

# PARS PLANA VITRECTOMY FOR VITREOUS HEMORRHAGE IN CIPTOMANGUNKUSUMO HOSPITAL: EVALUATION ON CLINICAL CHARACTERISTICS AND SURGICAL OUTCOMES IN CIPTOMANGUNKUSUMO HOSPITAL IN 2018

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## Abstract

**Introduction:** Vitreous hemorrhage is the presence of blood in the vitreous cavity that could impair the visual function and hindered the clinician's ability to examine the posterior segment of the eye. Pars plana vitrectomy (PPV) not only act as a surgical treatment of choice but also diagnostic procedure. Immediate PPV has the advantage to optimize visual acuity. Here we evaluate the clinical characteristics and outcomes of patients underwent PPV in our institution.

**Methods:** Retrospective descriptive study of vitreous hemorrhage patients underwent pars plana vitrectomy in Ciptomangunkusumo Hospital, Indonesia from January to December 2018

**Result:** There were 160 cases of vitreous hemorrhage cases undergoes pars plana vitrectomy in 2018. Most frequent etiology was proliferative diabetic retinopathy (49.4%). Rebleeding was found only in 8 cases within the period of three months follow up. Final visual acuity was improved in majority of the cases and found to be related to timing of the surgery.

**Conclusion:** Early vitrectomy along with systemic control of underlying factors in vitreous hemorrhage appeared to be beneficial. Depending on the etiology and retinal findings, most of the patients were able to maintain or improve their visual acuity.

**Keywords:** pars plana vitrectomy, vitreous hemorrhage

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## INTRODUCTION

Vitreous hemorrhage defined as the presence of blood excavating to the vitreous cavity which should be clear in normal condition.<sup>1</sup> This condition not only could impair the patient's visual function, but also obstruct the ophthalmologist's view of the retina on examination.<sup>2</sup> Vitreous hemorrhage prone to happen in patients with predisposing underlying diseases such as diabetes mellitus, sickle cell disease, inflammatory diseases which could cause occlusive vasculitis, hypertension, age macular degeneration (AMD), and patients who received blood-thinning medications.<sup>2-4</sup>

The incidence of spontaneous vitreous hemorrhage occurs in about seven cases per 100,000 population.<sup>3,5</sup> In population-based study in Taiwan, during the period of 2001 to 2010 there were 4,379 vitreous hemorrhage cases with the incidence of 4,8 cases per 10,000 people annually.<sup>4</sup> Treatment of choice for vitreous hemorrhage depends on its clinical appearances.

In cases with minimal to mild impairment of the visual acuity, observation could be done. But when vitreous hemorrhage significantly affect the visual function and hinder the pathological area so that definite treatment could not be given, pars plana vitrectomy (PPV) needed to be done.<sup>4,6</sup>

There has been no data on the clinical characteristic and surgical outcome in vitreous hemorrhage in our institution. This research aims to evaluate the clinical characteristic, visual function, and the association of clinical factors of vitreous hemorrhage patients underwent PPV.

## METHODS

This is a retrospective descriptive study of vitreous hemorrhage patients in Cipto Mangunkusumo

Hospital, Indonesia, who underwent PPV from January 2018 to December 2018. Data was collected from vitreous hemorrhage patient's medical records which includes pre-operative clinical characteristics, additional interventions other than PPV, and post-operative findings. These data were retrospectively reviewed. Patients with incomplete medical record were excluded.

## RESULTS

There were 160 vitreous hemorrhage cases from 153 patients that underwent PPV in the period of January 2018 – December 2018. The patient's demographic data is shown in table 1.

