• Clinical Research •

Rapid-onset neovascular glaucoma following cataract surgery in diabetes: outcomes of pars plana vitrectomy combined with Ahmed glaucoma valve implantation

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Abstract

● **AIM:** To present a case series of rapid-onset neovascular glaucoma (NVG) accompanied by vitreous haemorrhage (VH) following cataract surgery in diabetic patients, and to evaluate the efficacy of pars plana vitrectomy (PPV) combined with Ahmed glaucoma valve (AGV) implantation.

● **METHODS:** This is a retrospective, single-center, consecutive case series. All patients underwent 23-gauge PPV with AGV implantation 2-3d after intravitreal ranibizumab injection (IVR). The minimum postoperative follow-up period lasted 12mo. The primary outcome measures included best-corrected visual acuity (BCVA), intraocular pressure (IOP), and topical hypotensive medications.

● **RESULTS:** Fifteen diabetic patients (age, 46-81y) with rapid-onset NVG and VH following uncomplicated phacoemulsification were included. The median time to the initial NVG diagnosis following cataract surgery was within 4wk. After PPV combined with AGV implantation, the mean BCVA (logMAR) improved from 1.9 (range: 1.0 to 2.6) preoperatively to 1.2 (range: 0.2 to 2.6) at the final follow-up. Baseline BCVA and the presence of diabetic nephropathy (DN) were significantly associated with the final BCVA in the multiple regression model. The mean postoperative IOP at all follow-up visits was significantly reduced compared to baseline. At the final follow-up, 9 patients required one or two topical ocular hypotensive medications, while the other 6 needed not. Success was achieved in 87%, and the reoperation rate was 20%. The majority of NVG cases (9/15) were primarily attributed to the rapid progression of proliferative diabetic retinopathy. However, a notable subset (6 eyes) was complicated retinal vein occlusion or carotid artery occlusion.

● **CONCLUSION:** PPV combined with AGV implantation after adjuvant IVR for rapid-onset NVG with VH following diabetic cataract surgery is one of the safe and effective treatments. Baseline BCVA and preexisting DN may be potential indicators for visual outcomes.

● **KEYWORDS:** diabetic retinopathy; neovascular glaucoma; pars plana vitrectomy; Ahmed glaucoma valve implantation
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INTRODUCTION

Hyperglycaemia in patients with diabetes mellitus (DM) induces cataract morbidity at an earlier age, resulting in a higher prevalence rate of cataracts at an earlier age[1]. Moreover, hyperglycaemia compromises the integrity of the blood-aqueous and blood-retinal barriers[2]. Phacoemulsification cataract surgery is an effective and safe approach for cataract treatment[3]. However, cataract surgery in patients with DM can lead to serious complications, such as neovascular glaucoma (NVG) and accelerated proliferative diabetic retinopathy (PDR), with or without vitreous haemorrhage (VH)[4-5].

Neovascularization of the iris (NVI) and NVG have been associated with poor visual outcomes following cataract surgery, with 70% of patients having a visual acuity (VA) of less than 5/200 at 1y postoperatively; a previous study has also reported a 9% incidence of NVI in patients with diabetic retinopathy (DR) who have undergone lens surgery[6]. Generally, NVG is regarded as a refractory and blinding disease, which is difficult to manage and usually results in devastating visual impairment without timely and effective intervention[7]. NVG incidence after diabetic cataract surgery poses a significant therapeutic challenge[8-9].

This study reported a case series on NVG with VH after cataract surgery in patients with DM, exploring the possible causes and possible indicators of visual prognosis, and sought to investigate the clinical outcomes and complications associated with combined pars plana vitrectomy (PPV) and Ahmed glaucoma valve (AGV) implantation.

PARTICIPANTS AND METHODS

Ethical Approval The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethical Review Committee of Ruijin Hospital (Ethics: 2024, clinical ethics No.65), and was exempted from the requirement for written informed consent due to its exclusive use of retrospective, de-identified patient data.

