



VISUAL OUTCOMES OF SAME DAY VERSUS DELAYED PARS PLANA VITRECTOMY FOR DROPPED NUCLEUS DURING CATARACT EXTRACTION

Ophthalmology

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ABSTRACT

Purpose: To compare the visual outcome in patients of nucleus drop undergoing same day pars plana vitrectomy (PPV) versus delayed PPV. **Methods:** A prospective observational study was conducted on 50 eyes with posteriorly dislocated nucleus after cataract surgery who underwent PPV. Study variables included the time duration between nucleus drop and PPV, final best-corrected visual acuity (BCVA), and complications after PPV. In 7(14%) eyes, PPV was performed on the same day of cataract surgery and in 43(86%) eyes, an elective PPV was performed after 1 week of cataract surgery. All our cases had intraocular lens(IOL) implanted at the end of PPV. Patients were followed up for 6 months with BCVA, intraocular pressure (IOP) measurement, indirect ophthalmoscopy and ocular coherence tomography(OCT). **Results:** Comparison was made between VA in patients who underwent PPV on same day (n=7) and those who underwent delayed PPV (n=43). In the same day group, 85.71% patients had BCVA ranged between 6/6 to 6/18, while only 14.29% had BCVA between 6/18 to 6/60 at the final follow up. In the delayed PPV group, 60.47% had BCVA range between 6/6 to 6/18, 27.90% had BCVA ranged between 6/18 to 6/60 and only 11.63% patients had BCVA of <6/60- hand movements (HM). P value was 0.398 which was not statistically significant. **Conclusion:** Majority of the patients obtain good VA after PPV for nucleus drop irrespective of the time. The visual outcome in both the groups was comparable, but slightly better results were obtained in the same day PPV group.

KEYWORDS

Visual outcome, dropped nucleus, same day, PPV.

INTRODUCTION

Nucleus drop into the vitreous cavity after cataract surgery has been widely documented with reported incidences of 0.3%-2.7%.¹⁻⁶ and occurs with both, extra capsular cataract extraction (ECCE) and the phaco-emulsification⁷⁻¹⁴. Various sequelae of this complication include corneal edema, intraocular inflammation, secondary glaucoma, uveitis, cystoid macular edema (CME), increased IOP, retinal detachment(RD), vitreous hemorrhage(VH) and decreased VA^{7,9,11,12,15-26}. Nucleus drop can be vision threatening if not managed in time by PPV which not only reverses the secondary glaucoma, but also improves the VA in most patients. This study aims to compare the visual outcome in patients of nucleus drop who underwent PPV in the same sitting and in patients who underwent delayed PPV, i.e after 1 week of nucleus drop.

The ideal timing for PPV after nucleus drop has remained controversial^{12,27-29}. Earlier, it was preferred to delay PPV in order to let the eye recover from the insult and inflammation caused by the cataract surgery, but various recent studies have advocated that PPV should be performed on the same day of the complicated cataract surgery, because of less inflammation and clear cornea leading to reduced complication rates and better visual prognosis^{30,31}. Histological studies have also revealed that the inflammatory reaction is more severe when lens fragments remain within the eye for longer duration^{32,33}.

PATIENTS AND METHODS

It was a hospital based prospective observational study conducted on 50 eyes with posteriorly dislocated nucleus after cataract surgery who underwent PPV in the Department of Ophthalmology, Government Medical College and Hospital, Srinagar, Jammu and Kashmir, from September 2017 to April 2019. Patients who presented with cortical fragment displacement or nuclear fragment dislocation from any other cause other than cataract extraction were excluded. Patients with any pre-existing cause, like glaucoma or vascular occlusion that would affect the final visual outcome were also excluded. After obtaining a written informed consent, preoperative data was obtained from the patient's records and a detailed preoperative ocular and relevant history was taken. A complete eye examination including VA testing, slit-lamp examination, a dilated fundus examination and B-scan in cases of media opacities was done. Other study variables included the details of the procedure, VA after nucleus drop, duration between nucleus drop and PPV, BCVA, and complications after PPV. When facing a case of nucleus drop in our hospital, the operating surgeon

