

Visual Outcome of Vitreous Hemorrhage after Immediate Versus Delayed Vitrectomy

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Abstract

Background: Vitreous Hemorrhage secondary to proliferative diabetic retinopathy is a cause of severe vision loss in diabetic patients. The surgical approach in vitreous hemorrhage (VH) secondary to diabetic retinopathy remains the procedure of choice for non-clearing vitreous hemorrhage.

Objective: To compare the visual outcome and associated factors between groups of patients who underwent immediate and delayed vitrectomy for the management of vitreous hemorrhage due to proliferative diabetic retinopathy (PDR).

Methods: This Quasi study of 40 patients who underwent vitrectomy in one eye for vitreous hemorrhage Secondary to Proliferative Diabetic Retinopathy (PDR). Patients were excluded if they had prior vitrectomy, or vitreous hemorrhage due to other causes (vascular occlusion, uveitis, advanced glaucoma). Every patient received Intravitreal Anti VEGF 3-7 days prior to the vitrectomy. Primary outcome was observed visual acuity in the patient receiving immediate (less than 40 days) versus delayed (more than 40 days) vitrectomy.

Result: 40 eyes were included, 15 eyes had immediate vitrectomy while 25 eyes had delayed vitrectomy. There was no difference between the groups in terms of age, gender, diabetes control. But the duration of diabetes had an important role in visual acuity of those patients. During diabetes more than 10 years had poor vision and most of them are in delayed vitrectomy group. Pre-operative and final visual acuity were evaluated including 7 days, 30 days, and 4 months in both groups. Immediate vitrectomy shows good visual outcomes. Complications (re-bleeding) were dominantly seen in the delayed vitrectomy group.

Conclusion: Immediate vitrectomy for Vitreous hemorrhage due to PDR can save vision and decrease post-surgical complication in diabetic patients. Vitrectomy with Endo laser surgery is safe and may be considered earlier vitreous hemorrhage management.

Keywords: vitreous hemorrhage, Pars Plana Vitrectomy, Diabetic Retinopathy

Introduction

Vitreous Hemorrhage (VH) secondary to proliferative diabetic retinopathy (PDR) is a cause of severe vision loss in diabetic patients. It is reasonable to operate on such patients that have no spontaneous improvement. Intraoperative Endo

laser photocoagulation, minimally invasive techniques, modern vitrectomy machines make easy the surgical retina field and use of pre-operative use of Intra vitreal Anti VEGF minimize the per operative complication.

The most appropriate time of vitrectomy for the

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treatment of VH due to PDR is yet to be defined. This is unnecessary that patients spend months with low vision. If there is no spontaneous improvement of vitreous hemorrhage, the modern vitrectomy and implement of Anti VEGF safely and effectively improve their vision. [1-3]

This Quasi study compared visual outcome between two groups of patients with immediate and delayed vitrectomy for VH due to PDR during minimally invasive vitrectomy surgery with the help of Anti VEGF.

Materials and Methods

This Quasi study recorded in the patients (40 patients) effected by vitreous hemorrhage due to PDR who underwent to PPV between March 2019 to March 2022 in Ophthalmology department of BIRDEM General Hospital, Dhaka.

The Inclusion criteria was vitreous hemorrhage due to PDR. We excluded other cause of vitreous hemorrhage (Retinal occlusion diseases, vasculitis retinae), retinal detachment uveitis, advanced glaucoma.

Prior to vitrectomy surgery, every patient received intra vitreal Anti VEGF before 5 days to prevent intra operative re bleeding. Immediate vitrectomy was described as vitrectomy, which was performed in less than 40 days, while delayed vitrectomy was described as vitrectomy which was performed for more than 40 days. The following preoperative variables were identified, age, gender, presenting and follow-up visual acuities, lens status, intraocular pressure (IOP), medical comorbidities, duration of diabetics, Hemoglobin A1 c(HbA1C) that was closer to date of surgery , and complication were recorded.

Table 1: Socio demographic characteristics of the study subjects

characteristics	Immediate PPV (N=15)	Delayed PPV(N=25)	P value
Mean Age	49.53 ±6.32	46.92±5.91	.63
Gender, n (%)			
Male	8 (53.34%)	14 (46%)	.023*
Female	7 (46.66%)	11 (44%)	.014*
Mean Preoperative Intraocular pressure (IOP), mmHg Eye, n (%)	14.26± 1.53	13.44± 2.45	.51
Duration of Diabetes, n (%)			
Mean duration	10.55 ± 4.34	13.54± 3.20	.033*
<10 Years	2 (13.34)	0	
10-15 Years	12 (80.00)	22 (82.00)	.003*
>15 Years	1 (6.66)	2 (12.00)	.69
Co-Morbidity n (%)			
Hypertension	9 (60.00)	16 (64.00)	.031*
Chronic Kidney Disease	5 (33.33)	7 (28.00)	.53
Thyroid	2 (13.33)	3 (12.00)	.59
Mean HbA1c	9.67 ±1.95	8.84± 2.51	.63

* Result has been expressed in mean± SD and percentage distribution

The intraoperative information recorded included surgical time, spot amount of Endo laser, and postoperative tamponade.

