Biomedical & Pharmacology Journal Vol. **10**(2), 563-567 (2017)

Quantitative Study of the Effectiveness of Soft Laser on the Activity of the Blood Vessels in the Spleen of Diseased Mice with Cancer

AIDA Z. AL KAISSY[1], AHMED ANWAR ALBIR[2] and KHALIL ISMAIL A. MOHAMMED[3]

[1]Department of Physiology/ College of Medicine/ University of Baghdad, Iraq.
[2]Department of Basic Sciences/ College of Dentistry/ University of Baghdad, Iraq.
[3]Clinical Communicable Diseases Research unit / College of Medicine/ University of Baghdad, Iraq.
*Correspondent author E-mail: dr.alkarkhi@gmail.com

http://dx.doi.org/10.13005/bpj/1142

(Received: April 01, 2017; accepted: April 10, 2017)

ABSTRACT

In order to find out another strategy in treating cancer instead of drugs and surgical treatment, therefore, this study was designed to prove that: Firstly: the laser was a safe tool in treating cancer by increasing the number of blood vessels of the spleen without any side effects. Secondly: the laser was effective and successful in treating cancer by increasing blood supply through increasing the number of blood vessels of the spleen in diseased mice with cancer by exposure of the spleen to laser irradiation. Thirty two normal adult mice were selected randomly for this investigation. The mice were divided into four groups (n=8 each).The age of mice was50 days and body weight 37-44gm. Group A includes normal control mice non irradiated with laser, group B includes normal mice irradiated with laser, group C includes diseased mice with cancer non irradiated with laser, and group D includes diseased mice with cancer irradiated with laser. Both groups C, and D of mice were inoculated with mammary gland carcinoma, while groups of mice including B, and D were anaesthetized and irradiated with GaAlAs diode laser that directed to the spleen of mice for one hour twice daily at time interval of two hours during the entire period of exposure to laser irradiation (experimentation) which was 4 weeks. At the end of the experiment, all the mice were sacrificed and the spleen was quickly obtained. Sections were prepared by using a routine procedure and examined by light microscopy. The number of blood vessels for overall sections was counted by using mesh lens inserted into eyepiece of the light microscopy. There was a gradual increase in the range of the number of blood vessels of the spleen for normal mice irradiated with laser that reached to (10-13) in the fourth week of the experiment (the last week). There was also a gradual increase but fewer in the range of the number of blood vessels of the spleen for diseased mice with cancer irradiated with laser in comparison with the range of the number of blood vessels of the spleen for normal mice irradiated with laser, the range reached to (10-12) in the fourth week of the experiment. While, in the group of diseased mice with cancer non irradiated with laser, there was a decrease in the range of the number of blood vessels of the spleen in the fourth week of the experiment that was (7-7) when compared to the group of normal control mice non irradiated with laser which the range was (8-8) in the fourth week of the experiment (the last week). Spleen of both diseased mice with cancer and normal mice responded to the laser irradiation and brought about an increase in the number of blood vessels and as a result of this, there was an increase in the blood supply and that led to overcome the cancer, not to be doubted.

Keywords: Blood vessels, spleen, laser in medicine.

INTRODUCTION

The spleen is positioned in the abdomen, just below the diaphragm, and it is connected to the stomach. The spleen is considered to be the largest filter of the blood in the body[1, 2].The arterial supply contains smaller branches that are sheathed by lymphoid tissue, which forms the white pulp of the

spleen[3]. The location of the spleen in the circulatory system and with the specialty of its structure (lymphoid compartments), that makes the spleen a unique lymphoid organ[3].

The specific structure of the venous system of the red pulp gives this area the ability to filter the blood in order to get rid of aged erythrocytes. Arterial blood comes into cords in the red pulp, which made up of fibroblasts and reticular fibers and produce system of an open blood lacking endothelial lining[4]. Therefore, the structure of the spleen makes it able to get rid of aged erythrocytes from the circulation and that guides to the capable removing of blood – borne microorganisms and cellular wreckage[3].