used minimal manipulation, and immediate referral to vitreo-retinal(VR) surgeon was done after proper wound closure. All referred cases were operated after 1 week depending on the status of inflammation and corneal edema which was managed before PPV by topical steroids while anti-glaucoma medication. Topical antibiotics were prescribed to all patients in the delayed PPV group to prevent infection within this week. A three port 23G trans-conjunctival microcanula based vitrectomy system was used by a single surgeon in all the cases and IOL implanted in all cases at the end of PPV. The VA in our study was measured with the Snellen's chart and patients were followed up for 6 months with BCVA, IOP measurement, slit lamp examination, dilated fundus examination and OCT.

RESULTS:

Of the 50 patients, only 7(14%) patients underwent PPV in the same sitting whereas 43(86%) patients were managed by PPV later as shown in Table 1. The mean age of patients in our study was 64.6±9.41 years (range, 45-75years) and all the patients had IOL's implanted at the end of PPV.

Table 1: Distribution of time interval between nucleus drop and PPV

Time interval	Frequency	Percentage
Same Day	7	14.0
Delayed (> 7 Days)	43	86.0

Graph 1 shows that the postoperative visual outcome after PPV was 6/6 to 6/18 in 8(16%) eyes at 1 month, in 13 (26%) eyes at 3 months and in 30 (60%) eyes at 6 months, while only 15 (30%) had VA in the range of 6/18 to 6/60 and 5 (10%) patients had VA of <6/60 at the final follow up.

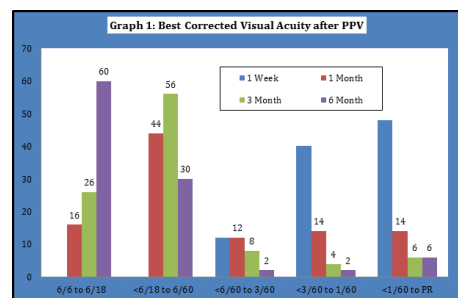
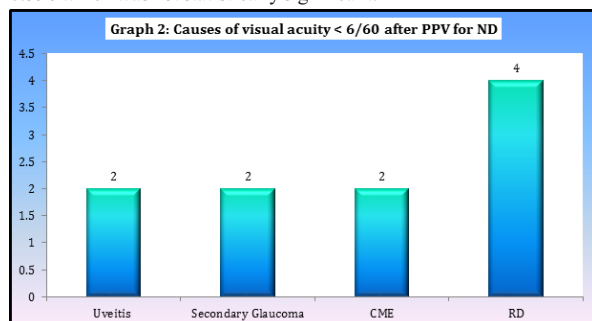


Table 2: Final visual acuity and relation of time duration between nucleus drop and PPV

BCVA	Same day (n=7)		Delayed (n=43)		P-value
	No.	%age	No.	%age	
6/6-6/18	6	85.71	26	60.47	0.398
6/18-6/60	1	14.29	12	27.90	
6/60-HM+			5	11.63	
Total	7	100	43	100	

Table 2 compares the VA in patients who underwent PPV on the same day and those who underwent PPV after 1 week. In the same day group, 6 (85.71%) patients out of 7 had a VA ranged between 6/6 to 6/18 at the end of 6 months while only 1 (14.29%) had VA between 6/18 to 6/60.

Out of 43 patients who underwent delayed PPV, 26 (60.47%) has VA range between 6/6 to 6/18, while 12 (27.90%) had VA ranged between 6/18 to 6/60 and only 5 (11.63%) had VA of 6/60-HM. P value was 0.398 which was not statistically significant.



Graph 2 illustrates the causes of VA < 6/60 after PPV for Nucleus drop in 5 patients and the reasons observed were presence or RD in 2 (4%) patients, while uveitis, secondary glaucoma and CME was seen in 1 (2%) eye each. None of these 5 patients belonged to the same day PPV group in our study.