Table 1. Patient's Demographic Data and Pre-operative Clinical Characteristics

Variable	Frequency (n)	Percentage (%)
Gender (n=153)		
Female	55	35.9
Male	98	64.1
Laterality (n=153)		
Unilateral	126	82.4
Bilateral	27	17.6
Systemic risk factors (n=153)		
Diabetes mellitus	29	19.0
Hypertension	30	19.6
Infection	3	2.0
Autoimmune	1	0.7
> 1 risk factors	55	35.9
None	35	22.9
Presenting symptoms (n=153)		
Blurred vision	108	70.6
Floaters	4	2.6
Combinations	41	26.8
Duration of symptoms (n=160)		
≤ 6 months	129	80.6
> 6 months	24	15.0
Initial visual acuity (n=160)		
Normal	1	0.6
Mild visual impairment	11	6.9
Moderate visual impairment	15	9.4
Severe visual impairment	17	10.6
Profound	8	5.0
Near total blindness	108	67.5
Total blindness	0	0
Pre-operative laser (n=160)		
Yes	36	22.5
No	124	77.5
Pre-operative intravitreal injection (n=160)		
Yes	17	10.6
No	143	89.4
Waiting time to PPV (n=160)		
≤ 30 days	48	30.0
> 30 days	112	70

Median age of vitreous hemorrhage patients is 53(6–85) years old. Majority of the patients are male (64.1%). The initial visual acuity (VA) was light perception to 1/60 (67.5%), commonly occurs unilateral (82.4%) with the onset within  $\leq 6$  months (80.6%). Most of the patients had no previous history of laser (77.5%) nor intravitreal injection (89.4%). Only 30% patients underwent PPV in less than a month after being diagnosed.

Table 2. Treatment Modalities

Variable	Frequency (n)	Percentage (%)
Intervention (n=160)		
PPV alone	10	6.3
PPV with additional intervention	150	93.8
Intraoperative laser (n=160)		
Yes	119	74.4
No	41	25.6
Tamponade (n=160)		
Gas	16	10.0
Silicon oil	38	23.8
No	106	66.3
Intravitreal injection (n=160)		
Anti-VEGF	56	35.0
Triamcinolone acetonide	13	8.1
No	91	56.9
Cataract extraction (n=118)		
Yes	5	4.2
No	113	95.8

Table 2 elaborates type of surgeries performed on vitreous hemorrhage patients. Almost all cases (93.8%) needed additional intervention aside from PPV. Simultaneous cataract extraction was only performed in 5 out of 118 cases.

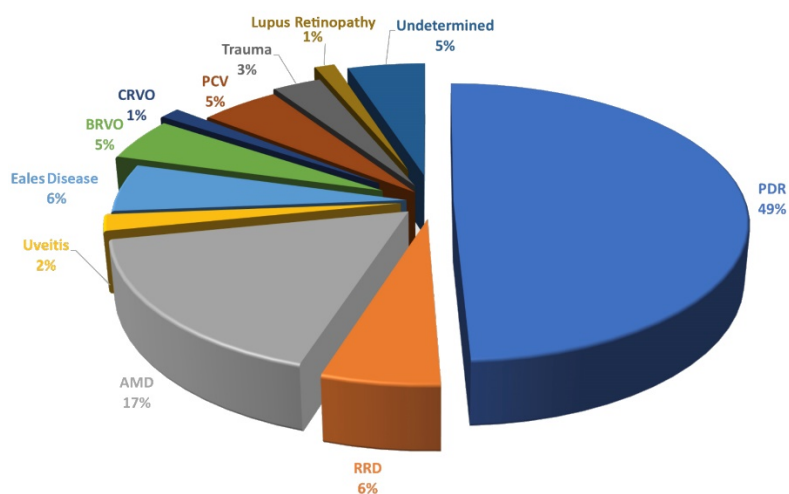


Figure 1. Etiologies of Vitreous Hemorrhage Based on Intraoperative Finding

Vitrectomy not only function as therapeutic intervention, but also aids to establish or confirm the underlying etiology. Figure 1 describe the etiology of vitreous hemorrhage patients with the most common cause is proliferative diabetic retinopathy (PDR). Still in 5% patients, the cause of vitreous hemorrhage could not be determined.

There were 117 vitreous hemorrhage cases that completed the three months follow up. There were only 8 (6.8%) cases with re-bleeding within the follow up period. Correlation analysis of re-bleeding and history of pre-operative intravitreal injection and laser were statistically insignificant ( $p=0.595$  and  $p=0.062$  respectively). Most of the retina (92.3%) were attached within 3 months after surgery.