Participants This is a retrospective, single-centre, consecutive case series. It included patients with diabetes diagnosed with NVG combined with VH following uncomplicated phacoemulsification. NVG diagnosis was based on an elevated intraocular pressure (IOP) of ≥22 mm Hg with NVI and/or neovascularization of the angle (NVA). VH enrolled in this case series was graded as moderate to severe according to the vitreous haze grading system developed by Nussenblatt *et al*[10] for uveitis evaluation.

Any new VH episode occurring 1wk after surgery was considered recurrent VH. The baseline data of the enrolled patients were collected, including age, sex, operated eye, best-corrected visual acuity (BCVA), IOP, results of dilated fundus examination, and systemic factors [hypertension, diabetic nephropathy (DN), hyperlipidaemia, glycated haemoglobin level, DM type, and DM duration]. BCVA was measured using a standard logarithmic visual acuity chart at a distance of 5 m to determine the logarithm of reciprocal decimal visual acuity (logMAR VA). IOP was measured using non-contact tonometry (TX-20, Canon, Japan). Fundus examination was conducted with a 90 D lens under a slit lamp with dilated pupils, and NVA was evaluated using gonioscope. The stage of DR was graded using the Early Treatment Diabetic Retinopathy Study Diabetic Retinopathy Severity Scale (DRSS)[11].

The exclusion criteria were as follows: 1) NVI, NVG, or VH prior to cataract surgery; 2) history of previous intraocular surgery or ocular trauma; 3) diagnosis of other retinal diseases, such as preoperative primary glaucoma and high myopia; 4) history of leukaemia or malignant tumours.

PPV and AGV Implantation Procedure All patients underwent standard 23-gauge PPV combined with AGV implantation 2–3d after preoperative intravitreal ranibizumab (IVR) injection at the Ophthalmology Department of Ruijin Hospital. One experienced retinal surgeon (Shen X) and one experienced glaucoma surgeon (Zhong YS) performed the surgeries. Panretinal photocoagulation (PRP) was performed after vitreous clearance in all patients. At the end of the surgery, tamponade agents were selected according to the intraoperative conditions, including air, balanced salt solution (BSS), or silicone oil (SiO).

Study Outcomes After PPV combined with AGV implantation surgery, the patients were followed up in the outpatient department at 1wk and 1, 3, 6, and 12mo postoperatively. The primary outcome measures included BCVA, IOP, recurrent rubeosis, and recurrent VH. The secondary outcome measures encompassed postoperative retinal detachment and intraocular infection. VA of light perception (LP), hand motion (HM), and counting fingers (CF) were quantified as 2.6, 2.3, and 1.85 logMAR, respectively[12-13].

The criteria for success were defined as IOP ≥6 and ≤21 mm Hg with a clear vitreous cavity at 12mo postoperatively and without severe complications sunch as loss of light perception or endophthalmitis. Furthermore, success was categorized into complete success and qualified success; complete success was defined as achieving the desired outcomes without the necessity for adjunctive medications and qualified success was defined as achievement with the use of adjunctive medications[14].

Statistical Analysis Statistical analysis was performed using GraphPad Prism 7.0 (GraphPad Software, CA, USA). A paired *t*-test was used to compare the difference between the values of different visits; an unpaired *t*-test was used to compare the difference between the two groups; a Mann-Whitney *U* test was used to compare BCVA and changes in BCVA between patients with DN and without DN. Pearson correlation analyses were performed to determine the relationships between normally distributed metric data. Multiple linear regression analysis was performed using SPSS software version 21.0 (IBM-SPSS, Chicago, Illinois, USA), and stepwise multiple regression was used to explore the risk factors. Statistical significance was set at $P<0.05$.

