ORIGINAL ARTICLE

THE EFFECT OF PANRETINAL PHOTOCOAGULATION TREATMENT ON VISION-RELATED QUALITY OF LIFE OF PATIENTS WITH PROLIFERATIVE DIABETIC RETINOPATHY AT KARIADI HOSPITAL

Dea Prita Caesarita[1], Arief Wildan[2], Afrisal Hari Kurniawan[2], Andhika Guna Dharma[2]
[1] Resident of Ophthalmology Department of Diponegoro University, Kariadi Hospital, Semarang, Central Java
[2]Staff of Vitreoretina Subdivision, Ophthalmology Department of Diponegoro University, Kariadi Hospital, Semarang, Central Java
Email: deadeadea27@gmail.com

ABSTRACT

Objectives: Proliferative Diabetic Retinopathy (PDR) is one of the leading causes of blindness and visual loss. Panretinal Photocoagulation (PRP) reduces the risk of severe vision loss in PDR. Good visual acuity results can improve vision-related quality of life. The objective of this study is to evaluate the effect of laser PRP on patients with PDR on vision-related quality of life.

Methods: In this prospective study, 30 PDR patients (12 men and 18 women) treated with PRP were included (mean age: 51 years, SD: 5,08 years). On average, patients received 1.264 laser spots. The National Eye Institute 7-Item Visual Function Index (VF-7) was used to evaluate patient's vision-related quality of life. The VF-7 was filled in by interview twice, at the beginning before laser PRP and at least 1 month after the completion of PRP. Comparison of VF-7 before and after laser PRP was performed. The correlation between alteration in visual acuity and VF-7 will be evaluated.
Results: Mean VF-7 before laser PRP was 7.00 ± 0.00 and after laser PRP it was 3.43 ± 3.16 ($p<0.001$, Wilcoxon). VF-7 scores had a statistically significant difference between before and after laser PRP ($p<0.05$). There was a strong correlation between VF-7 score alteration with visual acuity ($p <0.001$, r 0.748).

Conclusion: There was a significant improvement in vision-related quality of life following panretinal photocoagulation of patients with proliferative diabetic retinopathy.

Keywords : Proliferative diabetic retinopathy, Panretinal photocoagulation,Vision-related quality of life.

INTRODUCTION

Diabetic retinopathy (DR) is one of the leading causes of blindness and vision loss in adults. Diabetic retinopathy is one of the microvascular complications of diabetes mellitus (DM). Almost all patients with type 1 diabetes and 60% of patients with type 2 diabetes will experience these complications in 15 to 20 years after the diagnosis of diabetes mellitus. In 2011, diabetic retinopathy was the third most common complication of diabetes mellitus according to a study based in Indonesia. In 2013, there was an increase in the number of patients with diabetic

retinopathy in Indonesia by 29.41% from the previous year. The incidence of retinopathy may increase as the incidence of DM and uncontrolled blood sugar increase.[1,2]

Studies reported that the majority of patients with DR have disease progression, and a significant percentage develop vision-threatening complications, such as proliferative disease and macular edema. Blindness due to diabetic retinopathy needs to be prevented as it can reduce the quality of life and productivity of patients.[3,4]

Management of diabetic retinopathy can be done with various options depending on the severity of diabetic retinopathy. One of the treatments that can be done is Panretinal Photocoagulation (PRP) laser. PRP is performed to reduce the risk of vision loss in patients with high risk of PDR and some severe cases of NPDR.[5]

According to the Diabetic Retinopathy Study, PRP lasers can reduce 50% the risk of severe vision loss in patients with severe PDR and NPDR when compared to non-lasered eyes. The main effect of PRP laser is to reduce the level of vision loss in a preventive manner, however patients with vision loss cannot be restored with laser therapy.[6]

Vision in people with diabetic retinopathy can affect daily activities that require vision function and the patient's quality of life. Quality of Life (QoL) is one way to measure patients' personal and social context, especially in patients with chronic diseases. QoL measurements in clinical practice can ensure that the treatment and evaluation are directed to patients in general and not just their diseases.[7]

Visual Functioning Index 7 (VF-7) is several questions that can help determining the Quality of Life associated with visual function. Visual Functioning Index 7 has been shown to improve the measurement of visual acuity clinically. QoL value can be used as evaluation material for DR patients regarding PRP laser and the effect of this therapy on the patient's quality of life. [8]