DISCUSSION:

PPV is the definitive management to retrieve the posteriorly dislocated nucleus from the eye. The primary goal of PPV for retained nucleus is the posterior vitreous removal to avoid traction during lens fragment removal, and to prevent complications like RD. Topical antibiotics were prescribed to all patients to prevent infection. Inflammation and corneal edema was subsided with the help of topical steroids and anti-glaucoma medication respectively, and a relatively quiet eye was taken for PPV. We made a comparison between VA in patients who underwent PPV on same day (n=7) and those who underwent delayed PPV (n=43). In the same day group, 6 (85.71%) patients out of 7 had BCVA ranged between 6/6 to 6/18 at the end of 6 months while only 1 (14.29%) patient had BCVA between 6/18 to 6/60 in this group. Out of the 43 patients who did not undergo PPV on same day, 26 (60.47%) had BCVA between 6/6 to 6/18, while 12 (27.90%) had BCVA ranged between 6/18 to 6/60 and only 5 (11.63%) patients had BCVA of <6/60-HM. P value was 0.398 which was not statistically significant.

Other studies where no statistical difference was observed was a study by **Verma L et al (2001)**³⁴ where overall 10 eyes were operated upon before 1 week and 14 eyes after 1 week. The mean VA of the eyes that underwent early vitrectomy (<1 week) was better than that of the delayed vitrectomy (>1 week), but the difference was not statistically significant. Other large series^{12,35} with similar conclusion have failed to demonstrate a statistically significant association between the timing of vitrectomy and chronic glaucoma or visual outcome. A study by **Kim JE et al. (1996)**³⁶ has also reported that 75% of eight eyes operated on the same day as the cataract surgery had final vision of 0.66 or better with a mean of 0.62, whereas only 63% of the other 54 eyes operated later had final vision of 0.5 or better. Various other studies^{7,37} have reported that with early PPV there is significantly less inflammatory cell activity and thus decreased rate of secondary glaucoma and other complications, and later removal is associated with persistently elevated IOP and poorer visual outcome. Conversely, some studies³⁸ have also suggested that delaying vitrectomy for more than 2 weeks can have advantages like softening of the nuclear material inside the eye, posterior vitreous detachment, and better control of intraocular inflammation and pressure, hence making removal of nuclear material easier.

The factors that contributed to the timing of PPV in our study included the availability of VR surgeon in the same centre, time taken by cataract surgeon for referral, distance between the location of the patient and the VR specialist, ocular media clarity, and severity of ocular inflammation. With the availability of the VR surgeon in the same centre and on the same day, it was easier and quicker for the cataract surgeons to refer patients for PPV. This also had the advantages of avoiding risks of repeated anesthesia, reduced patient stress levels, hassle free patient dealing and one time admission in hospital. Although performing same-day PPV when the VR surgeon is available has numerous benefits, sometimes certain limitations like edematous cornea, reduced media clarity, intraocular inflammation, and fragile inflamed tissues make the PPV difficult and increase the risk of hypotony, supra-choroidal hemorrhage, and RD. In such a scenario, assessment of whether to operate or wait is entirely the VR surgeons discretion based on his expertise and past experience.

In our study we have also observed the causes of VA being < 6/60 after PPV were RD in 2 (4%) patients, while uveitis, secondary glaucoma and CME was seen in 1 (2%) eye each. None of these 5 patients belonged to the same day PPV group in our study. Similar observations were seen in the study by **Salehi A et al (2011)**³⁹ where they observed that in the late vitrectomy group, 66.6% of eyes developed persistent uveitis, 53.3% of eyes showed elevated IOP and 5 eyes reported to have RD. In early PPV group 16.6% developed uveitis and 20% showed elevated IOP while only 1 eye was reported to have RD.

CONCLUSION:

Our study concludes that majority of the patients obtain good VA after PPV for nucleus drop irrespective of the time, but comparatively better results were obtained in same day PPV group. There is lesser inflammatory response, lower incidence of RD, and a quicker visual recovery with added advantage of clear cornea and minimally inflamed eye that enabled better removal of nucleus. Same-sitting PPV also eliminates the need of two separate surgeries and hassle free patient dealing. Although the P value was not statistically significant, we conclude that the benefits of early PPV outweighs those of delayed PPV and whenever nucleus drop occurs, an early referral to the VR surgeon is beneficial.

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