Original Article

Outcomes of 25-gauge pars plana vitrectomy for cytomegalovirus retinitis-related retinal detachment

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Purpose: The purpose of this study is to evaluate the anatomical and functional outcomes of 25-gauge (G) pars plana vitrectomy (PPV) in patients with cytomegalovirus retinitis (CMVR)-related rhegmatogenous retinal detachment (RRD). **Methods:** Single-center retrospective consecutive case series of patients who underwent 25-G PPV for CMVR-related RRD repair with a minimum follow-up of 3 months. Complete anatomic success was defined as the complete attachment of retina including the periphery. Best-corrected visual acuity (BCVA) of ≥20/400 was defined as functional success. **Results:** Sixteen eyes of 15 patients were included in the study. Eleven patients were human immunodeficiency virus positive, three patients had hematological malignancies, and one patient suffered from dyskeratosis congenita. The mean follow-up was 20.5 ± 17.4 months (range 3–60 months). Complete anatomical success was seen in 15 eyes (93.75%). One eye had a residual inferior detachment with attached macula. Silicone oil was used as tamponade in 15 eyes and C_3F_8 gas in one eye. The mean change in BCVA was statistically significant, preoperative LogMAR BCVA was 2.05 ± 0.94 while the final follow-up postoperative LogMAR BCVA was 1.03 ± 0.61 ($P < 0.001$). Thirteen eyes (81.25%) had final BCVA ≥20/400. **Conclusion:** Microincision vitrectomy surgery can achieve excellent retinal reattachment rates in post-CMVR RRDs without significant intraoperative and postoperative complications. The visual outcome varies depending on the status of the optic disc and macula. Majority of the patients maintained functional vision.

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Cytomegalovirus retinitis (CMVR) is the most common opportunistic ocular infection in patients with acquired immune deficiency syndrome (AIDS).[1,2] Patients receiving immunosuppressive therapy and periocular or intraocular steroids are also predisposed to develop CMVR.[3] Visual loss in patients of CMVR occurs secondary to retinitis, optic atrophy, and rhegmatogenous retinal detachment (RRD). RRD occurs in up to 30% of patients with CMVR, mostly during the healing phase, but can occasionally occur during active retinitis (AR) as well.[4-7] During AR, full-thickness retinal necrosis causes multiple large retinal breaks leading to the development of RRD.[6] Delayed RRDs are more common. It occurs as a result of vitreous liquefaction, vitreoretinal interface gliosis due to inflammation and traction leading to the formation of retinal breaks in eyes with atrophic retina secondary to healed CMVR.[7]

The outcomes of pars plana vitrectomy (PPV) for RRD repair secondary to CMVR varies among different studies with reported retinal reattachment rates between 63% and 92%.[6,8-12] Most of these studies were done using 20-gauge (G) PPV.[6,8,9,12] With improvements in vitreoretinal surgical techniques and the advent of microincision vitrectomy surgery (MIVS), anatomic success has improved. The study by Wong *et al*.[10] looked at outcomes of both 20-G and 23-G PPV for RRD repair in patients of CMVR. They reported better anatomic and functional outcomes in the 23-G group compared with the 20-G group. The 25-G PPV was initially used only for noncomplex retinal pathologies.[13] Newer generation 25-G instruments have proven their efficacy in managing complex vitreoretinal conditions like giant retinal tears and diabetic tractional retinal detachments.[14,15] We report a retrospective series highlighting the structural and functional outcomes of 25-G PPV in patients with CMVR-related RRD.

Methods

This was a retrospective study in which patients who had undergone 25-G PPV for CMVR-related RRD repair with a minimum follow-up of 3 months, at our tertiary care eye center, from January 2015 to December 2019, were included. The study was conducted according to the tenets of the Declaration of Helsinki. Institutional Ethics Committee (IEC) approval was obtained (dated: 05/05/2021).

