GERONTOLOGIA POLSKA 2025; 33; 188-193 ARTYKUŁ ORYGINALNY / ORIGINAL PAPER
zgłoszono 30.07.2025 – zaakceptowano 13.09.2025

Vitrectomy (23 G) with silicone oil tamponade in both eyes as the only chance to preserve functional vision – case reports

Witrektomia (23 G) tamponadą olejową w obu oczach jedyną szansą na zachowanie funkcjonalnego widzenia – opisy przypadków

Natalia Lekston[1], Sebastian Sirek[2,3], Justyna Sierocka-Stępień[2,3], Dorota Wyględowska-Promieńska[2,3]

[1]Students' Scientific Society, Department of Ophthalmology, Faculty of Medical Sciences in Katowice, Medical University of Silesia, Katowice

[2]Department of Ophthalmology, Faculty of Medical Sciences in Katowice, Medical University of Silesia

[3]Department of Adult Ophthalmology, Prof. Kornel Gibiński University Clinical Center, Medical University of Silesia

Abstract

Introduction. *Pars plana vitrectomy (PPV) is a key procedure for treating advanced posterior segment eye diseases. In bilateral retinal detachment, surgery in both eyes may be needed to prevent permanent vision loss. The aim of this study was to present the outcomes of bilateral 23G vitrectomy with silicone oil tamponade as the only option to preserve functional vision in patients with advanced retinal pathologies.* **Materials and Methods.** *Three patients with bilateral retinal pathology underwent 23G bilateral PPV using decalin and silicone oil. Procedures included ILM peeling, retinal laser photocoagulation, and in some cases phacoemulsification and retinotomy.* **Results.** *The first patient showed gradual improvement in visual acuity in the right eye, with no change in the left eye. The second patient improved in the right eye, while visual acuity in the left eye remained at 0.002. The third patient achieved the greatest improvement in visual acuity, from 0.002 in both eyes to 0.2 in the right eye and 1.0 in the left eye.* **Conclusions.** *Bilateral PPV with silicone oil is an effective and safe treatment for vision-threatening conditions. (Gerontol Pol 2025; 33; 188-193) doi: 10.53139/GP.20253320*

Keywords: *bilateral PPV, retinal detachment, silicone oil*

Streszczenie

Wstęp. *Witrektomia przez część płaską ciała rzęskowego (PPV) jest kluczowym zabiegiem w leczeniu zaawansowanych chorób tylnego odcinka oka. W obustronnym odwarstwieniu siatkówki operacja obu oczu może być konieczna, by zapobiec trwałej utracie widzenia.* **Cel.** *Celem pracy było przedstawienie wyników obustronnej witrektomii (23G) z zastosowaniem oleju silikonowego jako jedynej możliwości zachowania funkcjonalnego widzenia u pacjentów z zaawansowanymi patologiami siatkówki.* **Materiały i metody.** *Trzech pacjentów z obustronną patologią siatkówki poddano obustronnej PPV (23G) z użyciem dekaliny i oleju silikonowego. Zabiegi obejmowały peeling ILM, laseroterapię, a u niektórych fakoemulsyfikację i retinotomię.* **Wyniki.** *Pierwszy pacjent uzyskał stopniową poprawę ostrości wzroku w prawym oku, bez zmian w lewym oku. Drugi pacjent uzyskał poprawę w prawym oku, podczas gdy ostrość wzroku w lewym oku pozostała na poziomie 0,002. Trzeci pacjent osiągnął największą poprawę ostrości widzenia z poziomu 0,002 w obu oczach do 0,2 w prawym oku oraz do 1,0 w lewym oku.* **Wnioski.** *Obustronna PPV z olejem silikonowym to skuteczna i bezpieczna metoda leczenia zagrażających widzeniu schorzeń. (Gerontol Pol 2025; 33; 188-193) doi: 10.53139/GP.20253320*

Słowa klucze: *bilateralna PPV, odwarstwienie siatkówki, olej silikonowy*

Correspondence address: ✉ Natalia Lekston, Uniwersyteckie Centrum Kliniczne im. prof. K. Gibińskiego Śląskiego Uniwersytetu Medycznego w Katowicach ul. Ceglana 35, 40-514 Katowice ☎ (+48) 608 404 090 💻 lekstonnatalia@gmail.com
ORCID: Natalia Lekston 0009-0006-8967-8505, Sebastian Sirek 0000- 0002- 3138- 3011, Dorota Wyględowska-Promieńska 0000- 0001- 5336- 3460