RESULTS

Baseline Clinical Characteristics Fifteen eyes of 15 patients with diabetes and NVG rapid-onset accompanied by VH secondary to cataract surgery were included in this study. The BCVA of these patients ranged from 0–0.3 logMAR at 1d after cataract surgery, and none of the patients had a history of either laser photocoagulation or intravitreal anti-vascular endothelial growth factor (anti-VEGF) injection in either eye prior to the cataract surgery. The baseline clinical characteristics of the patients are presented in Table 1. The mean age of the patients (11 males, 4 females) was 66.1±8.9y (range: 46–81y) with a diabetes duration of 9.9±4.1y (range: 5–22y) and glycated haemoglobin levels of 7.7±0.7 (range: 6.1–8.6)%. Of these patients, two had type 1 DM, thirteen had type 2 DM, eight had DN, and all had hypertension and hyperlipidaemia (Table 1). The median time to the initial diagnosis of NVG

Table 1 Demographic and clinical characteristics of the enrolled patients

No.	Sex	Age (y)	Duration of diabetes (y)	Type of DM	HbA1c (%)	FBS (mmol/L)	Hypertension	Diabetic nephropathy	Hyperlipidaemia
1	Female	67	6	2	8.1	9.8	Yes	No	Yes
2	Male	68	12	2	7.3	8.7	Yes	Yes	Yes
3	Male	70	10	2	8.1	10.1	Yes	No	Yes
4	Male	81	22	2	7.5	9.6	Yes	No	Yes
5	Male	56	8	2	8.2	8.9	Yes	Yes	Yes
6	Female	76	13	2	7.8	8.7	Yes	No	Yes
7	Female	66	9	2	6.9	7.8	Yes	Yes	Yes
8	Male	57	10	2	7.1	8.6	Yes	No	Yes
9	Male	46	5	1	7.8	9.5	Yes	Yes	Yes
10	Male	69	9	2	8.3	10.5	Yes	Yes	Yes
11	Male	72	10	2	6.1	6.7	Yes	Yes	Yes
12	Male	58	6	1	7.5	9.1	Yes	No	Yes
13	Male	61	9	2	8.3	9.7	Yes	No	Yes
14	Male	75	12	2	7.7	9.5	Yes	Yes	Yes
15	Female	65	7	2	8.6	10.6	Yes	Yes	Yes

HbA1c: Glycated haemoglobin; DM: Diabetes mellitus; FBS: Fasting blood-glucose.

Table 2 Baseline ophthalmological examinations before PPV

No.	Eye	BCVA, logMAR	IOP, mm Hg	First diagnosis of NVG (wk)	Fundus exam before cataract surgery	DR degree of the fellow eyes	Grade of VH before PPV
1	OD	1.85	49	3	Severe NPDR	Mild	Severe
2	OS	2.3	43	5	Mild NPDR	Mild	Severe
3	OD	1.0	32	2	N	N	Moderate
4	OD	2.3	50	4	N	Mild	Severe
5	OS	2.3	55	6	Moderate NPDR	Moderate	Severe
6	OD	2.6	60	6	N.A.	Mild	Severe
7	OS	2.3	52	3	N.A.	N	Severe
8	OD	1.85	48	5	Moderate NPDR	Mild	Moderate
9	OD	1.85	38	3	Moderate NPDR	Mild	Severe
10	OS	2.3	46	4	Moderate NPDR	N	Severe
11	OS	2.3	51	7	N.A.	N	Severe
12	OD	1.6	39	4	Moderate NPDR	Mild	Moderate
13	OS	1.6	42	3	Moderate NPDR	Moderate	Severe
14	OD	1.0	34	3	Moderate NPDR	Mild	Moderate
15	OS	1.3	36	2	N	Mild	Severe

PPV: Pars plana vitrectomy; OD: Right eye; OS: Left eye; BCVA: Best corrected visual acuity; IOP: Intraocular pressure; NVG: Neovascular glaucoma; DR: Diabetic retinopathy; NPDR: Nonproliferative diabetic retinopathy; N: No manifestation of DR found; N.A.: No record of fundus description due to severe cataracts; VH: Vitreous haemorrhage.

after cataract surgery was 4wk (range: 2–7wk, Table 2). Two patients (patients 5 and 11) had a history of severe ipsilateral carotid stenosis.

