Effect of Radiation on Employers in Radiology (X-rays, CT Scan and Magnetic Resonance Imaging (In Al-muthanna Province-Iraq)

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Abstract

The aim of this study was evaluated the effect of radiation on the hematological parameter of employers in X-rays, CT scan and MRI units, during the period from October-2016 up to March–2017. Fifty sample were examined in the present study as well as twenty apparently healthy people selected as the control, their ages ranged between 25-36 years old. The samples were examined by using hematological tests. The study showed a significant increase at (P<0.05) in Male, age groups (31-36) and blood group B. The study indicated a significant decrease at (P<0.05) in red blood cells(RBC) and hemoglobin (HB) compared with control groups. Also, indicated a significant increase at (P<0.05) in white blood cells (WBC), Neutrophil, Monocyte and Lymphocyte compared with control groups.

Keywords: Hematological, Radiation, MRI, CT scan, Iraq.

Introduction

The term “radiation” covers the electromagnetic spectrum, which includes static fields like the earth's magnetic field, fields generated by 50 or 60-cycle alternating currents, radio waves, microwaves, infrared, visible and ultraviolet (UV) light [1]. Radiation may be the sum around us it may be characteristically introduce to our nature's domain, mechanical restorative wellsprings and need been since the conception for this planet. Consequently, life need developed clinched alongside an surroundings which need critical level of ionizing radiation confusion initiated Eventually Tom's perusing transformations in you quit offering on that one alternately A greater amount of the β-globin gene loci that bring about lessened β-globin creation [2].

It is commonly divided into two categories Non ionizing (NIR) and ionizing radiation (IR) [3]. Non ionizing radiation will be low recurrence radiation that disperses vitality through high temperature What’s more expanded atomic development. It incorporates noticeable light; ultra violet rays; what are more microwaves, ultrasound, radio frequency, and a few electromagnetic waves. NIR usually interacts for tissue through that era for high temperature [3]. Ionizing radiation may be a characteristic and only the planet. It incorporates particles (alpha Also beta particles) Also A percentage electromagnetic radiation (gamma beams Furthermore x-ray) [4]. It will be utilized within symptomatic and in addition restorative purposes similarly as malignancy for A percentage cases; it might make the absolute best medicine about growth. it can stopping them from spreading as through irradiation modulates tumor - Cell phenotype and increases immune recognition [5].

Kim et al., [6] found that the used of radiation as following; in medicine, industry, security purposes and in-the study of solid objects. MRI is In light of the attractive properties for iota. Attractive reverberation innovation may be in view of the absorption what's more emanation from claiming vitality in the radio recurrence starting with Different figure tissues. MRIs utilize a capable magnet to prepare An attractive field pretty nearly 10,000 times stronger over those regular foundation attractive field prepared toward the earth, Furthermore produce a variable RF radiation in the1MHz to100 MHz extend [7]. A little percent-age from claiming hydrogen iota inside a human body will adjust to the static magnet-ic field. At focused, radio wave pulses would transmit should ward the
adjusted hydrogen iotas previously, tissues from claiming interest, the place they will reflect a feeble indicator. Pictures are makes through the gathering Also dissection of the reflected powerless radio signs.

These slight contrasts in the sign accepted starting with Different form tissues empower those MRI to prepare pictures about uncommon determination that separate organs, and conceivably contrast benevolent What’s more harmful tissue [8]. X-Ray that Because of those greatly helter skelter frequencies Furthermore energies from claiming these types of EMR, they have addition vitality should break compound securities clinched alongside living tissue. The well-known living impacts about x-beams would connect with that ionization of molecules [9]. Those a number sorts for X-beam gadgets include:-

- Radiographic frameworks (dental, podiatry, veterinary, medical, chiropractic)
- Fluoroscopic imaging frameworks (hospitals, radiologists)
- Cancer therapy
- CT Scan (Computed Tomography)
- Mammography
- Cabinet X-ray frameworks for security (baggage inspection at airports)
- Streamlined radiography (pipe welds, circuit table analysis).
- Bone thickness filters to identification about osteoporosis.
- Different medicinal what’s more examination requisitions.

A CT examine may be basically a complex publicizing kind of X-beam that camwood detract cross area pictures of the particular figure. These examine give fantastic bone point of interest toward shooting various X-beam beams through the muscle to with make a computer-generated picture. Whole-body filters oblige higher doses of the X-beam radiation on settle on these pictures [10].

As may be the individual’s body of evidence with different sorts from claiming. Ionizing radiation, X-rays, over those in length haul might the change hereditary material done units What’s more reason mutations prompting malignancy. It may be essential on understand that the measure about X-beam radiation utilized within the majority symptomatic methods is along these lines little that those danger is greatly low. Various X-beam examinations don’t show up will expansion risk, Also no breaking points have been put on the amount of therapeutically important X-beam examinations an individual might experience. However, it is continuously sheltered to expect that the same sort of impacts that happen.