Figure 2 illustrates the progression of uncorrected visual acuity (UCVA) of vitreous hemorrhage patients during the period of 3 months. There was improvement of median UCVA at the end of 3 months follow up [1.77(0.00–3.00)].

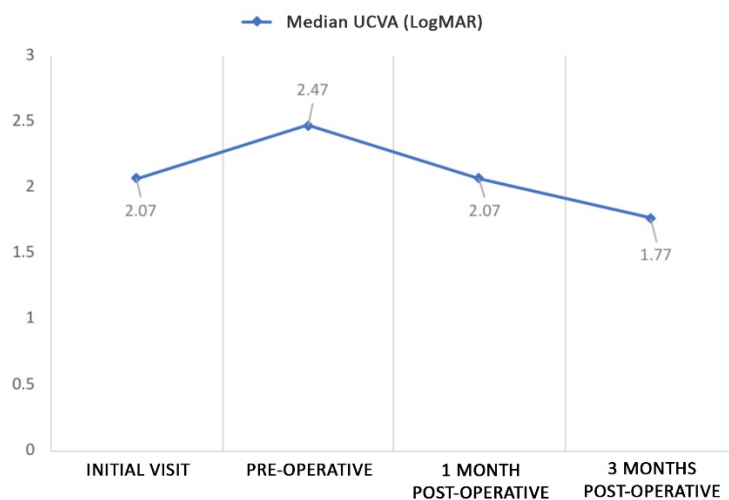


Figure 2. Median BCVA of Vitreous Hemorrhage Cases Underwent PPV

Table 3 represents proportion comparison of best corrected visual acuity (BCVA) according to visual impairment classification. At the end of the follow up, there were 14 (12%) cases that achieved normal visual acuity. Two cases went total blindness due to neovascular glaucoma and choroidal detachment.

Table 3. Difference of BCVA of Vitreous Hemorrhage Cases Pre and Post Operatively Based on International Council of Ophthalmology Classification

	BCVA (# of eyes/%) n=117 eyes	
	Initial visit	3 months post-op
Normal	1(0,9)	14(12,0)
Mild visual impairment	10(8,5)	17(14,5)
Moderate visual impairment	11(9,4)	15(12,8)
Severe visual impairment	12(10,3)	8 (6,8)
Profound visual impairment	8(6,8)	14(12,0)
Near total blindness	75(64,1)	24(40,2)
Total blindness	0(0)	2(1,7)

Analysis of pre-operative clinical characteristics and the improvement of BCVA was done and it was noted that case with pre-operative laser were statistically significant. The detail is presented in table 4.

Table 4. Pre-operative Clinical Factors Assumed to be Associated with BCVA Improvement

Pre-operative Clinical Factors	$\Delta$ LogMAR Median (min – max)	p
Symptoms duration		0.16
$\leq$ 6 months	-0.23(-2.47–2.31)	
$>$ 6 months	-0.88(-1.87–1.60)	
Pre-operative laser		0.017*
Yes	0.00(-1.77–2.08)	
No	-0.46(-2.47–2.31)	
Pre-operative intravitreal injection		0.38
Yes	0.00(-1.98–1.65)	
No	-0.33(-2.47–2.31)	

\*statistically significant ( $p < 0.05$ )

Waiting time to PPV and post-operative BCVA is also statistically significant ( $p = 0.004$ ) with low correlation (coefficient correlation 0.27) as shown on figure 3.