We observed the visual outcome after one week, one month and four months with any complication (Re-vitreous hemorrhage).

Result

After inclusion and exclusion criteria 40 patients were identified. A total of 40 eyes participated in the study. Table 1 showed the comparison of two

groups that underwent immediate and delayed vitrectomy for non-clearing VH secondary to PDR. Other characteristics, including age, gender, diabetes duration, and control were similar between the groups. The mean age was 49.53 ± 6.32 years, 7 (46.66%) patients were female, and 8 (53.34%) patients were male for immediate vitrectomy group. The mean age was 46.92 ± 5.91 years, 11 (44%) patients were female, and 14 (46%) patients were male for delayed vitrectomy group. The mean preoperative IOP (Intraocular Pressure) was 14.26 ± 1.53 for group 1 and 13.44 ± 2.45 for group 2.

Table II : Visual Acuity at the entry visit, one week, one month and four month follow up

Entrance Visual Acuity, n (%)			
Visual Acuity			
<i>Entrance Visual Acuity</i>	Immediate PPV (N=15)	Visual Activity	Delayed PPV(N=25)
<20/200	10	<20/200	17
20/100	4	20/100	2
20/200	1	20/200	6
<i>After One Week</i>			
20 / 30	6	<20/200	16
20 / 40	4	20/100	4
20 / 50	3	20/200	5
20 / 70	2		
<i>After One Month</i>			
20 / 30	4	<20/200	5
20 / 40	6	20/ 70	5
20 / 50	2	20/100	6
20 / 70	3	20/200	9
<i>After Four Month</i>			
20 / 30	4	<20/200	3
20 / 40	6	20/ 50	3
20 / 50	2	20/ 70	4
20 / 70	3	20/100	7
		20/200	8

*Classification- 20/200-20/100 Poor, 20/70-20/50 Fair, 20/40-20/30 Good

For duration of diabetes, we found that there were patients with duration of diabetes 10 to 15 years in two groups, and the amount was significant. The most common co-morbidity in both groups was hypertension with 25 patients where 9 patients are in immediate group and 16 patients are in delayed group, and the P values was significant, followed

(48%), and silicon oil (32%). They use silicon oil more in delayed vitrectomy group. Silicon oil itself damages optic nerve and reduce vision in early vitrectomy there was no need to use silicon oil except any per-operative iatrogenic damage to retina.

Table III: Intraoperative Information among the study subjects

Tamponade	Immediate PPV (N=15) %	Delayed PPV (N=25) %	P Value
Silicone Oil	3 (20.00)	8 (32.00)	0.021*
Gas	5 (33.34)	12 (48.00)	0.004*
BSS (Balance Salt Solution)	7 (46.66)	5 (20.00)	0.61

by chronic kidney disease with 12 patients (30.58%). Both groups were having the HbA1C more than 6.4% significantly.

The follow-up period was up to 3 months after vitrectomy. Table 2 showed the visual acuity at the initial visit, 1 week, 1 month, and 3 months after surgery. There was a significant difference in final visual acuity, when in the immediate vitrectomy group showed good progression for visual acuity between initial visit and 3 months postoperative.

Here we use 3 patients silicon oil tamponade in immediate group for this reason.

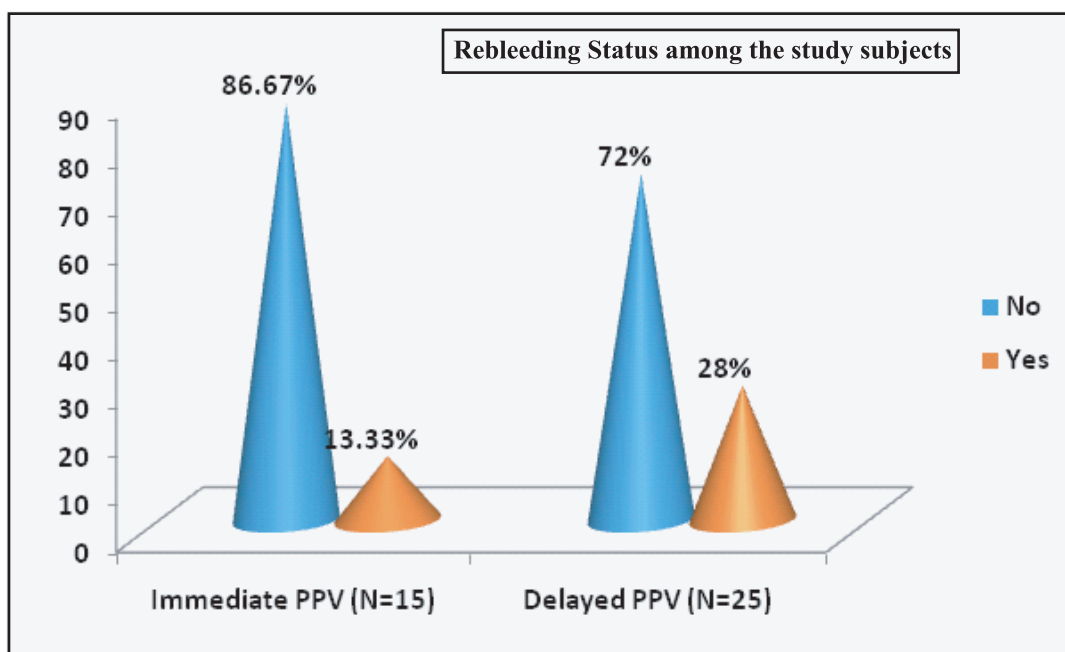
We found that duration of diabetes is another risk factor for visual acuity after vitrectomy (Table 4). Here the patients who have duration of diabetes less than 10 years had good vision and the patients who have diabetes more than 10 years had poor vision. In the delayed group most of the patients were diabetic for more than 10 years.