Introduction

Pars plana vitrectomy (PPV) is an advanced ophthalmic procedure used to treat posterior segment eye disorders. In certain cases, surgical intervention is required in both eyes, performed either simultaneously or sequentially. The decision to carry out bilateral vitrectomy is made individually for each patient after thorough clinical evaluation, risk assessment of complications, and careful consideration of the potential benefits versus the risks inherent to the invasive nature of the procedure. Visual acuity significantly influences the choice of surgical strategy and the interval between procedures. Rare indications for bilateral PPV include extensive, bilateral vitreous hemorrhages (often seen in proliferative diabetic retinopathy) and bilateral macular holes, particularly full-thickness ones [1, 2, 3]. Vitreoretinal procedures in both eyes are also utilized in cases of bilateral retinal detachment, which may otherwise lead to blindness [4, 5]. Furthermore, simultaneous PPV procedures are frequently performed in patients with advanced retinopathy of prematurity. The timing of vitrectomy is crucial—the surgery should be performed when vascular activity begins to decline and retinal detachment is just developing. Delaying the procedure may significantly reduce its effectiveness [6]. Early vitrectomy, including bilateral cases, has proven effective in improving visual acuity in patients with Terson Syndrome, in which subarachnoid hemorrhage is accompanied by vitreous hemorrhage [7]. PPV enables effective intervention in previously untreatable diseases of the retina and vitreous body, leading to improved visual acuity and, consequently, enhanced quality of life for the patient. This study aimed to report the outcomes of bilateral 23G vitrectomy with silicone oil tamponade, representing the sole option for preserving functional vision in patients with advanced retinal disorders.

Materials and methods

Three patients (two women and one man) aged 40–70 years, hospitalized at the Department of Ophthalmology due to bilateral, advanced retinal pathologies threatening permanent vision loss, were included in the study. Inclusion criteria were the presence of bilateral retinal detachment involving or threatening the macula, significantly reduced visual acuity (BCVA ≤ 0.01 in at least one eye), and the lack of alternative, less invasive treatment options. Surgical procedures were performed on a planned or urgent basis, depending on the clinical condition of each patient. All operations were carried out under peribulbar anesthesia (under Tenon's capsule) using a 1:1 mixture of lidocaine and bupivacaine.

Trocars were placed in standard positions and infusion was established. Pars plana vitrectomy (23G PPV) was then performed using decalin for temporary tamponade and retinal repositioning, The procedure included internal limiting membrane (ILM) peeling in the macular area, retinal endophotocoagulation, partial retinotomy and phacoemulsification of cataracts with intraocular lens implantation into the capsular bag. In all cases, final tamponade with silicone oil was applied. Patients were monitored during the postoperative period and followed up regularly, with assessments of best corrected visual acuity (BCVA), intraocular pressure (IOP), and the presence of any potential complications.

Patient 1

A 40-year-old man presented with advanced ophthalmic complaints and severe vision impairment. Examination showed a mature cataract in the left eye (OS) and early cataract in the right eye (OD). BCVA was 0.01 in OD and light perception in OS. Bilateral rhegmatogenous retinal detachment involving the macula was diagnosed. Intraocular pressure (IOP) was 10 mmHg in the OD and 17 mmHg in the OS. Peribulbar anesthesia was performed using a 1:1 solution of lignocaine and bupivacaine under Tenon's capsule. Trocars were placed in typical positions and infusion was established. In the OD, a 23-Gauge (23G) posterior approach vitrectomy was performed using decalin (figure 1A), internal limiting membrane (ILM) peeling in the macular area (figure 1B), and retinal endophotocoagulation (figure 1C). Silicone oil tamponade was applied. Phacoemulsification of the cataract with implantation of intraocular lens (+9.50 D) into the capsular bag was also performed. The OS procedure was conducted the following day, performing a PPV (23G) with decalin (figure 1D), ILM peeling in the macular region, and retinal endophotocoagulation. A 270-degree retinotomy was made, and a lens (+10 D) was implanted (figure 1E, 1F). The surgery and postoperative period were uncomplicated. At discharge, BCVA was 0.002 in the OS and 0.1 in the OD. IOP was 16 mmHg in both eyes (OU).