Clinical records of included patients were reviewed for demographic data, immune status, nature, and extent of RRD, the grade of proliferative vitreoretinopathy (PVR),

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details of surgery done, preoperative and postoperative Snellen's best-corrected visual acuity (BCVA), intraocular pressure (IOP), anterior and posterior segment findings on slit-lamp biomicroscope and indirect ophthalmoscope. The diagnosis of CMVR was based on clinical and angiographic features. Data about additional intraoperative procedures, such as concomitant cataract surgery/lensectomy, use of encircling band, and type of endotamponade, were also retrieved. Any intraoperative or postoperative complications like the recurrence of RRD, glaucoma (IOP >21 mmHg), hypotony (IOP <6 mmHg), cataract, corneal decompensation, epiretinal membrane (ERM) formation, neovascular glaucoma, phthisis bulbi, etc., were noted. Details of additional procedures in the postoperative period, such as cataract surgery, silicone oil removal (SOR), ERM peeling, repeat PPV, etc., were also noted.

Surgical technique

All eyes underwent three-port 25-G PPV using the Constellation Vision System (Alcon, Fort Worth, TX, USA) by a single vitreoretinal surgeon (RS) under peribulbar anesthesia/general anesthesia. Careful and meticulous removal of the posterior hyaloid was done. PVR membranes were removed with intraocular forceps, while vitreous base dissection was carried out with 360° peripheral scleral indentation. Circumferential 240 encircling scleral (SB) band (Labtician Ophthalmics, ON, Canada) was placed if needed by the operating surgeon. Pars plana lensectomy (PPL)/cataract extraction was done if the cataract precluded adequate visualization during PPV or if extensive anterior PVR dissection was required. Fluid–air exchange was done to aspirate the subretinal fluid through an iatrogenic posterior drainage retinotomy. Two to three rows of near confluent laser spots were applied to the junction of atrophic and normal retina. The choice of endotamponade was either silicone oil (1000 centistoke [CS] or 5000 CS) or C_3F_8 gas. Inferior iridectomy was done in aphakic patients in the case of silicone oil tamponade (SOT). All scleral ports were sutured with interrupted 7-0 vicryl sutures as we routinely suture the ports in infective eyes.

Outcome measures

Anatomic success was defined as retinal re-attachment after the first PPV. Complete anatomic success (CAS) was defined as the attachment of the whole of the retina including macula after the primary vitrectomy and internal tamponade with gas or silicone oil. Partial anatomic success (PAS) was defined as attached macula with detached peripheral retina after the first PPV. The functional outcome was quantified by looking at the BCVA at the final follow-up. BCVA of ≥20/400 was defined as functional success.

Statistical analysis

Statistical analysis was done using SPSS version 20 (Chicago, IL, USA) software. Mean and standard deviations were computed for all continuous variables. Qualitative data were expressed as percentages. BCVA was converted from Snellens to the logarithm of the minimum angle of resolution (LogMAR) scale for statistical analysis. The LogMAR equivalents for visual acuity of CF (counting fingers at 2 ft) and HM (hand motions at 2 ft) were taken as 2 and 3, respectively.[16] Wilcoxon rank-sum test was used to assess the change in BCVA at presentation and final follow-up. *P* value <0.05 was taken as statistically significant.

Results

Sixteen eyes of 15 patients (4 females) were included in the study. The mean age at the time of presentation was 36 ± 16.7 years (range 13–63 years). The mean follow-up was 20.5 ± 17.4 months (range 3–60 months). The demographic profile, surgical details, and outcomes are listed in Table 1. Three patients (20%) had hematological malignancies (cases 6, 7, and 9), one patient (6.7%) suffered from dyskeratosis congenita (case 15), while 11 patients (73.3%) were human immunodeficiency virus (HIV) positive. All HIV-positive patients were receiving highly active antiretroviral treatment (HAART) at the time of presentation and had a mean CD_4 count of 110.2 ± 71.8 cells/mm^3 (range 33–237 cells/mm^3).

Eight patients (53.3%) had bilateral CMVR. Three patients presented with bilateral RRD (cases 4, 5, and 10) with no light perception vision in one of the eyes. Hence, PPV was done only in the eye with visual potential. Two patients (cases 14 and 15) presented with RRD in one eye and underwent vitrectomy. Subsequently, the contralateral eyes were involved and operated. The second eye of case 14 is not included in this study due to inadequate duration of follow-up. Three patients (cases 2, 6, and 12) presented with healed CMVR lesions in the contralateral eyes. None of the patients received prophylactic barrage laser.