Low level laser therapy (L L L T) is considered increasingly as a suitable choice for removal of pain[5]. Some researchers put forward for consideration that laser phototherapy has two effects, a local effect which occurs in the region treated by laser light, and a systemic effect through the release of metabolites[6-9]. The laser is an efficient tool for killing microorganisms for the reason that laser has both the energy and wavelength characteristics[10].

So, the objective of our presented work is to perform an evaluation involves in studying histometrically the effect of the irradiation with semiconductors of Ga Al Asdiode laser (wavelength 790nm)of low powered intensity on the activity of the blood vessels located in the spleen of diseased mice with cancer.

MATERIALS AND METHODS

Thirty two normal adult micewere selected randomly for this investigation. The mice were divided into four groups (n=8each).They were aged 50 days and body weight 37-44gm.The four groups of mice of our investigational work were arranged according to the following:

1. Group A: Considered as normal control mice nonirradiated with laser in order to compare with the other three groups of mice.
2. Group B: Represents normal mice irradiated with laser.
3. Group C: Represents diseased mice with cancer noniradiated with laser.
4. Group D: Represents diseased mice with cancer irradiated with laser.

As above mentioned, both groups C, and D of mice were inoculated with mammary gland carcinoma.

Groups of mice including B, and D were anaesthetized and irradiated with Ga Al As diode laser (wavelength 790 nm) of low powered intensity for one hour twice daily at time interval of two hours during the entire period of exposure to laser irradiation (experimentation) which was 4 weeks. The laser was directed to the spleen of mice including groups B and D.The distance between the object and the laser source was 1 cm. At the end of the entire period of the exposure to laser irradiation, all the mice of the experiment were sacrificed and the spleen was quickly obtained. Sections were prepared by using a routine procedure, and stained histology sections were examined by light microscopy. Moreover, the number of blood vessels for overall sections was counted by using mesh lens inserted into eyepiece of the light microscopy.

RESULTS

The counting of the blood vessels of the spleen of the mice in the overall stained histology sections indicated the following considerable notes:

- There was a gradual increase in the range of the number of blood vessels of the spleen for normal mice irradiated with laser that represent group B (Table 2)until the range reached to (10-13) in the fourth week of the experiment (the last week).
- There was also a gradual increase but fewer in the range of the number of blood vessels of the spleen for diseased mice with cancer irradiated with laser that represent group D (Table 4)in comparison with the range of the number of blood vessels of the spleen for normal mice irradiated with laser that represent group B(Table 2), the range reached to (10-12) in the fourth week of the experiment (Table 4).
- In group C, which includes diseased mice with cancer non irradiated with laser (Table 3), there was a decrease in the range of the number of blood vessels of the spleen in the fourth week of the experiment, the range was (7-7) when compared to

the group A which includes normal control mice non irradiated with laser (Table 1), the range was (8-8) in the fourth week of the experiment (the last week).

• n the same time, we observed that there was a notice able increase in the range of the number of blood vessels of the spleen for diseased mice with cancer irradiated with laser that represent group D(Table 4)which reached to (10-12) in comparison with the range of the number of blood vessels of the spleen for diseased mice with cancer non irradiated with laser that represent group C, the range was (7-7) in the fourth week of the experiment (Table 3).

The results for every group of mice were arranged as in the following tables:

DISCUSSION

Laser light has various characteristics of absorption, reflection, scattering, or transmission[11] inside the tissues. Besides, the spleen has soft parenchyma fully placed among vasculature.

So, the light of laser could easily penetrate the target tissue and affects the blood vessels of the spleen. According to this concept, the range of the number of blood vessels of the spleen for normal mice irradiated with laser that represent group B (Table 2) increased from the first week of the experiment to the fourth week (the last week) gradually until the range reached to (10-13) when

Table 1: Group of normal control mice non irradiated with laser (group A)

	Number of mice per group = 8				
Time	**Base line**	**1 week**	**2 weeks**	**3 weeks**	**4 weeks**
Range of the number of blood Vessels	5-6	6-6	7-8	8-8	8-8

Table 2: Group of normal mice irradiated with laser (group B)