Fundus Examination Preoperative dilated fundus examinations of the operated eyes revealed that three eyes exhibited no signs of DR, three lacked fundus documentation due to severe cataracts, and the remaining eyes were diagnosed with mild to severe nonproliferative diabetic retinopathy (NPDR). Similarly, dilated fundus examinations of the contralateral eyes identified four eyes without DR, nine with mild NPDR, and two with moderate NPDR; none of the contralateral eyes exhibited clinically significant macular edema, as detailed in Table 2. After PPV, two patients were diagnosed with central retinal vein occlusion (CRVO), two with branched retinal vascular obstruction (BRVO) superimposed on DR, and nine with PDR (Table 3).

Combined Surgery and Complications All patients underwent 23-gauge PPV with AGV implantation 2–3d subsequent to the preoperative IVR administration. During the PPV procedure, BSS, air, and SiO were employed as tamponade agents in ten, two, and three patients, respectively. Recurrent rubeosis, recurrent VH, and postoperative combined

Table 3 Treatment and postoperative follow-up of the patients

No.	BCVA, logMAR (1y)	IOP, mm Hg					Post-surgical diagnoses	Tamponade agents	Recurrent VH	PPV reoperation/ IVR	Rubeosis	Adjunctive medication (*n*, 1y)
		1wk	1mo	3mo	6mo	12mo						
1	1.0	26	15	22	24	18	PDR	BSS	No	N.A.	No	1
2	1.3	18	17	19	24	13	BRVO	Air	Yes	IVR	Yes	1
3	0.3	29	22	17	16	18	CRVO	BSS	No	IVR	Yes	0
4	0.2	21	21	20	18	16	BRVO	BSS	No	N.A.	No	1
5	2.3	17	16	21	21	19	CAO	SiO	Yes	PPV+IVR	Yes	2
6	2.3	19	23	22	17	23	PDR	BSS	No	N.A.	No	0
7	1.85	31	23	18	19	21	CRVO	Air	No	IVR	Yes	0
8	0.5	22	21	17	11	12	PDR	BSS	No	N.A.	No	0
9	1.3	30	21	22	22	23	PDR	BSS	No	N.A.	No	1
10	1.85	16	13	9	12	12	PDR	SiO	No	PPV+IVR	Yes	2
11	2.6	31	21	13	18	19	CAO	SiO	Yes	PPV+IVR	Yes	2
12	0.5	22	19	18	15	21	PDR	BSS	No	N.A.	No	1
13	0.7	23	18	16	18	20	PDR	BSS	Yes	IVR	No	1
14	0.7	29	21	22	20	20	PDR	BSS	No	N.A.	No	0
15	0.5	10	11	23	17	19	PDR	BSS	No	N.A.	No	0

BCVA: Best corrected visual acuity; IOP: Intraocular pressure; BSS: Balanced salt solution; SiO: Silicone oil; VH: Vitreous haemorrhage; PPV: Pars plana vitrectomy; IVR: Intravitreal ranibizumab injection; CRVO: Central retinal vein occlusion; BRVO: Branched retinal vascular obstruction; PDR: Proliferative diabetic retinopathy; CAO: Carotid artery occlusion; N.A.: Not applicable.

traction/rhegmatogenous retinal detachments respectively occurred in six (patients 2, 3, 5, 7, 10, and 11), four (patients 2, 5, 11, and 13) and one patient(s) (patient 11) after PPV combined with AGV implantation surgery. No other unmanageable intraoperative or postoperative complications, or endophthalmitis, occurred in these patients.

One patient with postoperative VH combined with recurrent rubeosis received IVR once (patient 2), and two underwent another PPV combined with preoperative IVR (patients 5 and 11). One patient with postoperative VH received IVR once (patient 13). Two patients with recurrent rubeosis without VH received IVR once (patients 3 and 7), and one underwent another PPV combined with preoperative IVR (patient 10). The reoperation rate was 20% in 15 patients (Table 3).