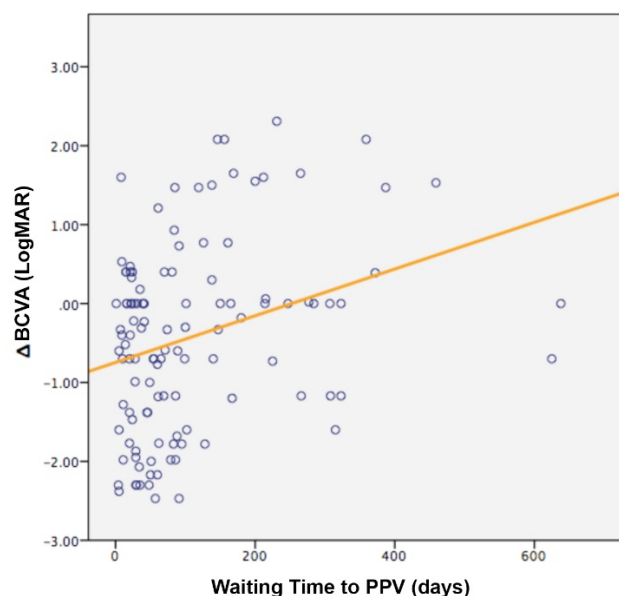


Figure 3. Correlation of Waiting Time and BCVA Changes

## DISCUSSION

In this descriptive retrospective study, we evaluate 160 eyes of 153 patients underwent PPV for non-clearing vitreous hemorrhage in Ciptomangunkusumo Hospital in 2018. Male predominance (64.1%) was found in this study in accordance with findings on Sharma et al<sup>1</sup>, Wang et al<sup>4</sup>, and Darajati et al<sup>7</sup>. Median age was 53 years old similar with population based study in Taiwan by

Wang et al<sup>4</sup> that found patients within the range of 40 to 59 years old was the most common age group to have vitreous hemorrhage during the period of 10 years. Literature stated that this conditions relies on the underlying etiology of vitreous hemorrhage.<sup>3</sup>

Several systemic conditions can predispose vitreous hemorrhage. In diabetes mellitus, occlusive vasculitis, hematological abnormalities, vitreous

hemorrhage could occur due to ischemic condition.<sup>3</sup> Based on the etiology, PDR, vitreous detachment with or without retinal break (with or without retinal detachment), and trauma was the major cause of vitreous hemorrhage depending on the age group.<sup>3,5,8</sup> In this study, PDR was the most common cause of vitreous hemorrhage (49.4%). This finding differs with Zhang et al<sup>9</sup> that reported age macular degeneration (AMD) was the most common cause. Vitreous hemorrhage due to diabetic retinopathy closely related to high number of patients with uncontrolled diabetes mellitus. International Diabetes Foundation in 2014 estimated that 9.1 million people in Indonesia have diabetes mellitus. But despite the increasing number, the accessibility for appropriate medical services were still not supported well. Thus, long term complication such as microangiopathy and diabetic retinopathy are expected to increase.<sup>10</sup>

Post-operative evaluation of vitreous and retina at the months were made because it was the time frame between early and late onset of rebleeding.<sup>11,12</sup> In this study, 8 (6.8%) cases had rebleeding with the etiologies of PDR (4 cases), Eales disease, AMD, and Lupus retinopathy. Both pre-operative laser and anti VEGF injection did not have any association with rebleeding in this study. This result differ from Faisal et al<sup>12</sup> that found significant decrease of post-operative rebleeding due to PDR on patients who previously had intravitreal anti VEGF injection.

This study also found significant improvement of UCVA pre and post PPV ( $p=0.000$ ). Median UCVA of vitreous hemorrhage on the initial visit was 2.07 LogMAR. But due to the wait for surgery and patient's compliance to follow up and systemic control, the median fell to 2.47 LogMAR pre-operatively. This decrease affects the decision to hasten the surgical intervention. Post-operative BCVA closely related on the retina and macular condition. Metita et al<sup>13</sup> found that vitreous

hemorrhage patients with the underlying cause of PDR, patients with visual acuity better than finger counting improved from 10.9% to 34.9%. Unfortunately, due to variability of etiological factors, this study could not evaluate the association of visual acuity improvement between underlying factors.

Timing of surgical intervention in vitreous hemorrhage determined by several factors. Connor et al<sup>14</sup> and Tan et al<sup>15</sup> reported that in vitreous hemorrhage case due to retinal break, immediate PPV needed to be done due to the higher risk of subsequent retinal detachment. Zhang et al<sup>9</sup> also stated that early PPV in vitreous hemorrhage related to trauma was needed to be performed promptly. Other factors are the need to evaluate the pathological underlying cause, degree of affected eye, one-eyed cases, and the quality of life of the patients.<sup>16</sup> The median of waiting time of vitreous hemorrhage cases to finally underwent PPV was 2(1–638) days in this study. This also influence the post-operative BCVA with weak correlation, so that the longer the wait, the BCVA would be worse.

