

Original Research Article

Visual acuity outcome after diode laser therapy in patient with diabetic retinopathy.

Abstract

Background and objective:

Diabetic retinopathy as an important complication of diabetic mellitus is a common cause of blindness in diabetic people .The purpose of this study is to investigate the efficacy of the diode laser on visual acuity in patients with diabetic retinopathy.

Methods and material:

In this descriptive analytic study, Medical records of patients with diabetic retinopathy who were candidates for laser therapy in Birjand valiAsr Hospital. High-risk diabetic patients with retinopathy were being treated by a diode laser with wavelength of 810nm. The visual acuity was evaluated of 3, 6 and 12 months after the intervention and the patient data was recorded. The data were collected with SPSS-15 and the distribution of descriptive data indeed of use of **Nonparametric Test, Wilcoxon and Mann-Whitney** compared the mean log Mar before and after laser photocoagulation on visual acuity.

Results:

This study was done on 50 patients (64 eyes) with diabetic retinopathy. 27 (54%) of patients were male and 23 (46%) were female. The results of this trial showed visual acuity from 1.21 logmar before laser therapy to 0.83 logmar 3 months after intervention was improved, but this improvement decreased with time after intervention, with 12 months after the intervention had been near before intervention. These results were not statistically significant ($p>0.05$).According to this study, the difference of visual acuity before intervention and 12 month after that did not have any significant relation to gender.

Conclusion:

According to these results, patient's visual acuity in logmar, 3 and 6 months after intervention improved; but did not 12 months after that. Laser therapy in patients with diabetic retinopathy does not have significant effect in reducing patient's visual acuity long time.

Key words: Diabetic retinopathy, Visual acuity, Laser therapy

Introduction:

The high prevalence of diabetes and its complications initial damage to the vascular system, the effect of increased mortality and morbidity in diabetic patients. One of the vascular complications of diabetes, retinopathy, an eye complication of diabetes is the most serious health and development over the last 40 years it has been reduced due Khtrkvry. However, since the prevalence of diabetes is retinopathy is a major problem remained. [2,1] Diabetes is the leading cause of blindness in those aged 20 to 74 years. The importance of this issue, since it appears that the risk of blindness in diabetics approved, 25 times more than other people. Blindness primarily as a result of advanced retinopathy, macular edema is clinically significant, occurs. The proliferative retinopathy in more than 50% of patients with type 1 and more than 10% in patients who had passes from their diabetes 15 years. [1,3,4]

Diabetic retinopathy divided into two stages of none proliferative diabetic retinopathy and proliferative diabetic retinopathy. None proliferative diabetic retinopathy usually appeared in the late first decade or early second decade of diabetes, the non-proliferative disease as more severe disease it has a chance of increasing it to proliferative over 5 years [2]. This is an opportunity to provide early detection and treatment of retinopathy. Diabetic retinopathy is the most common chronic complication of diabetes and its

complications is one of the most important and the most destructive and the most common cause of blindness in those aged 25-74 years in America. The risk of blindness in patients with diabetes is 25 times higher than non-diabetic patients [3]. Diabetic retinopathy, have direct relation to duration of diabetes which often in direct proportion to the late first or early second decade after the onset of diabetes occurs. Chronic hyperglycemia leads to increased secretion of vascular endothelial growth factor (VEGF) and the change in resistance tight junctions between cells and, ultimately, vascular leakage, and the creation of new blood vessels in the retina. [2] At the present time, improving the quality of health care, chronic disease such as diabetes mellitus and its complications, has become one of the most important public health problems[1].

Laser photocoagulation is recognized as one of known treatment in diabetic retinopathy. Laser treatment, found to reduces abnormal blood vessels in diabetic retinopathy. It is thought that the destruction of the peripheral parts of the retina by laser treatment reduces angiogenesis factors generated from the parts of the ischemic retina,so the macula is protected from damage caused by diabetic proliferative retinopathy [5]. Retinal photocoagulation proposed over 50 years ago by "Mir Shvvyt Cross" The first functional laser built in 1960 [6]. Since current therapies such as steroids and anti-neo-angiogenesis compounds (Anti-vascular endothelial growth factors) Unfortunately is temporary and require repeated injection into the vitreous fluid although retinal photocoagulation showed that 50% of patients retinopathy continued to progress despite retinopathy laser treatment, but it prevent of drastic reduction of visual acuity 7.