BCVA The mean BCVA (logMAR) showed significant improvement, increasing from a preoperative value of 1.9 (range: 1.0–2.6) to 1.2 (range: 0.2–2.6; P<0.001) at the final visit. BCVA improved in 13 eyes at the final visit. The VA remained unchanged in one eye with 2.3 (patient 5); in another eye, it decreased from 2.3 to 2.6 (patient 11, Tables 2 and 3). The BCVA of patients without DN was not significantly different from that of patients with DN at the final visit (P=0.051). However, the change in BCVA from baseline to the final visit in patients without DN was greater than that in patients with DN (P=0.032). The BCVA at the final visit positively correlated with baseline BCVA, baseline IOP, and time of initial NVG diagnosis after cataract surgery (r=0.7, 0.67, and 0.684; P=0.004, 0.006, and 0.005, respectively; Figure 1). However, in the multiple regression model, baseline BCVA and the presence of DN were significantly associated with the final BCVA (P=0.003, 0.035; Table 4).

Table 4 Multivariate linear regression analyses of risk factors

Parameters	Unstandardized β	Standardized β	P
BCVA baseline	1.025	0.648	0.003
DN	0.633	0.407	0.035

BCVA: Best-corrected visual acuity; DN: Diabetic nephropathy.

IOP and Antiglaucoma Medications The mean IOP was 45±8.2 mm Hg preoperatively and decreased to 22.9±6.3, 18.8±3.7, 18.6±3.9, 18.1±3.8, and 18.3±3.6 mm Hg at 1wk, and 1, 3, 6, and 12mo postoperatively, respectively. The mean postoperative IOP at each follow-up was significantly lower than the preoperative mean IOP (all P<0.001; Figure 2). At the final follow-up, 6 patients did not require topical ocular hypotensive agents, while another 6 were managed with a single topical ocular hypotensive agent; none of these patients required reoperation for PPV. The remaining 3 patients, who underwent PPV reoperation during the follow-up period, were treated with two hypotensive agents to control IOP (Table 2). A success rate of 87% was achieved in 15 participants, and the complete success rate was 40%.

DISCUSSION

NVG with VH following diabetic cataract surgery is a rare but severe, aggressive, and challenging condition. Inadequate or delayed management of NVG can lead to complete vision loss of vision with intractable pain, and medical treatment alone is often insufficient to control the progression of NVG[5]. Few studies have reported on the treatment outcomes of NVG

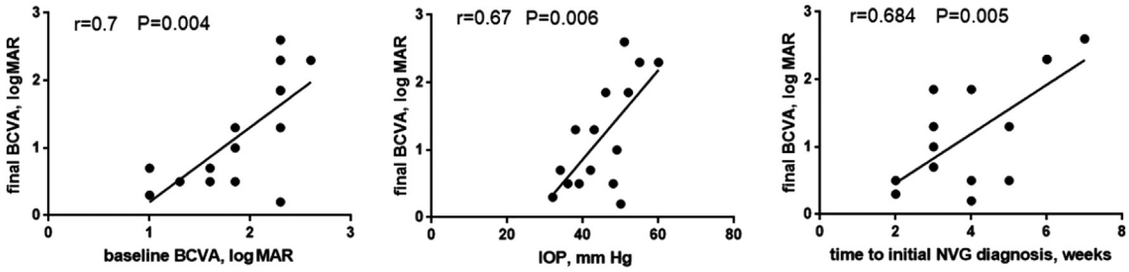

Figure 1 Association of the BCVA at the final visit to the baseline BCVA, IOP, and time of initial diagnosis of NVG after the cataract surgery
BCVA: Best-corrected visual acuity; IOP: Intraocular pressure; NVG: Neovascular glaucoma.