One week after surgery, BCVA in OD was 0.2, and in OS 0.002. IOP was 22 mmHg in OD and 24 mmHg in OS. Three weeks postoperatively BCVA in OD improved to 0.3, and remained 0.002 in OS. IOP was 18 mmHg in OU. Four months after surgery, due to the development of epiretinal membranes in OS, PPV with silicone oil exchange in OS was performed. Two months after the previous procedure, the patient underwent

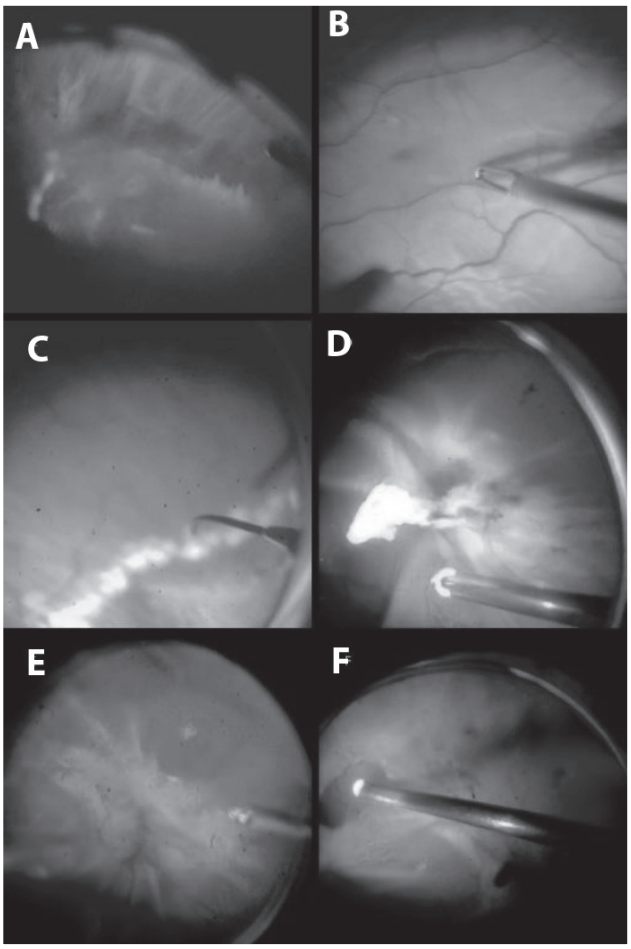

Figure 1. A) Peripheral vitrectomy OD; **B)** ILM peeling OD; **C)** Retinal endolaser OD; **D)** Vitrectomy OS; **E)** Induction of posterior vitreous detachment (PVD) OS; **F)** Subretinal fluid aspiration OS

silicone oil removal from OD. At follow-up, BCVA was 0.012 in OD and 0.002 in OS. IOP was 30 mmHg in OD and 34 mmHg in OS.

Patient 2

A 70-year-old woman with type II diabetes complicated by diabetic retinopathy and secondary glaucoma was electively admitted. On admission BCVA was 0.002 in OD and light perception in OS, IOP was 16 mmHg in OU. A cataract was present in OD, and OS was pseudophakic. Retinal detachment was confirmed in each eye, patient was qualified for PPV, performed on two consecutive days. Peribulbar anesthesia was executed under Tenon's capsule using a 1:1 solution of lidocaine and bupivacaine. Trocars were placed in the standard positions, and infusion was initiated. In the OD, a PPV (23G) was performed using decalin, followed by ILM peeling in the macular region (figure 2A), retinal endophotocoagulation, and silicone oil endotamponade. Phacoemulsification of the cataract was also carried out and an intraocular lens of +21.00 D was implanted into the capsular bag. The procedure in OS was performed on the following day. A PPV (23G) with decalin was carried out (figure 2B, 2C, 2D), followed by ILM peeling in the macular area with removal of epiretinal and subretinal membranes (figure 2E). A 360-degree retinotomy was performed, alongside with retinal endolaser photocoagulation (figure 2F) and an Ando method iridotomy. Silicone oil was used for endotamponade.