	Number of mice per group = 8				
Time	**Base line**	**1 week**	**2 weeks**	**3 weeks**	**4 weeks**
Rangeof the number of blood Vessels	5-6	6-8	8-10	10-10	10-13

Table 3: Group of diseased mice with cancer non irradiated with laser (group C)

	Number of mice per group = 8				
Time	**Base line**	**1 week**	**2 weeks**	**3 weeks**	**4 weeks**
Rangeof the number of blood Vessels	5-6	6-6	6-6	6-7	7-7

Table 4: Group of diseased mice with cancer irradiated with laser (group D)

	Number of mice per group = 8				
Time	**Base line**	**1 week**	**2 weeks**	**3 weeks**	**4 weeks**
Rangeof the number of blood Vessels	5-6	7-8	7-8	8-10	10-12

compared to the range of the number of blood vessels of the spleen for diseased mice with cancer irradiated with laser that represent group D(Table 4) which was fewer and reached to (10-12) gradually also in the fourth week of the experiment. This was, because the action of the laser was more effective on the blood vessels of the spleen of the normal mice irradiated with laser than its effect on the blood vessels of the spleen of diseased mice with cancer irradiated with laser. In group C, that includes diseased mice with cancer non irradiated with laser (Table 3), there was a decrease in the range of the number of blood vessels of the spleen in the fourth week of the experiment, the range was (7-7) when compared to the group A that includes normal control mice non irradiated with laser (Table 1), the range was (8-8)in the fourth week of the experiment. This was, due to the suppressive action of the cancer on the normal growth of the blood vessels. Moreover, cancer causes damage to tissues surrounding the target.

There was a fact considered as the main goal of this quantitative study which cannot be ignored that there was marked action of the soft laser on the blood vessels of the spleen in the diseased mice with cancer irradiated with laser, the range of the number of blood vessels reached to (10-12) in the fourth week of the experiment (Table 4) in comparison with the range of the number of blood vessels of the spleen in the diseased mice with cancer non irradiated with laser which was (7-7) in the fourth week of the experiment (Table 3).That increase may be explained by the stimulatory character of the soft laser and using the suitable wavelength of the laser, also, due to the dramatic response of the cancer to laser irradiation in this quantitative study.

On the other hand, we must put in the eye of consideration that the entire period of our work was four weeks and the results were considered noticeable, while, it was published somewhere that prolonged period of laser irradiation for more than 10 days generates acute changes in the immune system[12].

We monitored that the action of soft laser on the activityof the blood vessels hasnot been studied yet according to the literature review which emphasized that there is no paper has been published including the use of soft laser in increasing the number of blood vessels of the spleen and then counting them in both normal and diseased mice with cancer in order to study the mentioned results quantitatively.

Generally, we cannot provide a precise explanation for both increasing and decreasing the number of blood vessels of the spleen in both normal and diseased mice with cancer because the uses of laser in the field of medical applications still represent a question that has given rise to much controversy.

Finally, it could be said that in spite of considering laser is a controversial subject, the results of our work and what above mentioned proved that laser succeeded in overcoming cancer by increasing blood supply through increasing the number of blood vessels of the spleen gradually and that was obvious in our quantitative study in the case of diseased mice with cancer irradiated with laser but fewer than the number of blood vessels of the spleen in case of normal mice irradiated with laser also.

CONCLUSION

The results of this quantitative study are promising and may represent a new treatment for cancer because; there was an increased gradual response of the spleen of diseased mice with cancer to laser irradiation. Therefore, we reckon that laser was an efficient and safe tool in treating cancer through increasing the number of blood vessels of mice spleen and then, caused increasing in the blood supply. Also, it is concluded in this quantitative study that the spleen of normal mice responded to the laser irradiation and brought about an increase in the number of blood vessels gradually, that means intern laser is an effective and successful tool in the medical applications and that will create positive signs towards the future.

ACKNOWLEDGMENT

The authors would like to introduce their thanks and gratefulness to all the colleagues that help to achieve this paper in Basic Science Department, College of Dentistry, Department of

Physiology and the Clinical communicable Diseases Research unit/ College of Medicine/ University of Baghdad

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