Table IV : Association of duration of diabetes with visual acuity among the study subject

Variables	Visual Acuity		P value
	Poor	Fair and Good	
< 10 Years	1	2	0.55
> 10 Years	23	14	0.003*

We also recorded the intraoperative information, including the surgical time, Endo laser spot, and postoperative tamponade, which showed in Table 3. The most frequent tamponade that have been used in immediate vitrectomy group was fluid (46%) and gas (33%). while the most common tamponade in delayed vitrectomy group was gas

We summarized the re-bleeding status that occurs post operatively (Diagram 1)). 7 patients experienced re-bleeding after 3 months follow up in the delayed vitrectomy group. Whereas 2 patients had re-bleeding in the immediate vitrectomy group.

Diagram 1: Re-bleeding Status among the study subjects

Discussion

Vitreous hemorrhage has an incidence of about 8% cases, which makes it one of the most common causes of decreased vision, secondary to PDR. About a third of these patients will undergo vitrectomy for non-clearing VH. Still, there is no defined timing of intervention in today's age of Endo laser and minimally invasive vitrectomy techniques⁽⁴⁾. We suggest that minimally invasive vitrectomy surgery with Endo laser photocoagulation within 40 days of presentation yields visual results comparable to those of vitrectomy surgery that is delayed for additional PRP sessions or to await natural clearing of hemorrhage^[4-8]

Pars plana vitrectomy remains the treatment of choice for eyes in which the vitreous hemorrhage is not spontaneously resolving. Findings of the DRVS still inform the decision-making processes as to when to operate^[4, 9-11]. This study evaluated eyes with severe vitreous hemorrhage reducing visual acuity 20/200.

Furthermore, pre-operative (before 3 to 5 days of vitrectomy) use of Anti VEGF help to decrease the per operative complication (re-vitreous hemorrhage), decrease operation time and facilitated the good anatomical as well as visual outcome^[11-14]

In this study we found that the visual outcome of immediate vitrectomy came 20/30 in 25% patients with minimum post-operative complication (Re-Bleeding). In Delayed vitrectomy patient's visual outcome 20/30 in 12% patients with re-bleeding 28% patients^[4, 5].

Some studies found that patients receiving PRP for PDR associated vitreous hemorrhage were more likely than patients with PDR alone to undergo vitrectomy within 1-2 years of PRP treatment. Taking these results in context with the current study, immediate vitrectomy may alleviate the need for preoperative PRP, especially since Endo laser will be performed concurrently intra-operatively. Current guidelines recommend taking patients to surgery by 3 months for non-clearing VH; however, this systematic review was based

solely on data from DRVS. Many retina surgeons are taking these patients to surgery within 1 month; yet this is the study to demonstrate that doing so is safe and effective.^[1, 5, 15-18]

In case of delayed vitrectomy sometimes we need to put silicon oil in and after three months we remove the oil. Silicon oil itself damages optic nerves and compromises the visual outcome. As the indications for diabetic vitrectomy expand, the appropriate timing for surgical intervention as well efficacy of adjunctive treatment will become increasingly important to understand^[13,19-23]

There are limitations in this retrospective study. There were many exclusions for providing homogeneous data and low numbers of patients included for analysis. Though diabetic retinopathy is a heterogeneous disease and with strict inclusion criteria, this doesn't guarantee that all patients would behave the same.

Conclusion

This study reviewed that early vitrectomy for vitreous hemorrhage due to PDR decrease the time spent with visual loss, and post-surgical complication. And will improve the quality of life and decrease economic burden by facilitating their return to work. So, advanced vitrectomy surgery use of pre-operative Anti VEGF is safe and considered earlier surgery in vitreous hemorrhage management.

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