In secondary doses for radiation Might happen during low doses; there-fore, it will be finer to attempt to decrease purposes of presentation to the extent that could be allowed. Patients ought further bolstering , though possible, minimize their purposes of presentation to X-rays, particularly to CT filters which ought further bolstering not be performed looking into ladies who might a chance to be pregnant [8].

So the aim of study is evaluation the effect of radiation on the hematological parameter of employers in X-rays, CT scan and MRI units in Al-Muthanna province -Iraq.

Materials and Method

Method

Fifty sample of blood from employers in rays unit participated in the present study as well as twenty apparently healthy people were selected as the control group that none of these people was exposure for any radiation. All sample and control group were completed hematological tests, and they divided according to effect of some factors as: sex, age, location and WBC count, during the period from October -2016 up to March – 2017.

Blood Samples

Five ml of venous blood were collected from each person (employers and controls) according to (questionnaire sheet paper Appendix 1) involved in the present study samples, and the collected blood was putting into EDTA polypropylene tube. The blood in the EDITA tubes was used to perform a Complete blood counts (CBC) test.

Hematological Parameters

Complete Blood Count (CBC)

A complete system of reagents of control and calibrator, (Sysmax-Kx-21) was used to determine complete blood count (CBC) of employers and controls that including (RBCs,
WBCs, Hb, PCV, Platelets, differentiation WBCs).

Principle of Apparatus System

50 ul of the blood taken by the apparatus, after that all complete blood parameter is recorded by (Sysmax-Kx-21) [11].

Statistical Analysis

The Chi-square test might have been used to analyses those generally predominance data, and contrasts were recognized noteworthy At P< 0.05. [12]

Results and Discussion

Effect of Some Factors (Sex, Age and Blood Group)

The present study showed significant increase at (P<0.05) in male, age group (31-36) years old and B B blood group compared with control group.

These results may be due to the most of samples which ranged between age group (31-36) years old, more than of male and they carried B blood group. These results are agreement with. [9]

Table 1: Effect of radiation on gender and blood groups

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>P value</th>
<th>Blood Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>A</td>
</tr>
<tr>
<td>25-30</td>
<td>23(6.00)[7.71]</td>
<td>20(4.00)[6.40]</td>
<td>(10.24)[2.41]</td>
</tr>
<tr>
<td>31-36</td>
<td>43(41.40)[0.08]</td>
<td>3(4.60)[0.56]</td>
<td>(22.76)[0.21]</td>
</tr>
</tbody>
</table>

*significant at P<0.05

Effect of Hematological Parameters

The present study indicated a significant increase at (P<0.05) in WBC, Neutrophil, Monocyte and Lymphocyte of employers in radiation as compared with control groups. This results may be due to defect in bone marrow production and the increased in lymphocyte rate may be relative with immune system because these cells have related with immune response against infection. These results are in agreement with the [13,14]. Also, the results showed a significant decrease at (P<0.05) in HB and RBC of employers in radiation as compared with control groups. These results may be due to the Hemoglobin substance Might make attributed of the decrease in the number from claiming red platelets. Also, the diminishing to hematocrit may a chance to be the outcomes for erythropoiesis failure, decimation from claiming develop cells, or expanded plasma volume. Also, the exhaustion from claiming fringe blood components might make a bone marrow syndrome. Also, two mechanisms were suggested to explain the reduction in hemoglobin concentration due to irradiation. Firstly, blockage of the incorporation of iron into hemoglobin due to disturbance in the bio generation structure of the hemoglobin molecule. Secondly, oxidations of hemoglobin iron causing loss of the biological structure and activity of hemoglobin molecule.[15]

Table 2: Effect of radiation on hematological parameters

<table>
<thead>
<tr>
<th>Age</th>
<th>RBC</th>
<th>HB</th>
<th>P value</th>
<th>Neutrophil</th>
<th>Monocyte</th>
<th>Lymphocyte</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-30</td>
<td>5(9.00)[1.78]</td>
<td>5(1.00)[16.00]</td>
<td>0.00001</td>
<td>3(8.00)[3.12]</td>
<td>5(0.80)[22.05]</td>
<td>2(1.20)[0.53]</td>
<td>0.00001</td>
</tr>
<tr>
<td>31-36</td>
<td>85(81.00)[0.20]</td>
<td>5(9.00)[1.78]</td>
<td>77(72.00)[0.35]</td>
<td>3(7.20)[2.45]</td>
<td>10(10.80)[0.06]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at P<0.05

References