METHODS

This study used a prospective method involving 30 patients (12 men and 18 women) with Proliferative Diabetic Retinopathy (PDR) who underwent PRP laser in the polyclinic and CDC of Dr. Kariadi Semarang. The inclusion criteria in this study were patients with diabetes mellitus, PDR which needed PRP laser according to the criteria for the Early Treatment of Diabetic Retinopathy Study. The exclusion criteria were patients who had not previously received fundal laser therapy, significant ocular pathologies such as uncontrolled glaucoma, cataracts, and age-related macular degeneration. Patients who were matched inclusion and exclusion criteria signed a consent form. Patients who consented were assessed for visual acuity

using LogMar, before and after the PRP laser. Patients were then asked some questions in the form of questionnaire, namely the Visual Function Questionnaire (VF-7), before and after the PRP laser, to determine the difference of QoL. The questionnaire was administered 1 month after PRP laser to patients who received a laser number of at least 1,000 laser spots and without complications such as intravitreal hemorrhage. Visual acuity assessments were assessed before and after laser using LogMar.

VISION-RELATED QUALITY OF LIFE ASSESSMENT

Quality of life assessment in this study used the Visual Function Index 7 (VF 7) that includes several questions to determine QoL related to the visual function that has been tested to improve visual acuity measurements clinically. The VF-7 consists of 7 questions regarding difficulties in driving a vehicle, seeing fine prints, watching television, walking on the sidewalk or going up and down the stairs, seeing traffic signs or names of shops, cooking, and sewing or chopping wood.

STATISTICAL ANALYSIS

The independent variable in this study was PDR with panretinal photocoagulation laser. The dependent variable of this study is QoL. Data was tested for normality with the Shapiro Wilk test. To evaluate the effect of the PRP laser on quality of life related to vision, Wilcoxon test was performed by comparing VF-7 scores before and after the PRP laser. Spearman rank correlation was used to determine the correlation of the PRP laser effect on vision, therapy and quality of life before and after PRP laser.

Table 1. Characteristics of Research Subjects

Variable	F	%	Mean ± SD	Median
Age			51.37 ± 5.08	52 (42 - 64)
Gender				
Male	12	40.0		
Female	18	60.0		
BMI			23.17 ± 2.02	22.63 (19,47 - 28.73)
Diabetes mellitus				
Yes	30	100		
No	0	0		

2. Visual acuity

Table 2 explains the visual acuity before PRP laser (mean 1.0667) and after PRP laser (mean 0.87733) using LogMar. Table 3 shows that the results of visual acuity have increased significantly after PRP laser.

Table 2. Comparison of visual acuity in the eye before and after PRP laser.

	Vision Pre-PRP Laser	**Vision Post-PRP Laser**
N	30	30
Mean	1.0667	0.8733
Std. Deviation	0.44282	0.44870
Median	1.3000	0.8000
Minimum	0.10	0.10
Maximum	1.60	1.60

Table 3. Wilcoxon signed rank test

Vision	**Mean ± SD**	**Median (min - max)**	**p**
Pre PRP laser	1.07 ± 0.44	1.3 (0.1 - 1.6)	0.045
Post PRP laser	0.87 ± 0.45	0.8 (0.1 - 1.6)	

Significant: (p <0.05)

3. Quality of Life (VF-7)

Table 4 explains that Qualitative assessment of the results obtained, there was an increase in the VF7 score in 30 patients, and no patient had the same score or a decreased score after PRP laser was performed. Table 5 shows that the mean VF-7 scores before the PRP laser (7.00 ± 0.00) and after the PRP laser (3.43 ± 3.16) were analyzed using Wilcoxon, namely P <0.001. Wilcoxon had a statistically significant difference when P <0.05, therefore the mean VF-7 score before and after the PRP laser was statistically significant.

Table 4. Quality of Life (VF-7) before and after PRP laser.

Question	**Answers Pre-PRP Laser**		**Answers Post-PRP Laser**	
	Yes	No	Yes	No
1	30 (100%)	0 (0%)	20 (66.7%)	10 (33.3%)

2	30 (100%)	0 (0%)	12 (40%)	18 (60%)
3	30 (100%)	0 (0%)	17 (56.7%)	13 (43.3%)
4	30 (100%)	0 (0%)	12 (40%)	18 (60%)
5	30 (100%)	0 (0%)	17 (56.7%)	13 (43.3%)
6	30 (100%)	0 (0%)	13 (43.3%)	17 (56.7%)
7	30 (100%)	0 (0%)	12 (40%)	18 (60%)

Information:
Question 1: driving a vehicle.
Question 2: see small print.
Question 3: watching television.
Question 4: walk on the sidewalk or go up and down stairs.
Question 5: read traffic sign or shop name.
Question 6: cooking.
Question 7: sewing or cutting wood.