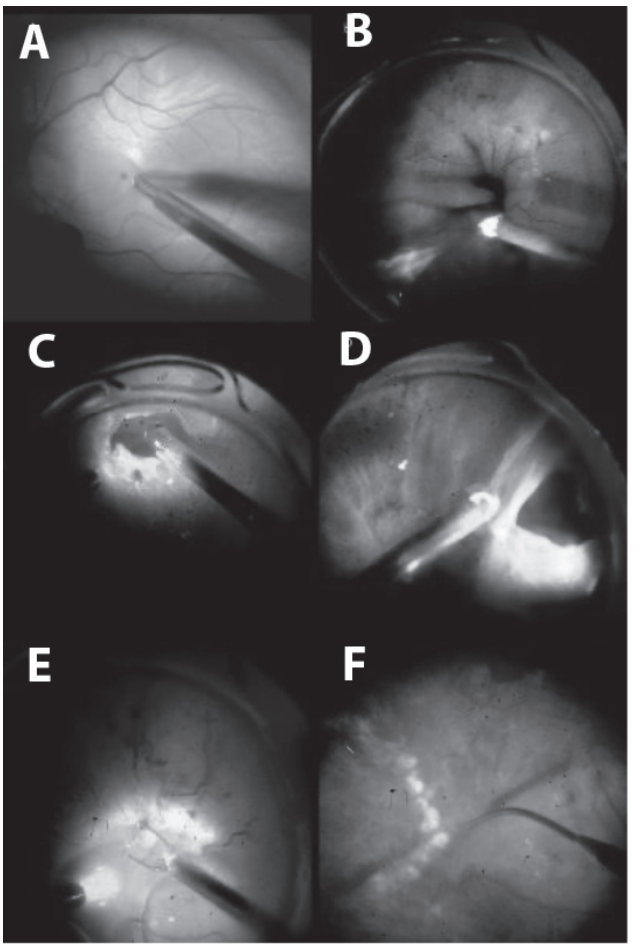

Figure 2. A) ILM peeling OD; **B)** Vitrectomy OS; **C)** Subretinal fluid aspiration OS; **D)** Subretinal fluid aspiration OS; **E)** Removal of epiretinal and subretinal membranes OS; **F)** Retinal endophotocoagulation OS

At discharge, BCVA was 0.1 in OD and 0.002 in OS, IOP was 15 mmHg in OD, 16 mmHg in OS. One week post-operation BCVA improved to 0.04 in OD, IOP was 13 mmHg in OD, 32 mmHg in OS. Beta-blocker and fluoroquinolone drops were prescribed.

Patient 3

A 53-year-old woman admitted electively due to bilateral retinal detachment. BCVA was 0.002 OD and 1.0 in OS; IOP was 12 mmHg in OD, 14 mmHg in OS. Pseudophakia in OU and secondary glaucoma was observed.

Peribulbar anesthesia was administered under Tenon's capsule using a 1:1 solution of lignocaine and bupivacaine. Trocars were placed in typical locations and infusion was connected. In OD, a PPV (23G) was performed via the posterior approach using decalin (figure 3A), ILM peeling (figure 3B), retinal endophotocoagulation (figure 3C), and silicone oil endotamponade was applied. The surgical procedure in OS was performed the same day. Trocars were placed in typical locations (figure 3D), and infusion was connected. A PPV (23G) was performed using decalin (figure 3E). ILM peeling and retinal endophotocoagulation were conducted (figure 3F), followed by silicone oil endotamponade.