## CONCLUSIONS

Vitreous hemorrhage could be cause by various underlying etiologies. Pars plana vitrectomy in these cases not only function as therapeutical but also diagnostic procedure. Rebleeding cases highly associated with patients' systemic control thus education to regulate the underlying cause needed to be done. Although several factors contribute to final BCVA, immediate PPV is an effective intervention to improve or maintain the patients' visual acuity.

## REFERENCES

1. Sharma R, Joshi S, Shrestha J. Etiology of vitreous hemorrhage in a tertiary eye care center in Nepal. *Nepal J Ophthalmol.* 2010;2:121–6.

2. Williamson TH, editor. Vitreous haemorrhage. In: Vitreoretinal disorders in primary care. Florida: CRC Press; 2018. p. 35–43.
3. Ortiz A, Medina CA. Vitreous hemorrhage. In: Medina CA, Townsend JH, Singh AD, editors. Manual of retinal diseases. Cham: Springer International Publishing; 2016. p. 143–7.
4. Wang C-Y, Cheang W-M, Hwang D-K, Lin C-H. Vitreous haemorrhage: a population-based study of the incidence and risk factors in Taiwan. *Int J Ophthalmol*. 2017;10:4614666.
5. Rabinowitz R, Yagev R, Shoham A, Lifshitz T. Comparison between clinical and ultrasound findings in patients with vitreous hemorrhage. *Eye*. 2004;18:253–6.
6. Fassbender JM, Ozkok A, Canter H, Schaal S. A comparison of immediate and delayed vitrectomy for the management of vitreous hemorrhage due to proliferative diabetic retinopathy. *Ophthalmic Surg Lasers Imaging Retina*. 2016;47:35–41.
7. Darajati IT, Wardhana FS, Sasongko MB, Supanji, Widayanti TW, Agni AN. Vitreous hemorrhage in Dr. Sardjito general hospital. *Ophthalmol Indones*. 2016;42:301–5.
8. Spraul CW, Grossniklaus HE. Vitreous hemorrhage. *Surv Ophthalmol*. 1997;42:3–39.
9. Zhang T, Zhang J, Sun X, Tian J, Shi W, Yuan G. Early vitrectomy for dense vitreous hemorrhage in adults with non-traumatic and non-diabetic retinopathy. *J Int Med Res*. 2017;45:2065–71.
10. Soelistijo SA, Novida H, Rudijanto A, Soewondo P, Suastika K, Manaf A, et al. Konsensus pengelolaan dan pencegahan diabetes melitus tipe 2 di Indonesia 2015. Jakarta: PB. PERKENI; 2015. 1–3,60 p.
11. Nagpal M, Mehrotra N, Vishnoi A. The role of perioperative anti-VEGF during vitrectomy for vitreous hemorrhage in relation to postoperative nonclearing vitreous hemorrhage and cystoid macular edema. *J Vitreoretin Dis*. 2017;1:379–84.
12. Faisal SM, Tahir MA, Cheema AM, Anjum MI. Pars plana vitrectomy in vitreous hemorrhage with or without intravitreal Bevacizumab a comparative overview. *Pak J Med Sci*. 2018;34:221–5.
13. Metita M, Sovani I, Kartasasmita AS, Iskandar E, Virgana R. Surgical approach in vitreous hemorrhage: timing of vitrectomy for various retinal disorders. *IJRETINA*. 2018;1:12–6.
14. Connors D, Shah G, Blinder K, Dang S. Early versus delayed vitrectomy for nondiabetic vitreous hemorrhage. *J Vitreoretin Dis*. 2018;2:87–90.
15. Tan HS, Mura M, Bijl HM. Early vitrectomy for vitreous hemorrhage associated with retinal tears. *Am J Ophthalmol*. 2010;150:529–33.
16. El Annan J, Carvounis PE. Current management of vitreous hemorrhage due to proliferative diabetic retinopathy. *Int Ophthalmol Clin*. 2014;54:141–53.



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