Treatment for CMVR was given in the form of intravitreal and oral valganciclovir. Six patients received intravitreal ganciclovir injections (2 mg/0.05 ml twice a week until the lesions healed followed by once a week as maintenance dose). Eight patients received oral valganciclovir (900 mg twice daily for 2 weeks followed by 900 mg once daily as maintenance dose). One patient (case 15) was treated with oral valganciclovir (900 mg twice daily) but also received intravitreal ganciclovir (2 mg/0.05 ml) to augment the therapeutic effect.

The mean baseline LogMAR BCVA was 2.05 ± 0.94 with just four eyes (25%) having BCVA ≥20/400. All patients underwent 25-G PPV, while 240 encircling band was used in eight eyes (50%). No active retinitis was present during surgery in any eyes. Three eyes (18.75%) had a macula-on RRD at the time of surgery (cases 3, 8, and 14). We identified three eyes with PVR grade CP and one eye with PVR grade CA. There were holes of different sizes within the sieve-like retina or at the edge of the normal and abnormal retina. Pars plana lensectomy was done in the eye with PVR grade CA eye to permit complete anterior PVR dissection (case 5). SOT was used in 15 eyes (93.75%). Five eyes (31.25%) received 5000 CS, while 10 eyes (62.5%) received 1000 CS oil. In one eye (6.25%) with superior RRD, 16% C_3F_8 gas was used (case 9). Triamcinolone acetonide and perfluorocarbon liquid (PFCL) were not used in any eyes. We did not do retinectomy in any case. Fig.1 shows the pre- and postoperative wide-field fundus images of case 10.

The retina was attached in all patients at the end of the procedure. CAS was seen in 15 eyes (93.75%). One eye had an inferior redetachment with an attached macula (case 13). This case was managed conservatively. At the last follow-up, the mean change in BCVA was statistically significant, preoperative LogMAR BCVA was 2.05 ± 0.94 while the final follow-up postoperative LogMAR BCVA was 1.03 ± 0.61 ($P < 0.001$). BCVA improved in 11 patients (68.75%); 4 eyes (25%) did not gain or lose vision and maintained preoperative BCVA. Thirteen patients (81.25%) had a final BCVA ≥20/400 [Table 1]. One patient (6.25%) had a decrease in vision from 20/200 to 20/400 due to optic atrophy (case 14). Three eyes (18.7%) had postoperative visual acuity of <20/400 (cases 1, 7, and 10). They were symptomatic for more than 6 months duration and had macula off RD at presentation. Although it is not possible to ascertain the exact duration of RD from history, the unsatisfactory vision gain could be due to longer duration of RD in these cases.

Table 1: Demographic profile, surgical details and outcomes of CMVR-related retinal detachment patients who underwent 25-gauge vitrectomy