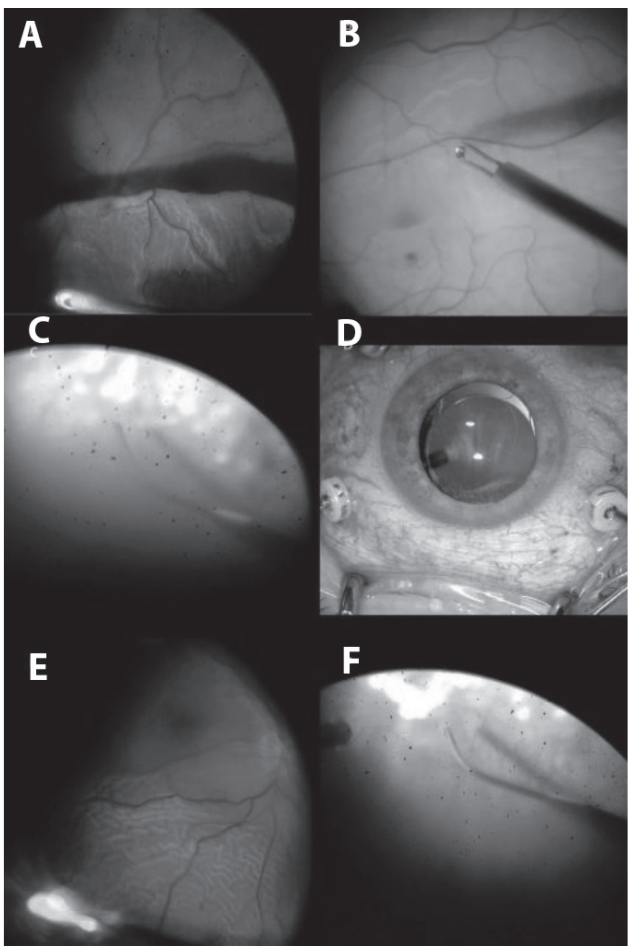

Figure 3. **A)** Vitrectomy OD; **B)** ILM peeling OD; **C)** Retinal endophotocoagulation OD; **D)** Trocar placement OS; **E)** Vitrectomy OS; **F)** Retinal endophotocoagulation OS

At discharge BCVA was 0.1 in OD and 0.3 in OS. IOP was 15 mmHg in OU. After one month BCVA was 0.2 in OD and 0.7 in OS. IOP was 41 mmHg in OD and 45 mmHg in OS. Treatment with dorzolamide and fluoroquinolone antibiotic in drops was prescribed. Two months after surgery, BCVA was 0.2 in OD and 0.8 in OS, IOP of 56 mmHg in OD and 44 mmHg in OS. Brimonidine eye drops added to the therapy. Six months after surgery, the patient was qualified for silicone oil removal from OS. Two weeks after the procedure BCVA was 0.2 in OD and 1.0 in OS. IOP measured 29 mmHg in OD and 32 mmHg in OS. The patient reported no complaints. Dorzolamide, timolol, and brimonidine drops were prescribed.

Discussion

Bilateral vitrectomy represents a critical intervention for advanced ophthalmic pathologies, offering a final opportunity to preserve functional vision while posing increased procedural and postoperative risks. Bilateral PPV is performed even in neonates, as described by Özdek et al. The incidence of retinopathy of prematurity (ROP) rises with advances in neonatal care. Approximately 12% of patients with stage 4 and 5 ROP require surgical intervention, such as vitrectomy or scleral buckling, with carefully planned timing. In the cited study, simultaneous surgery was performed in 70 eyes, achieving success rates of 95.7% for stage 4A, 83.3% for 4B, and 50% for stage 5, while reducing anesthesia-related risks by 50% [6]. Hsia et al. compared visual prognosis in patients undergoing bilateral PPV sequentially or simultaneously, considering disease severity. Patients were divided into three groups: persistent vitreous hemorrhage beyond 3 months despite anti-VEGF therapy or complicated by neovascular glaucoma, progressive fibrovascular proliferation without detachment, and retinal detachment threatening the macula. Fifty-four patients (108 eyes) underwent simultaneous surgery, and 63 patients (126 eyes) underwent sequential surgery. Both groups improved visually; however, patients in the simultaneous group were younger but had more advanced disease and greater damage to the ellipsoid zone and external limiting membrane, resulting in poorer outcomes. Sequentially treated patients had better visual results, often with improvement in the first eye correlating with better outcomes in the second. Poor prognostic factors included fibrovascular proliferation, elevated intraocular pressure (IOP), advanced age, and low baseline BCVA. Anti-VEGF history was associated with better outcomes, whereas neovascular glaucoma correlated with worse results. Four patients in the simultaneous group achieved visual acuity of 0.002, while none in the sequential group had such low vision [1]. Song et al. focused their study on analyzing two groups of diabetic retinopathy patients-those after bilateral and unilateral vitrectomy. They analyzed systemic risk factors such as age, sex, duration of diabetes, HbA1c levels, body mass index, eGFR, albuminuria, hypertension, and dyslipidemia. Results showed that patients with proliferative diabetic retinopathy and renal insufficiency had

