



Research Article

A PROFILE OF DIABETIC RETINOPATHY PATIENTS RECEIVING GREEN LASER FROM 2015 TO 2019 IN D.I.KHAN DIVISION, PAKISTAN

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ABSTRACT:

Background: Diabetic retinopathy (DR) is one of the leading cause of blindness worldwide and laser therapy has a basic role in the control of diabetic retinopathy. Green laser therapies are performed both for proliferative diabetic retinopathy and diabetic macular edema. The aim of our study was to determine the frequencies of different stages of diabetic retinopathy in patients undergoing laser in our setup.

Materials & Methods: This descriptive study was conducted at the department of Ophthalmology, Gomal Medical College, D.I.Khan, Pakistan from January 2015 to December 2019. The sample consisted of all the diabetic patients undergoing green laser procedures during this period at Eye Unit, DHQ Teaching Hospital D.I.Khan Pakistan.

Results: Out of a total of 1,893 green laser procedures performed for diabetic patients from January 2015 to December 2019, 1,011 were male and 882 were female. 969 (51.1%) patients were having relatively early stages of DR, 676 (35.7) patients had advanced DR and 248 (13.1%) had diabetic macular edema (DME).

Conclusion: Laser therapy is frequently needed for the control of diabetic eye disease so keeping in mind the disease burden the laser facilities should be expanded in our setup.

KEY WORDS

Diabetic Retinopathy, Green Laser, Photocoagulation, Severe NPDR, PDR.

1 | INTRODUCTION

1.1 | Background

Diabetic retinopathy (DR) is the leading cause of blindness in the working-age group globally¹. International Diabetes Federation has recently released an estimated figure of 537 million diabetics worldwide and 33 million people are affected in Pakistan. A review study on diabetic retinopathy has estimated that globally 35% of people with diabetes had some form of DR, and that 7% had proliferative diabetic retinopathy (PDR), 7% had diabetic macular edema (DME), and 10% were affected by these vision-threatening stages of diabetic retinopathy². Laser (Light Amplification by Stimulated Emission of Radiation) therapy has long been used for the treatment of retinal diseases since the discovery and implementation of argon laser with emission in the blue and green spectrum range by Bridges in 1964³. The indications included but limited to proliferative diabetic retinopathy (PDR), diabetic

macular edema (DME), retinal vein occlusions, central serous chorio-retinopathy and vascular tumors⁴. The laser energy is absorbed by the melanin pigment in retinal pigment epithelium (RPE) and choroid and hemoglobin leading to photo-coagulation of the retina and formation of a chorio-retinal scar in the area later on. The exact mechanism through which this laser therapy leads to regression of vascular disease is not known but it has been proposed that as result of retinal ablation, the ischemic tissue decreases leading to decreased oxygen demand and the resulting decreased level of retinal hypoxia leads to down regulation of angiogenic factors and vascular endothelial growth factor (VEGF) production decreases. This results in increased oxygen perfusion of remaining viable retina⁵. The focal or grid laser treatment for DME has also been proposed to occlude the leaking micro-aneurysms in the macula and stimulation of cytokine production that leads to re-absorption of fluid from the macula^{6,7}.

Typical laser settings for conventional retinal photocoagulation utilize pulse durations from 100 to 200 milliseconds (ms), laser spot diameters from 100 to 500 micrometers (um), and powers from 100 to 750 milliwatts (mW) with the application of 1000 to 2000 medium-intensity burns in the peripheral retina, spaced one half to one spot width apart⁸. A complete PRP treatment can be divided into two or three treatment sessions to minimize side effects and patient discomfort. The Diabetic Retinopathy Study (DRS) was the first large, prospective, multi-center, randomized clinical trial of the efficacy of retinal laser photocoagulation, specifically to evaluate the timing of PRP in eyes with very severe non-proliferative diabetic retinopathy (VSNPDR) and with PDR⁹. With regards to the use of conventional laser photocoagulation for the treatment of diabetic macular edema, the Early Treatment Diabetic Retinopathy Study (ETDRS) was one of the earliest prospective, multi-center, randomized clinical trials to demonstrate the efficacy of focal (direct/grid) laser therapy for the treatment of clinically significant macular edema (CSME)¹⁰. Green laser therapy for diabetic retinopathy has been used in our unit based on the results of these two studies.

1.2 | Research Objectives

- To determine the distribution of stages of diabetic retinopathy in patients receiving green laser treatment in our setup.