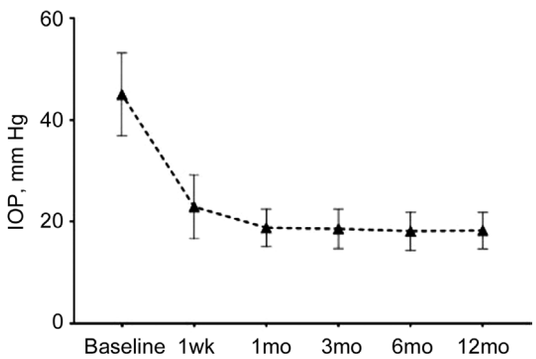

Figure 2 Mean IOP measurements at all follow-up visits IOP: Intraocular pressure.

with VH following diabetic cataract surgery, and the optimal treatment strategy remains unclear. This study presents the outcomes of patients with NVG accompanied by VH following diabetic cataract surgery, who underwent combined PPV and AGV implantation after adjuvant IVR with a 1-year follow-up in this retrospective, single-centre, consecutive case series.

Preexisting DR, particularly PDR, prior to surgery, is identified as a risk factor for postoperative NVG after cataract surgery, and visual outcomes are poor in the presence of active proliferative retinopathy[15]. Previous studies have also indicated an increased incidence of DR following cataract surgery[16-17]. Surgical trauma disrupts the blood-retina barrier (BRB), leading to increased vascular permeability, and VEGF along with proinflammatory cytokines, such as monocyte chemotactic protein-1 (MCP-1), interleukin (IL)-1β and IL-6 are significantly elevated in the aqueous humor of patients post-cataract surgery[18-20]. Vitreous levels of certain cytokines (MCP-1, IL-8, IL-6, and IL-1β) probably play a pivotal role in the development of PDR[21]. Furthermore, levels of VEGF and IL-6 in the aqueous humor were found to be positively correlated with those in the vitreous fluid in PDR patients[22]. Presumably, disruption of BRB may contribute to the progression of DR, and exacerbate retinal hypoxia and ischemia, potentially leading to rapid progression to rubeosis and NVG in this case series. However, our study did not include the collection of vitreous and aqueous humor samples. Future fundamental research is necessary to confirm the relationship between intraocular fluid cytokines and incidence of NVG following diabetic cataract surgery in the future.

Markedly asymmetric presentation of PDR was reported in approximately 5.2% of patients with PDR[23]. Conditions such as carotid obstructive disease, ocular ischemic syndrome (OIS), and retinal vascular diseases have been recognized as factors that are associated with asymmetric DR[24]. In this series, none of the contralateral eyes exhibited PDR; after PPV, two surgical eyes were diagnosed with CRVO and two with BRVO superimposed on DR, while nine eyes exhibited PDR. Additionally, two other patients with DR had a history of severe ipsilateral carotid stenosis. Therefore, the occurrence of asymmetric DR was a possibility in these patients. Furthermore, it is universally acknowledged that DR, especially PDR, ischemic CRVO, and OIS are the most common causes of NVG morbidity[7]. When nonischemic CRVO is superimposed on DR, it becomes a high-risk factor for NVG development[25-26]. The percent area of capillary nonperfusion, especially in peripherally, is usually higher in more advanced stages of DR, and DR eyes with the supra-large range nonperfusion area demonstrate a higher incidence of NVG[27-28]. Consequently, asymmetric PDR, superimposed RVO, and substantial peripheral nonperfusion may also contribute to the onset of NVG following cataract surgery.

NVG progresses through three clinical stages: pre-glaucoma, openangle glaucoma, and angle-closure glaucoma. NVA can impede the outflow of aqueous humour from the anterior chamber, resulting in increased IOP[7]. If left untreated, NVG can advance from secondary openangle to angle-closure glaucoma, ultimately causing irreversible blindness[26]. PRP has been shown to reverse both NVI and NVA[29-30]. However, in this case series, NV occurred post-cataract surgery, and the patient did not have the opportunity to complete PRP due to moderate to severe VH. Anti-VEGF intravitreal injection (IVI) has been demonstrated to effectively induce the regression of NVI and NVA, as well as to reduce IOP in conjunction with anti-glaucoma medications. This combination creates favorable conditions for subsequent surgical interventions, enhances surgical success rates, and diminishes the incidence of postoperative recurrent VH[31-32]. The efficacy and safety of anti-VEGF IVI as an adjunctive treatment in diabetic

vitrectomy are well-established[31-33], as corroborated by the findings of this case series. Notably, three patients in this study experienced recurrent rubeosis, which regressed following an additional IVR, thereby confirming that recurrent rubeosis can be effectively managed with repeated IVR in certain cases.

