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Mini Observational : Progression of Diabetic Retinopathy After Pan Retinal  
Photocoagulation

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## Progression of Diabetic Retinopathy After Pan Retinal Photocoagulation

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### ABSTRACT

**Introduction.** Diabetic retinopathy is the leading cause of severe vision loss in adults. Laser photocoagulation has been the gold standard for the treatment of DR. Panretinal photocoagulation (PRP) has been used for the treatment of severe NPDR, PDR and significantly reduced the risk of severe visual loss.

**Purpose** The purpose of this study was to evaluate the condition of Diabetic Retinopathy after Pan Retinal Photocoagulation.

**Methods** Total 14eyes from12 patients with diagnosis severe Proliferative Diabeic Rtinopathy who underwent Pan Retinal Photocagulation in Cicendo Eye Hospital at Januari 2017 were included.Pasien was control more than 6 month. The data collected is visual acuity and ophthalmology examination at1 month, 3 month and 6 month after PRP was complete.

**Results** After 1 month PRP, there were 2 eye underwent Pars Plana vitrektomy (PPV). After 3 month PRP, there were 1 eye who underwent PPV and after 6 month, PRP there were 1 eye who underwent PPV. Visual acuity in 1 month after PRP was decrease 100% eye (n=11). After 3 and 6 month, there is improvement 63,63 % eye (n=7) with stable visual acuity, 36,36% eye (n=4) with decrease visual acuity. After 6 month there were 4 progression eyes.

**Conclusion** PRP can decline the progresion of Diabetic Retinopathy. Diabetic retinopathy more stable after PRP treatment.

**Keyword** Diabetic Retinopathy, PanRetina photocoagulation.

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### INTRODUCTION

Diabetic retinopathy is the leading cause of severe vision loss in adults. It has long been recognized as a microvascular disease. The diagnosis of DR relies on the detection of microvascular lesions. The patients may experience severe vision impairment when the new abnormal vessels bleed into the vitreous (vitreous hemorrhage) or when tractional retinal detachment is present.<sup>1-3</sup>

The treatment of DR remains challenging. Current treatment strategies for DR aim at managing the microvascular complications, including intravitreal pharmacologic agents, laser photocoagulation and vitreous surgery. Laser photocoagulation has been the gold standard for the treatment of DR before the advent of anti-VEGF therapy. Panretinal photocoagulation (PRP) has been used for the treatment of severe NPDR, PDR and significantly reduced the risk of severe visual loss,

especially in cases with high-risk complications such as vitreous hemorrhage.<sup>4-6</sup>

Previous studies had revealed that laser therapy still plays an important role as an adjuvant treatment or rescue therapy. The utility of Laser photocoagulation as an adjuvant treatment dramatically reduced the frequency of anti-VEGF injections when compared with anti-VEGF treatment alone in DR patients.<sup>4-6</sup>

The purpose of this study was to evaluate the condition of Diabetic Retinopathy after Pan Retinal Photocoagulation.

## METHODS

This study are retrospective observational study of diabetic Retinopathy patient who underwent Pan Retina Photocoagulation in Cicendo Eye Hospital with initial assesment at Januari 2017. Pasien was control more than 6 month. All patients agree to participate after receive information about the Pan Retina Photocoagulation, advantages, disadvantages, and risk factor of the procedure.

Exclusion criteria are patients with follow up less than 6 month, and pasien with other pre-existing ocular pathology that may abscurd the result of this study.

The data collected is visual acuity and ophthalmology examination at 1 month, 3

month and 6 month after PRP was complete

The patients were treated through a maximally dilated pupil. The patients were treated in 3 session with topical anaesthesia. In those eyes in which treatment was completed with a three-mirror lens. The power was adjusted to produce just noticeable immediate blanching of the retinal pigment epithelium.<sup>7</sup>

## RESULTS

Forteen eye from twelve patients were included in this study. Tabel 1 showed characteristics of patients that was included in this study.