Patient	Sex/Age (years)	On HAART	Extent of RD	Macular status	Fellow eye	Baseline LogMAR BCVA (Snellen's equivalent)	Additional procedure	Tamponade	Use of SB	Follow-up, months	Anatomical success	Final LogMAR BCVA (Snellen's equivalent)
1	M/37	Y	Total	Off	wnl	2 (CF)	None	SO 1000	Y	6	Complete	2 (CF)
2	F/54	Y	Total	Off	Healed CMVR*	2 (CF)	None	SO 1000	Y	36	Complete	1.3 (20/400)
3	F/33	Y	Subtotal	On	wnl	0.6 (20/80)	PE + SOR	SO 1000	N	12	Complete	0.6 (20/80)
4	M/32	Y	Total	Off	PLN†	3 (HM)	None	SO 5000	Y	3	Complete	1.3 (20/400)
5	M/13	Y	Subtotal	Off	PLN†	1 (20/200)	PPL, SOR	SO 5000	N	36	Complete	1 (20/200)
6	M/13	N (NHL)	Total	Off	healed CMVR*	3 (HM)	PE, SOR, re-SOT	SO 5000	Y	30	Complete	0.6 (20/80)
7	F/22	N (ALL)	Subtotal	Off	wnl	3 (HM)	PE, SOR, yag	SO 1000	N	60	Complete	2 (CF)
8	M/36	Y	Subtotal	On	wnl	0.2 (20/32)	PE, SOR, yag, vitreous lavage	SO 1000	N	50	Complete	0.2 (20/32)
9	M/61	N (HCL)	Subtotal	Off	wnl	2 (CF)	PE	C_3F_8 (16%)	Y	22	Complete	0 (20/20)
10	M/19	Y	Total	Off	PLN†	3 (HM)	None	SO 5000	Y	24	Complete	2 (CF)
11	M/63	Y	Subtotal	Off	wnl	2 (CF)	PE	SO 1000	N	9	Complete	1 (20/200)
12	M/52	Y	Total	Off	Healed CMVR, optic atrophy	3 (HM)	PE	SO 1000	N	12	Complete	1 (20/200)
13	M/54	Y	Total	Off	wnl	3 (HM)	None	SO 1000	N	7	Partial	0.6 (20/80)
14	F/41	Y	Subtotal	On	Active CMVR	1 (20/200)	PE	SO 1000	N	8	Complete	1.3 (20/400)
15	M/23	N (DK)	R Total	Off	Bilateral CMVR	2 (CF)	None	SO 1000	Y	10	Complete	0.6 (20/80)
			L Total	Off		2 (CF)	None	SO 5000	Y	3	Complete	1 (20/200)

ALL=Acute lymphoblastic leukemia, BCVA=best-corrected visual acuity, C_3F_8=perfluoro propane gas, CF=counting finger at 2 ft, CMVR=cytomegalovirus-retinitis, CS=centistoke, DK=dyskeratosis congenita, F=female, HAART=highly active antiretroviral therapy, HCL=hairy cell leukemia, HIV=human immunodeficiency virus, HM=hand movement at 2 ft, IC=immunocompetent, L=left, M=male, N=no, NHL=non-Hodgkin lymphoma, PE=phacoemulsification, PLN=perception of light negative, PPL=pars plana lensectomy, R=right, RD=retinal detachment, SO=silicone oil, SOR=silicone oil removal, SOT=silicone oil tamponade, WNL=within normal limits, Y=yes, YAG=yag laser capsulotomy; *limited CMVR lesions where macula is not involved; †extensive retinitis, old retinal detachment, and optic atrophy leading to PLN vision

Table 2: Comparison of anatomical and functional success among various studies after pars plana vitrectomy for retinal detachment secondary to cytomegalovirus retinitis

Author/Year of publication	Study type	Number of eyes operated	Instrument gauge	Endotamponade agent	Anatomical success rate after primary surgery (%)	Functional outcome (%)
Singh *et al.*[8]/2013	Retrospective	12 (pre-HAART era)	20	SO/C_3F_8	91.66	50 (BCVA ≥20/400)
		16 (HAART era)	20	SO	93.33	87.5 (BCVA ≥20/400)
Gore *et al.*[6]/2013	Retrospective	43*	20	SO, C_3F_8	88	Legal blindness (BCVA <6/60) 0.58/eye year
Wong *et al.*[10]/2014	Retrospective	19*	20	SO, gas	62.5	12.5 Gain of >2 or more LogMAR lines
			23		88.9	77.8
Mathur *et al.*[9]/2015	Retrospective	40*	20	SO	78	56 (BCVA ≥20/400)
Sittivarakul *et al.*[23]/2020	Retrospective	52*	20, 23	SO, C_3F_8	84.6	65.4 (BCVA ≥20/200)
This study	Retrospective	14*	25	SO, C_3F_8	93.75	81.25 (BCVA ≥20/400)

BCVA: Best-corrected visual acuity, C_3F_8: perfluoro propane gas, SO: silicone oil. *Studies in serial numbers 2-6 are conducted in HAART era