Because of the high prevalence of diabetes in our society [8,9], retinopathy have a major effect on quality of life in diabetes patients especially when visual acuity is less than 1.0 on the Snellen chart. Therefore, this study was done to determine the effect of diode laser treatment on visual acuity in patients with diabetic retinopathy.

Methods:

In this cross-sectional study 50 cases of diabetes who had needed laser photocoagulation enrolled in this study. The patients underwent complete eye examination and those who had high-risk proliferative retinopathy or clinically significant macular edema treated by diode laser with a wavelength of 810nm. Laser photocoagulation was done in focal or diffuse maculopathy just around the macula or directly on micro-aneurysms (The minimum distance from the macula to 500µm) and the number of points in each session, 280-70, and the size of the laser level was 50-100 µ. Pan-retinal photocoagulation also had the same wavelength of 810nm, the spot size was 300-500µ and the applied laser points were about 400-300µ. Patients follow-up 3, 6, and 12 months after laser treatment and re-examination consisted of, visual acuity by Snellen chart which converted to logmar. Visual improvement defines the reduction of Log mar. The data after collection entered to software SPSS 15 and in spite of distribution of the descriptive statistic due to absence of normal distribution of data to compare the mean Log mar visual acuity before of laser to Log mar visual acuity after laser photocoagulation of Wilcoxon and to compare between two groups of Mann-Whitney test and to compare to the average visual acuity after laser therapy in 3, 6 and 12 months by analysis of repeated variance at a difference in the $\alpha \leq 0.05$ were used. The laser photocoagulation treatment in diabetic retinopathy is one of the management rules, with full explanation of treatment in comparison with other methods of treatment to the patient and informed consent for this study was conducted.

Results:

In this study 50 patients (64 eye) attended, that 27 persons of them (54%) Male and 23 persons (46%) Were female. The average age of patients was 9.7 ± 61 years. In

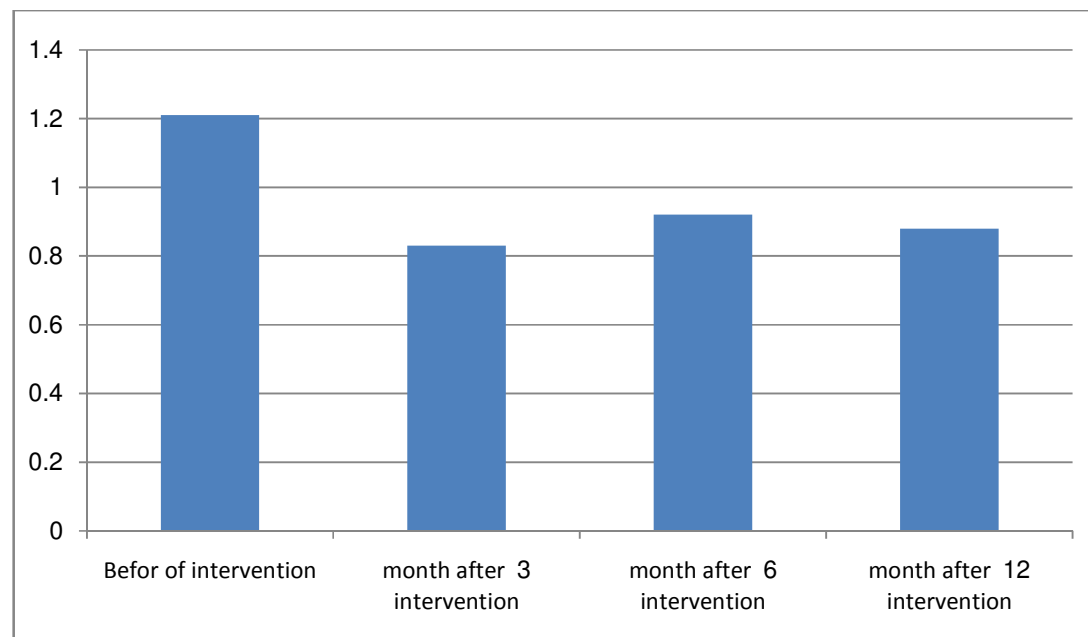
table 1 the frequency of patients on the basis of sex and changes in Visual acuity before and after laser therapy shows. In this comparison, as it showed in table 1 the difference of visual acuity before and after 12 months of intervention, increased in men and decreased in women, but this difference was not significant.