**Table 1. Characteristics of the patients**

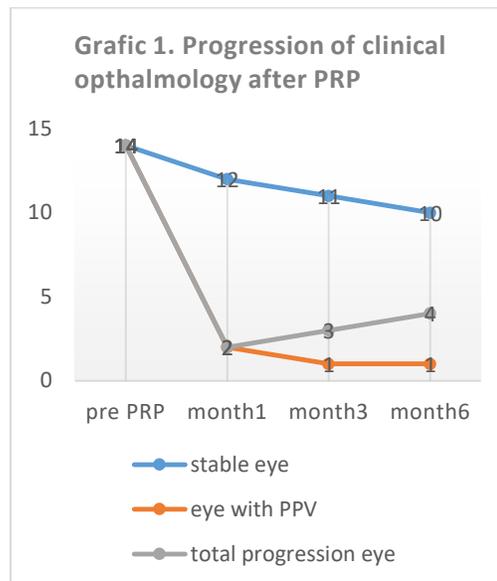
<b>Variables</b>	<b>n</b>	<b>%</b>
<b>Age</b>	54,5 ± 7.48	
<b>Sex</b>		
Male	5	41,6
Female	7	58,3
<b>Eye with PRP</b>		
Right eye only	4	33,33
Left eye only	6	50
Both eye	2	16,67
<b>Diabetic categories</b>		
DM I	0	0
DM II	12	100
<b>DR categories</b>		
PDR	12	85,71
Severe NPDR	2	14,28
<b>Duration of DM</b>		
<1 years	2	16,66
1 – 5 years	4	33,33
>5 years	6	50
<b>UCVA (snellen chart)</b>		

1,0 - 0,5	10	71,4
0,3 - 0,1	1	7,1
0,1 - 3/60	3	21,4
<3/60	0	0
<b>Lens status</b>		
Phakic	14	100
Aphakic	0	0

Tabel 1 showed the mean age  $54,5 \pm 7.48$  years (range 40 – 64 years old) and proportional ratio between sex and laterality of the eyes affected. Based on diabetic categories, there were 100% (n=12) with type 2 diabetes melitus. Based on Diabetic Retinopathy there were 85,71% (n=12) with proliferative Diabetic Retinopathy (PDR) and 14,28% (n=2) with Non-proliferative diabetic retinopathy (NPDR). Progression of diabetes Mellitus to Diabetic Retinopathy was mostly after 6 years duration. Status of lens 100% (n=14) was phakic.

**Table 2. Progression of clinical Ophthalmology after PRP**

Visual Acuity	Month 1	Month3	Month 6
stable	12	11	10
Underwent PPV	2	1	1



Tabel 2 and grafik 1 showed The progression of clinical ophthalmology until definitive surgery given. After 1 month PRP, there were 2 eyes underwent Pars Plana vitrektomy (PPV). After 3 month of PRP, there were 1 eye who underwent PPV and after 6 month PRP, there were 1 eye who underwent PPV. The total patient after 6 month follow up who showed progression is 4 eyes.

**Table 3. Duration of DM**

Variables	year
Progression eye	$12,5 \pm 2,5$
Non progression eye	$6,4 \pm 3,2$

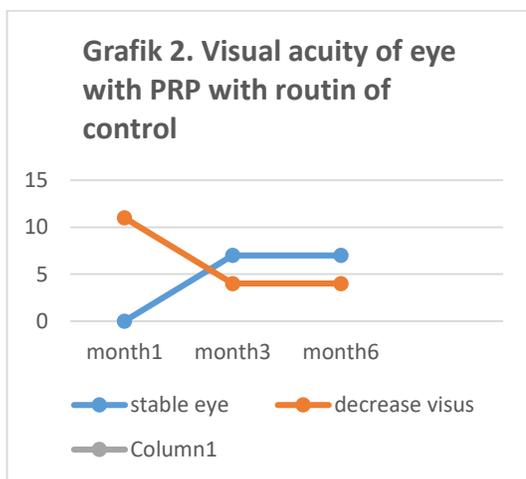
**Table 4. Mean of HbA1C**

Variables	%
Progression eye	$9,2 \pm 0,88$
Non progression eye	$7,55 \pm 0,19$

Table 3 showed that Duration of DM of progression eye 12,5 +/- 2,5 years compared with non progression eye 6,4 +/- 3,2 years. This data showed that pasien with progression eye have longer standing suffered of DM than non progression eye. Table 4 showed that the Value of HbA1C of progression eye were higher than non progression eye.