Figure 1: Wide-field fundus photo (a) of case 10 showing cytomegalovirus retinitis-associated retinal detachment (arrow) with foveal involvement, along with atrophic retina (star). Postoperative image (b) showing silicone oil-filled eye, attached retina, and laser marks (arrow) delineating normal and necrotic retina

During follow-up, eight eyes (50%) underwent uncomplicated phacoemulsification with intraocular lens implantation. Combined phacoemulsification and SOR were done in one eye (case 3). Five eyes (31.25%) had undergone SOR at the time of submission of this manuscript. One of the eyes that had undergone SOR developed re-RD (case 6). Repeat 25-G PPV with SOT was given within 1 week with successful retinal reattachment. IOP was raised in one eye due to residual oil globules after SOR (case 8). IOP was normalized after vitreous lavage without the need for long-term antiglaucoma medications. Two eyes developed posterior capsular opacification for which Nd:Yag capsulotomy was done (cases 7 and 8). None of the patients developed hypotony, corneal decompensation, neovascular glaucoma, or phthisis bulbi in this series.

Discussion

The introduction of HAART in the mid-1990s for HIV-positive patients led to a significant decrease in the incidence of CMVR-related RRD.[4,17] Institution of HAART has also been shown to improve functional outcomes in these patients; however, anatomic success seems to be the same.[6,8] Improved

success of RRD in CMVR patients requires PPV, with multiple studies reporting anatomic success in 62.5–91.66% cases and functional success in 12.5–87.5% cases [Table 2].[6,8-10] Most of these studies included patients who were subjected to 20-G PPV.[6,8,9] Wong *et al*.[10] compared outcomes of 20-G and 23-G PPV in CMVR-related RRD patients and concluded that 23-G PPV had an improved anatomic success of 88.9% as compared to 62.5% in patients who underwent 20-G PPV. The functional success (gain of 2 or more lines on the LogMAR chart) was 77.8% and 12.5% between 23 G and 20 G groups, respectively. Thus, MIVS using the 23-G platform has been shown to improve outcomes of RRD in CMVR patients. Improvement in vitrectomy systems has a positive influence on patient outcomes. Our study, which included patients who underwent 25-G PPV, also showed CAS in 93.75% eyes.

The 25-G PPV was initially used only for non-complex retinal pathologies.[13] With the advancement in instruments, MIVS offers several advantages compared to conventional 20-G PPV, namely reduced intraoperative retinal mobility, lesser vitreous traction, easy manipulation of tissues, cutter port optimization, lesser need for multiple instrument exchanges, improved sclerotomy wound anatomy, and faster postoperative recovery.[13-15] Compared with the 20-G vitrector, 25-G port is smaller and located closer to the tip of the probe. The smaller port has fundamentally lower aspiration and infusion rates. This, combined with the higher cutting rate of the 25-G cutter, results in a low-flow system which reduces the average vitreous fiber travel between the cuts and limits the traction exerted on the vitreous and retina. The "port-based flow-limiting," and less port-cutter tip distance in MIVS, not only enhances safety during vitreous shaving over mobile retina but also allows the cutter to serve as a dissection tool by enabling access to the very narrow tissue planes.[18] Twenty-five-gauge vitrectomy is now routinely used for complex retinal surgeries.[14,15]

All patients in this series underwent 25-G PPV for complex RRD secondary to CMVR. The vitreous overlying CMV lesions are often infiltrated, condensed, and adherent to the inner-retinal surface.[7] No insurmountable difficulty was encountered while inducing PVD in this series. In cases with difficulty in PVD induction, vitreous shaving was done. The fine vitrector of 25 G, less tip-port distance, and better fluidics allowed vitrectomy close to retinal surface without causing iatrogenic breaks.