Furthermore, the effectiveness of PPV combined with AGV implantation after adjuvant IVR, for treating NVG with VH following cataract surgery in patients with diabetes was confirmed in this case series. The mean BCVA improved significantly from 1.9 preoperatively to 1.2 at the final follow-up, and IOP significantly decreased at all postoperative visits. At the final visit, all the patients exhibited a clear vitreous cavity and well-controlled IOP. The success rate was 87% among the 15 participants. The implantation of a glaucoma valve is increasingly being recognized as a primary intervention for NVG[34-36]. And AGV implantation effectively controlled the IOP and preserved vision in the NVG patients following PPV for PDR[37]. Recurrent VH is one of the most common postoperative complications following diabetic vitrectomy[37]. In this study, three patients experienced postoperative recurrent VH with rubeosis, including one patient with recurrent retinal detachment after silicone oil removal. The reoperation rate was 20% among the 15 patients. Consistent with this, previous research has indicated that PPV combined with AGV implantation may be more effective than PPV with trabeculectomy in reducing IOP in patients with NVG accompanied by VH[38]. Another study found that IOP in NVG patients treated with trabeculectomy was significantly lower compared to those treated with AGV, despite similar visual acuity outcomes, while the glaucoma surgery did not combine with PPV in that study[39]. While, in a network Meta-analysis suggested that AVG combined with intravitreal anti-VEGF therapy is the most effective approach for NVG[40]. Future prospective-controlled studies are warranted to compare the outcomes of trabeculectomy versus AGV implantation when combined with PPV in this patient population.

Systemic conditions such as diabetes, hypertension, and hyperlipidaemia are known to contribute to the development of NVG[7]. In this study, all participants exhibited hypertension and hyperlipidaemia in addition to diabetes, which may as also be systemic risk factors for NVG in our cohort; uneventful cataract surgery can result in increased levels of inflammatory cytokines, particularly when complications such as DN and hyperlipidaemia are present. Baseline BCVA and baseline IOP demonstrated a positive correlation with logMAR BCVA at the final assessment. Notably, patients without DN experienced greater VA improvement compared to those with DN. In our multiple regression analysis, baseline BCVA and the presence of DN were significantly associated with final BCVA, suggesting they may serve as potential predictors of visual outcomes. Additionally, an earlier diagnosis of NVG following cataract surgery was linked to improved VA at the final visit, likely due in part to the timing of treatment initiation. Nonetheless, controlled studies with larger sample sizes are necessary to substantiate these findings.

It is important to acknowledge the limitations of the present study. First, the presence of cataracts may have influenced the accuracy of fundus examinations, potentially leading to an underestimation of fundus lesions in this study. This highlights the importance for cataract surgeons to promptly reassess retinopathy in such patients postoperatively and refer them to a fundus specialist for further management. Second, the sample size of this study was limited, attributed to the inclusion of a specific population experiencing rare complications following cataract surgery. Finally, the retrospective and non-controlled nature of the study, coupled with the small sample size, constrains the generalizability of the findings. To substantiate these results, future research should involve prospective, controlled trials with larger sample sizes.

In conclusion, this study presents a case series of rapid-onset NVG post-cataract surgery in patients with diabetes. Baseline BCVA and the presence of DN may serve as potential predictors of visual outcomes. PPV combined with AGV implantation after adjuvant IVR is suggested as a potentially safe and effective treatment for NVG with VH following cataract surgery in diabetic patients, although the optimal treatment strategy requires further validation through randomized controlled trials.

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