**Table 5. Visual acuity of eye with PRP with routin of control**

Visual Acuity	Month1	Month3	Month6
stable	0	7	7
decrease	11	4	4



**Table 6. Visual acuity of eye with PRP with not routin of control**

Visual Acuity	Month6
stable	0
decrease	3

Tabel 5 and grafik 2 showed that Visual acuity in 1 month after PRP in patients with routin of control was 100 % eye (n=11) decrease visual acuity. After 3 and 6 month, there is improvement 63,63% eye (n=7) with stable visual acuity, 36,36% eye (n=4) with decrease visual acuity. Table 6 showed that patients with not routin control there were 100% (n=3) eye with decrease visual acuity.

## DISCUSSION

Diabetic retinopathy (DR) is the most common microvascular complication of diabetes, which can result even in blindness. DR can be classified into two categories: nonproliferative (NPDR) and proliferative (PDR). PDR occurs with severe retinal ischemia and is characterized by the growth of new blood vessels on the optic disc or elsewhere in the retina. Management of DR including laser photocoagulation, tight systemic control of blood glucose, lipids, cholesterol, blood pressure, and intravitreal injections of steroids and anti-vascular endothelial growth factor (VEGF) drugs. Nearly 5% of patients show continued progression of retinopathy and require surgical intervention.<sup>8-11</sup>

The Result of this study showed that the progression of Diabetic Retinopathy with PanRetinal photocoagulation (PRP) decrease each month of control.

There were 2 eye (14,28%) underwent PPV after 1 month PRP. After 3 month treatment only 1 (7,14%) eye who underwent PPV. This results showed that there are 4 progression eye after 6 month eye. This study showed that HbA1C and duration of DM were significant risk factors for the development of DR.

Study by Yoon Jeon Kim et al, showed that duration of diabetes and higher mean HbA1c level were significant risk factors for the development of DR. Porta M et al showed that metabolic control and duration of diabetes are strong indicators of progression to proliferative retinopathy.<sup>11-12</sup>

Panretinal photocoagulation (PRP) has been used for the treatment of PDR and significantly reduced the risk of severe visual loss in PDR, especially in cases with high-risk complications such as vitreous hemorrhage. PRP can also inhibit the progression of retinopathy (Diabetic Retinopathy Study (DRS)). The hypothesis was that direct closure of leaking microaneurysms, the decrease of retinal blood flow associated with reduced retinal tissues and improved oxygenation. Laser therapy may cause permanent damage to the retinal cells, leading to side effects such as mild central visual loss and reduced night vision. Patients may often experience some permanent

decreases in peripheral, and color.<sup>3,13,14,17</sup>

In this study showed that in patients with routine of control, 100% eye with decrease visual acuity at the first month of follow up, After 3 month follow up showed that the stability of visual acuity, except patient with progression of DR (36,36% eye). In patients with not routine control showed 100% decrease visual acuity. This data was bias, whatever decrease visual acuity cause of laser or progression of DR so that in this patients need more time of follow up.

The landmark Diabetic Retinopathy Study demonstrated a reduction in severe vision loss in patients with high-risk PDR following prompt treatment with panretinal photocoagulation (PRP). The ETDRS originally demonstrated a 50% reduction in moderate vision loss in patients with diabetic retinopathy who underwent immediate laser photocoagulation. Moreover, among patients with PDR or severe non-proliferative diabetic retinopathy (NPDR), combined focal and scatter photocoagulation reduced severe vision loss by 50%.<sup>1,2,14</sup>

PRP remains a mainstay of treatment for proliferative disease. PRP is indicated to treat retinal ischemia and retinal neovascularization in PRD. PRP was an effective means of halting the progression of PDR and preventing vision loss. Duration of diabetes and

higher mean HbA1c level were significant risk factors for the development of DR. The compliance of patients is a factor who influence of visual acuity that will given after PRP in PDR patients.

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