The functional outcome (FO) of PPV for CMVR-related RRD shows a high degree of variability despite successful retinal reattachment. Functional outcome in the pre-HAART era was poor, with various studies reporting 20–75% eyes with ambulatory vision (≥5/200).[19-21] Different studies use varying criteria to quantify functional success in the HAART era [Table 2]. The World Health Organization and the National Programme for Control of Blindness in India guidelines define blindness as BCVA of <20/400 in the better eye.[22] Only two studies in the HAART era have used the aforementioned criteria to report the functional outcome. Mathur *et al*.[9] reported successful functional outcome in 56% eyes, and Singh *et al*.[8] in 87.5% eyes, who had undergone PPV for RRD secondary to CMVR.

The change in mean BCVA at the last follow-up as compared to baseline was statistically significant, improving from LogMAR 2.05 ± 0.94 preoperatively to LogMAR 1.03 ± 0.61 at final follow-up. BCVA improved in 11 eyes (68.75%) while 4 eyes (25%) had no change in visual acuity. Thirteen patients (81.25%) had a final BCVA ≥20/400. One eye (6.25%) developed optic atrophy in the postoperative period and subsequently had a reduction in vision from 20/200 preoperatively to 20/400 at the final follow-up (case 14). Poor visual outcome is reported in eyes with delayed surgery, requirement of retinectomy, and worse preoperative visual acuity.[23] In our series, eyes with <20/400 visual acuity postoperatively had either CF or HM visual acuity preoperatively and were symptomatic for more than 6 months duration and presented with macula off RD (cases 1, 7, and 10). Although it is not possible to ascertain the exact duration of RD from history, the unsatisfactory vision gain could be due to longer duration of RD in these cases. Extensive zone 1 disease and presence of optic atrophy at the time of PPV were the other causes of poor postoperative BCVA. The functional outcome was comparable with previously reported surgical outcomes in CMVR RD patients in the HAART era.[8]

The use of an encircling scleral band (ESB) along with PPV and SOT in eyes with RRD secondary to CMVR is controversial.[21,24] Proponents of this give the rationale, that it relieves residual traction around the vitreous base and supports inferior necrotic retina where a buoyant silicone oil bubble may not provide adequate tamponade.[21] Garcia *et al*.[24] published a series of 22 patients who underwent PPV with SOT with ESB in one group and PPV with SOT along with barrage laser of the inferior equatorial retina without ESB in the other group. The outcomes were comparable in both the groups and the authors went on to conclude that not placing an ESB reduces chances of inadvertent needle prick to the surgeon in these patients, who may be HIV positive. The decision for using ESB along with 25-G PPV in our series was taken in eyes with significant preoperative PVR to try and minimize the need for lensectomy and/or retinectomy. From the clinical notes, we identified three eyes with PVR grade CP and one eye with PVR grade CA. Pars plana lensectomy was done in the eye with PVR grade CA eye to permit complete anterior PVR dissection (case 5). One eye which did not receive ESB at the time of PPV had inferior redetachment in our series (case 13). We feel that ESB has importance in the HAART era because of PVR changes and the need to remove silicone oil. Due to HAART, the survival of HIV patients has increased; hence, silicon oil has to be removed to prevent its sight-threatening side effects. ESB provides long-term equatorial support and takes care of PVR.

The use of SOT in the surgical management of RRD related to CMVR has gained popularity as it resulted in a higher retinal reattachment rate and good functional outcome.[12,25,26] Some studies advocate the role of 5000 CS SOT as these eyes need tamponade for long duration.[27] Silicone oil tamponade with 1000 CS was used in 10 eyes (62.5%) and 5000 CS was used in 5 eyes (31.25%). Choice of 5000 CS oil as endotamponade was made for one-eyed patients (cases 4, 6, and 10), pediatric patients (case 5), and bilateral RRD (case 15). Case 15 had unilateral CMVR with RD at presentation where 1000 CS SO was used in the primary PPV. The contralateral eye which was normal previously got involved later and developed RD where 5000 CS SO was used [Table 1].