In comparison to the other depending variable on the amount of Visual acuity the patients visual acuity before the laser treatment was 1.21 Log mar that this, three months after intervention showed recovery of Visual acuity to 0.83 Log mar and after six months reached to 0.92 and the final follow up after 12 months was 0.88 log mar (table .1).

Table 1.Distribution of patients according of sex and visual acuity before and after laser photocoagulation			
Variable	No	SD±Mean	Mann-Withney test
Sex			
Male	34	0.15±0.54	Z=1.25
Female	30	- 0.34±0.82	P= 0.23

The survey showed (Figure 1) that despite the improvement in Visual acuity before and after the laser treatment, but these differences was not statistically significant using repeating ANOVA test. ($P>0.05$)

Figure 1. Comparative study of visual acuity before and after retinal photocoagulation



Discussion and conclusions

In our study, the Visual acuity of patients with diabetic retinopathy after 3 months and 6 months of laser treatment compared to baseline increased. In a study by Lima and his colleagues' Visual acuity of 48% of patients with diabetic retinopathy after 3 weeks laser photocoagulation improved [10]. Another review by Solaiman KA and his colleagues, showed that Visual acuity of patients with diabetic retinopathy after 6 months of laser therapy or after the intravitreal injections, or both regime with the intervention. In all three groups it had improvement after the intervention, but only

in groups that had received combined treatments or only intravitreal injections it showed statistically significant difference. [11].

In these three groups [11] of Soliman and his colleagues as our study reduced Visual acuity after the intervention of laser photocoagulation could possibly be due to differences of laser photocoagulation or lack of controlling the blood glucose, lipid and blood pressure. The other suggestion in this patients may be in advanced stage of retinopathy that the laser treatment alone has not impact on improvement of Visual acuity. The above factors probably cause exacerbation of symptoms of retinopathy.

In a similar survey by the Jain and colleagues on the Visual acuity in diabetic macular edema, Visual acuity of patients from 20/45 before of intervention reached to 20/40 after 4 months that it was statistically significant [12] as well as the Shimura.MI and his colleagues report that Visual acuity of 43% of diabetic patients with macular edema after 6 months of intervention improvement found [13].

In studies that evaluate the therapeutic methods in diabetic retinopathy for systematic meta-analysis, steroid injections and Anti-VEGF in the liquid inside the vitreous describe that only a small group which using these remedies obtain good vision and therefore it necessitate to investigate new therapies as part of the priorities of the therapy in diabetic retinopathy [14, 7].

In another study by Shrestha A and his colleagues invoked a comment that in less developed countries, laser therapy is now more available and it is the preferred treatment.[15] Our study result in short time was similar to this report, but current

therapies including laser photocoagulation and intravitreal injection therapy have themselves treatment restriction. Therefore according to our study, and other results [16] that emphasis in this paper it is necessitated to do research to find an impressionable prevention and therapeutic manner in this common diseases. The lack of timely lookup and accepting the initiation of treatment in the early stage of retinopathy and the low number of patients were the limitations of this research.

Conclusions:

Early visual improvement after laser treatment in patients with diabetic retinopathy and reduce the impact of laser treatment in the long term could be appearing due to progression or not controlling retinopathy risk factors. So, awareness to control the strengthening diabetic retinopathy risk factors as well as there is not a definite curing approach. Hence, while the patient experience of more effective therapies they already should know the next time visit to control their diseases.

Suggestions:

Due to the high incidence of diabetes and its debilitating effects, it is essential that factors precipitating or exacerbating the intervention on retinopathy include: Hyper lipidemia, hypertension and smoking in patients on therapy controlled. With regard to the Visual acuity of patients with diabetic retinopathy after laser therapy reduced in the long term effect, it is recommended for patients after treatment of frequent recourse to control Visual acuity and a full examination of the eyes, if it progress again beginning proper treatment. Obviously the information gained from this study is appropriate to carry out further investigation and future studies would provide the

necessary solutions be familiarizing on increasing the quality of life in diabetic retinopathy patients.

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