a higher risk of developing severe bilateral retinopathy (bilateral PPV 0.2, unilateral PPV 0.05). However, no significant differences were found between the two groups regarding other risk factors [8]. The wide applicability of vitreoretinal surgery is illustrated by Storey et al., who described a patient with Gaucher disease in whom glucosylceramide accumulation caused significant vitreous opacities and visual deterioration. The described patient exhibited mildly delayed development, hearing loss, and unilateral aseptic necrosis of the femoral head. She received enzyme replacement therapy, maintaining good systemic disease control. Visual acuity declined to 0.13 in both eyes, with bilateral epiretinal membranes confirmed by OCT. PPV (25G) with ERM removal and ILM peeling was performed in the right eye, in the left eye, ILM peeling was initially omitted, leading to ERM recurrence and reoperation. Post-reoperation, visual acuity improved to 0.5 in the right eye and 0.4 in the left [9]. In the present series, visual improvement varied. Patient 1 showed gradual BCVA improvement in OD, with no significant change in OS. Patient 2, despite very low initial visual acuity in both eyes, improved in OD, while OS remained at 0.002. Patient 3 exhibited the greatest improvement-from a preoperative BCVA of 0.002 in OD to 0.2 postoperatively, and 1.0 in the OS. Although vitrectomy outcomes varied among patients, it represented the only chance to preserve vision. Patient 3 experienced elevated intraocular pressure in the postoperative period, controlled with dorzolamide and brimonidine eye drops. IOP elevation is a common complication after posterior segment surgery. The effectiveness of surgery depended on baseline retinal status, comorbidities, and potential for visual rehabilitation. Even minor visual gains can significantly enhance quality of life. The urgency of retinal detachment repair depends on macular involvement, comorbidities, and symptom duration. Elghawy et al. reported that moderate surgical delay (3–7 days) in macula-off detachments does not significantly affect outcomes compared to surgery within 48 hours, whereas delays beyond 7 days worsen prognosis [10]. Patient 1 had macula-involving bilateral retinal detachment requiring urgent surgery, as delays worsen prognosis. Patient 2's detachment spared the macula, but coexisting diabetic retinopathy and secondary glaucoma prompted early intervention. Patient 3 also had macula-involving bilateral detachment with secondary glaucoma, necessitating immediate bilateral PPV. Good baseline visual acuity in the left eye was a favorable prognostic factor. In all cases, bilateral involvement posed a high risk of rapid vision loss, justifying urgent surgery. Sympathetic ophthalmia (SO) is a rare, bilateral, vision-threatening granulomatous uveitis that can develop after ocular trauma or surgery [11]. Cases after vitrectomy have been reported, including a 21-year-old woman with SO following bilateral PPV for retinal hemangioblastomas, associated with von Hippel-Lindau syndrome. Shortly after surgery, she experienced vision loss and distortions in the left eye, which resolved after four months of prednisone therapy [12]. SO has also been reported after vitrectomy for subretinal hemorrhage due to polypoidal choroidal vasculopathy, with postoperative serous retinal detachments resolving under high-dose steroids. Diagnosis was made after excluding other causes of detachment [13]. Shen et al. described two additional cases after PPV for retinal detachment, both presenting acute vision loss two months postoperatively and responding well to corticosteroid therapy [14]. These cases show that sympathetic ophthalmia is a rare but serious post-vitrectomy complication, particularly after multiple surgeries or trauma. Diagnosis is challenging, requiring multimodal imaging (OCT, OCT-A, fluorescein and indocyanine green angiography), and prompt corticosteroid therapy improves prognosis [11]. The multicenter, retrospective study by Simpson et al. included 17 patients (34 eyes) who underwent immediate sequential bilateral PPV, performed by nine surgeons across eight centers in the United Kingdom. Patients were aged 18–72 years. The most common pathologies were rhegmatogenous retinal detachments (20 eyes), diabetic vitreous hemorrhage or tractional retinal detachment (12 eyes), and full-thickness macular holes (2 eyes), with identical pathology in both eyes, justifying simultaneous intervention. The analysis showed that bilateral PPV is a valuable option in bilateral vitreoretinal diseases, particularly when urgent intervention is required and staged treatment could allow disease progression. Indications also included high anesthetic risk, limited postoperative care, difficulties attending procedures, learning challenges, and patient preferences. The type and location of retinal pathology determine the choice of procedure and tamponade. Postoperative complications were rare, including elevated intraocular pressure, vitreous hemorrhages, cystoid macular edema, and macular folds, one eye required reoperation due to persistent vitreous hemorrhage. These results indicate a moderate risk of complications that should be considered when planning the procedure [15]. Although bilateral PPV increases the risk, none of the described patients experienced serious postoperative complications, supporting the procedure's use when indicated.

Conclusions

Bilateral vitreoretinal surgery is a key treatment for vision-threatening conditions. Despite its invasiveness and

the need to operate on both eyes quickly, the patients showed improved visual acuity. No severe complications occurred, confirming the procedure's safety and effectiveness. Outcomes depend on initial clinical status, and without surgery, patients would likely lose vision, underscoring the necessity of PPV in such cases.