2 | MATERIAL AND METHODS

2.1 | Design Duration and Setting

This descriptive study was conducted at the department of Ophthalmology, Gomal Medical College, D.I.Khan, Pakistan from January 2015 to December 2019. The sample consisted of all the diabetic patients undergoing green laser procedures during this period at Eye Unit, DHQ Teaching Hospital D.I.Khan Pakistan. Proper approval from the ethical committee of Gomal Medical College, DIKhan was taken before starting the study. Green laser procedures consisted of either pan-retinal photocoagulation (PRP) for proliferative diabetic retinopathy or focal/grid laser for diabetic macular edema (DME). It was performed with mono-spot slit-lamp delivery system, Nidek GYC-1000, Japan in all patients under topical anesthesia using a wide-field Mainster PRP contact lens. The energy level, spot size and duration was titrated from case to case to get the desired effect.

2.2 | Population & Sampling (Size, technique, selection)

The sampling technique was consecutive, non-probability technique.

2.3 | Exclusion Criteria

All patients in whom green laser treatment was not possible due to any reason were excluded.

2.4 | Sample Analysis Plan

Sample was described by frequency and percentage using SPSS 20 software.

3 | RESULTS

Out of a total of 1,893 green laser procedures performed for diabetic patients from January 2015 to December 2019, 1,011 were male and 882 were female (Table-1).

TABLE 1 Gender Distribution

Gender	Frequency	Percent
Male	1011	53.4%
Female	882	46.6%
Total	1893	100%

Year-wise distribution of cases is shown in Table No.2.

TABLE 2 Year-wise Distribution of cases of DR

Year	Male	Female	Total
2015	189 (52.8%)	169 (47.2%)	358 (100%)
2016	231(53.8%)	198 (46.2%)	429 (100%)
2017	198 (53.1%)	175 (46.9%)	373 (100%)
2018	201(55.2%)	163(44.8%)	364 (100%)
2019	192 (52.1%)	177 (47.9%)	369 (100%)

Overall distribution of green laser performed across different stages of DR is shown in Table No.3.

TABLE 3 Distributions of Different Stages of DR

Stage of DR	Frequency	Percent
SNPDR	510	26.9%
VSNPDR	459	24.2%
PDR	528	27.9%
Advance PDR	148	7.8%
DME	248	13.1%
Total	1893	100%

4 | DISCUSSION

The Diabetic Retinopathy Study (DRS) was one of the first controlled clinical trial that recommended the conventional laser therapy for very severe non-proliferative diabetic retinopathy (VSNPDR) and PDR, but in our setup due to ignorance about the complications of diabetes, the patients fail to complete the follow up and so may present with complications like vitreous hemorrhage (VH) or tractional retinal detachment. Therefore we have adopted to do laser photocoagulation for even severe non-proliferative diabetic retinopathy (SNPDR) cases.

A total of 1893 patients undergoing laser treatment over a period of five years indicates a significant disease burden although we lack proper statistical data about the disease in our setup. Most of the patients having these advanced stages of DR may be having other micro-vascular complications like diabetic nephropathy, cardio-vascular disease and peripheral neuropathies leading to further burden on the already weak health system.

Table-2 shows 510 cases of SNPDR received laser over this period of five years apart from more severe stages of DR. 148 cases were having advanced PDR ie they were having either tractional retinal detachment or vitreous hemorrhage. Such cases pose significant challenge regarding their management as application of laser therapy becomes difficult due to compromised view of the retina¹¹. 248 patients were having DME that was significant enough to cause visual compromise. Such cases not fully respond to conventional laser therapy and usually needs additional pharmacological therapies¹².

Conventional green laser therapy is not without side effects and disadvantages. A significant disadvantage is patient discomfort that sometimes prevents proper laser therapy and needs multiple sessions. Side effects are rare but may cause scotoma, peripheral visual field loss, defective color and night vision, exudative retinal detachment, raised intra-ocular pressure, cystoid macular edema, choroidal neovascularization and extension of laser scar specially in the macula^{13,14,15}. Laser therapy has evolved and improved significantly over the last couple of decades leading to decrease patient discomfort and improved anatomical and visual results. Some of these innovations include Pattern Scanning Laser (PASCAL)¹⁶, Sub-threshold Micro-pulse lasers¹⁷ and Selective Laser Therapy¹⁸.

5 | CONCLUSIONS

A significant number of diabetic patients needs laser therapy for the control of their diabetic retinopathy in our area. So the laser services should be expanded including the availability of modern laser platforms for better disease control and patients comfort.

6 | LIMITATIONS

As we lack proper statistical data of our diabetic patients, the need assessment for laser therapies of diabetic patients cannot be properly estimated from our study.

Ethical Approval

No ethical approval was required for this study.

Conflict of Interests

None declared.

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