholesterol , LDL and a significant correlation (p<0.05) between duration work in x-ray with TG in study group in figures (5, 8 &7 respectively). Also the results have been shown an significant negative correlation (p>0.05) among duration work in x-ray with HDL in study group in figure (6).This results is agreement Nwokocha *et al* (2012) (29) on rats there are subtle changes in serum lipids, electrolytes and protein after total body irradiation of normal rats. These variations could be due to non-specific stress reactions; as such, they are important markers in radiation induced injury diagnosis

**CONCLUSIONS**

 X-ray was found to be associated with lipid profile level. Lipid profile (cholesterol, LDL and Triglyceride ) were higher in study group while HDL was lower in study group . There a positive correlation between age and (,cholesterol ,TG, LDL-C)and negatively with HDL-C in study group, and there a positive correlation between age and (,cholesterol ,TG, LDL-C)and negatively with HDL-C in study group

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