Conflict of interest

None

References

1. Hsia Y, Yang CM. Bilateral vitrectomy in patients with proliferative diabetic retinopathy-characteristics and surgical outcomes. Graefes Arch Clin Exp Ophthalmol. 2024;262(9):2833-44. doi:10.1007/s00417-024-06462-5.
2. Jiang JH, Wu RH, Ren MX, Lin K, Lin W, Hu XT, et al. Surgical strategy and outcome in patients with bilateral proliferative diabetic retinopathy. Int Ophthalmol. 2023;43(12):4921-31. doi:10.1007/s10792-023-02895-9.
3. Yoon SP, Polascik BA, Grewal DS, Fekrat S. Bilateral recurrent macular holes. Am J Ophthalmol Case Rep. 2018;11:52-5. doi:10.1016/j.ajoc.2018.05.008.
4. Radeck V, Schindler F, Helbig H, Gamulescu MA, Cvetkov Y, Barth T, et al. Characteristics of bilateral retinal detachment. Ophthalmologica. 2023;246(2):99-106. doi:10.1159/000527625.
5. Asano M, Tsukamoto S, Sonoda KH, Kondo H. Revesz syndrome with bilateral retinal detachments successfully treated by pars plana vitrectomy. Am J Ophthalmol Case Rep. 2021;23:101137. doi:10.1016/j.ajoc.2021.101137.
6. Özdek Ş, Özmen MC, Yalınbaş D, Atalay HT, Coşkun D. Immediate sequential bilateral vitrectomy surgery for retinopathy of prematurity: A single surgeon experience. Turk J Ophthalmol. 2021;51(4):225-30. doi:10.4274/tjo.galenos.2020.07377.
7. Ritland JS, Syrdalen P, Eide N, Vatne HO, Řvergaard R. Outcome of vitrectomy in patients with Terson syndrome. Acta Ophthalmol Scand. 2002;80(2):172-5. doi:10.1034/j.1600-0420.2002.800210.x.
8. Song Y, Nagaoka T, Yoshida A. Systemic risk factors in cases with bilateral proliferative diabetic retinopathy requiring vitrectomy compared with monocular cases. Invest Ophthalmol Vis Sci. 2014;55(13):5352.
9. Storey PP, Tan JJ, Rayess N, Rao N. Bilateral pars plana vitrectomy for vitreous opacities and epiretinal membrane in Gaucher disease. J Vitreoretin Dis. 2018;2(4):235-9. doi:10.1177/2474126418780761.
10. Elghawy O, Duong R, Nigussie A, Bogaard JD, Patrie J, Shildkrot Y. Effect of surgical timing in 23-g pars plana vitrectomy for primary repair of macula-off rhegmatogenous retinal detachment: a retrospective study. BMC Ophthalmol. 2022;22(1):136. doi:10.1186/s12886-022-02364-4.
11. Parchand S, Agrawal D, Ayyadurai N, Agarwal A, Gangwe A, Behera S, et al. Sympathetic ophthalmia: A comprehensive update. Indian J Ophthalmol. 2022;70(6):1931-44. doi:10.4103/ijo.IJO_2363_21.
12. Zhuang X, Gao F, Sun Z, Ding X, Xu G. Case report: Sympathetic ophthalmia after vitrectomies in a patient with Von Hippel-Lindau syndrome. Front Med. 2023;10:1118913. doi:10.3389/fmed.2023.1118913.
13. Suetsugu T, Yasukawa T, Uemura A, Higaki M, Ogura Y. Sympathetic ophthalmia in fellow eye after vitrectomy for massive subretinal hemorrhage secondary to polypoidal choroidal vasculopathy. Int Med Case Rep J. 2018;11:293-6. doi:10.2147/IMCRJ.S183836.
14. Shen J, Zhang Z, Ye D, Wen Z, Shu X, Chen Z. Sympathetic ophthalmia after vitreoretinal surgery: a report of two cases. J Int Med Res. 2021;49(8):3000605211032782. doi:10.1177/03000605211032782.
15. Simpson AI, Gigon A, Whitlow S, McGowan G, Burgula S, Ramsden CM, et al. Indications and outcomes of patients undergoing Immediate Sequential Bilateral Vitreoretinal Surgery (ISBVS): a case series. Ophthalmologica. 2025;1-13. doi:10.1159/000546410.