Table 5. Wilcoxon's signed rank test on Quality of Life (VF-7)

VF-7 Score	Mean ± SD	Mean	p
Pre PRP laser	7.00 ± 0.00	7 (7-7)	<0.001
Post PRP laser	3.43 ± 3.16	3 (0-7)	

Significant: (p <0.05)

Table 6 and chart 1 explain the relationship between differences in vision in the eye before and after laser (-0.15 (-1.2 - 0.9) with the difference of VF-7 scores before and after PRP laser (-4 (-7 - 0) analyzed using the Spearman rank correlation obtained P <0.001, R = 0.748, which showed a significant, positive and strong correlation.

Table 6. Spearman correlation test of Vision to Quality of Life (VF-7).

Variable	**Median**	**p**	**r**	**p**
Pre PRP laser	0.15 (-1,2- 0.9)	<0.001	0.748	Signifi-cant, positive, strong
Post PRP laser	-4 (-7 - 0)			

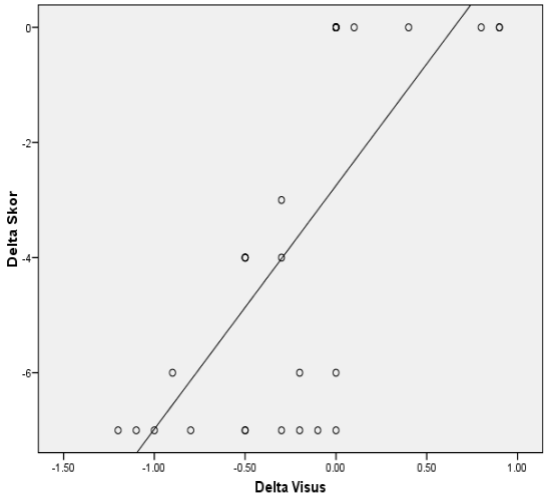

Chart 1. Spearman Rank Correlation of Vision to Quality of Life (VF-7).

DISCUSSION

PDR is one of the main causes of blindness and vision loss. The Early Treatment Diabetic Retinopathy Study (ETDRS) and the Diabetic Retinopathy Study (DRS) provide important data to establish guidelines for the effective management of DR. The Diabetic Retinopathy Study (DRS) demonstrated the effectiveness of the PRP laser for PDR. The Early Treatment Diabetic Retinopathy Study (ETDRS) showed that PRP lasers can reduce the risk of severe vision loss. Several other studies also show the effectiveness of PRP laser therapy in PDR patients, such as the study by Nellaye et al.[1,2,3]

Several studies have reported that PDR might reduce patients' quality of life, as patients have difficulty in doing vision-related daily activities. Questionnaires regarding quality of life (QoL) are one way to measure the personal and social context of patients, especially patients with chronic diseases.[6,7,8]

This study aims to determine the effect of PRP laser therapy on PDR patients' subjective perceptions of QoL using the Visual Functioning Index 7 (VF7) questionnaire. Visual Functioning Index 7 consisted of several questions to determine visual-related QoL that has been tested for sensitivity to improve visual acuity measurements clinically. The QoL value assessed is carried out before and after PRP laser therapy, hence it can be used as an evaluation material for PDR patients regarding PRP laser, and understand the effect of laser on the patient's quality of life.[7,8]

In a previous study by Miltiadis et al, the increase in QoL in PDR patients after PRP laser was not significant compared to before the PRP laser. Nellaye et al showed that there was an improvement in vision-related quality of life after PRP laser. The results of this study showed that the QoL VF-7 value significantly increased after the PRP laser was performed. The result

of this study is in contrast to Miltiadis et (al), yet showed the same results as the study by Nellaye et al.[9,10, 11]

Among the 30 patients, all patients had improved QoL scores using VF-7, none of the patients had either same or decreased scores after PRP laser. Significant improvements were found in QoL scores associated with difficulties in driving a vehicle, seeing fine print, watching television, walking on the sidewalk or going up and down stairs, reading traffic signs or shop names, cooking, and sewing or chopping wood. This study shows that the PRP laser for PDR has a beneficial effect on patients' subjective perceptions of visual function-related QoL.

This study used a small number of samples therefore further research with larger number of samples is needed to provide better accuracy of QoL assessment. Assessment of clinical and laboratory characteristics that can aggravate the patient's clinical condition can be added to future studies.

CONCLUSION

This study was conducted on 30 patients with Proliferative Diabetic Retinopathy (PDR) in Kariadi Semarang Hospital from January to March 2019 with a result of a significant increase in vision-related quality of life (QoL) after laser panretinal photocoagulation (PRP).

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