Silicone oil removal is desirous to reverse the loss of functional vision due to hyperopic shift and to prevent complications from the oil such as corneal decompensation, glaucoma, and cataract formation.[28,29] However, early SOR in eyes with CMVR-related RRD is associated with high chances of retinal redetachment, ranging from 18% to 53% in different series.[29-31] Dave *et al*.[31] reported a series of 60 eyes who underwent PPV with SOT for CMVR-related RD of which only 11 (18.3%) eyes underwent SOR over a 5-year follow-up. Two eyes (18.18%) developed redetachment following SOR. In our series, five eyes (31.25%) underwent SOR and the

average duration of SOR following PPV was 16.2 months (range 9–24 months). Silicone oil removal was done, once oil emulsification was noticed. The prerequisites were completely attached retina, absence of any unlasered retinal breaks, and hypotony. Similar to the figures reported by Dave *et al*.,[31] one eye in our series (20%) developed RRD following SOR. Repeat SOT was given within 1 week with successful retinal reattachment.

The study has its limitations. It is retrospective in nature and has a small sample size. However, being a rare disease, a large number of patients are difficult to come by.

Conclusion

This study has shown excellent anatomic and satisfactory functional outcomes of 25-G PPV. To conclude, 25-G PPV can achieve excellent retinal reattachment rates in post-CMVR RRDs without significant intraoperative and postoperative complications. Functional outcome may remain poor due to extensive retinal damage secondary to the infection and ischemia and development of optic atrophy.

Ethical approval

The study was conducted in accordance with the ethical standards of the Declaration of Helsinki. Institutional Ethics Committee (IEC) approval was obtained (dated: 05/05/2021).

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Conflicts of interest

There are no conflicts of interest.

References

1. Jabs DA, Van Natta ML, Holbrook JT, Kempen JH, Meinert CL, Davis MD, *et al*. Longitudinal study of ocular complications of AIDS: 1. Ocular diagnoses at enrolment. Ophthalmology 2007;114:780-6.
2. Dogra M, Singh R, Agarwal A, Sharma A, Singh SR, Gautam N, *et al*. Epidemiology of uveitis in a tertiary-care referral institute in North India. Ocul Immunol Inflamm 2017;25:S46-53.
3. Iu LP, Fan MC, Lau JK, Sharma A, Singh SR, Gautam N, *et al*. Long-term follow-up of cytomegalovirus retinitis in Non-HIV immunocompromised patients: Clinical features and visual prognosis. Am J Ophthalmol 2016;165:145-53.
4. Holland GN. AIDS and ophthalmology: The first quarter century. Am J Ophthalmol 2008;145:397-408.
5. Singh SR, Dogra M, Kaur S, Bajgai P, Tigari B, Handa S, *et al*. Spectrum of newly diagnosed cytomegalovirus retinitis in a developing country in the HAART Era. Ocul Immunol Inflamm 2020;28:119-25.
6. Gore KS, Gore DM, Chetty K, Visser L. Cytomegaloviral retinitis-related retinal detachment: Outcome following vitrectomy in the developing world. Int Ophthalmol 2014;34:205-10.
7. Brar M, Kozak I, Freeman WR. Vitreoretinal interface abnormalities in healed cytomegalovirus retinitis. Retina 2010;30:1262-6.
8. Singh R, Bhalekar S, Parchand S, Sharma A, Gupta V, Dogra MR, *et al*. Outcome of surgery in post-cytomegalovirus retinal detachment: Experience before and in the era of highly active anti-retroviral therapy in Indian eyes. Indian J Ophthalmol 2013;61:636-9.
9. Mathur G, Ratra D, Bhuibhar SS, Roy R. Clinical outcome of retinal detachment surgery following cytomegalovirus retinitis in patients on highly active anti-retroviral therapy for acquired immune deficiency syndrome. Ocul Immunol Inflamm 2015;23:400-4.
10. Wong JX, Wong EP, Teoh SC. Outcome of cytomegalovirus retinitis-related retinal detachment surgery in acquired immunodeficiency syndrome patients in an Asian population. BMC Ophthalmol 2014;14:150.
11. Almeida DRP, Chin EK, Tarantola RM, Tegins EO, Lopez CA, Boldt HC, *et al*. Long-term outcomes in patients undergoing vitrectomy for retinal detachment due to viral retinitis. Clin Ophthalmol 2015;9:1307-14.
12. Chuang EL, Davis JL. Management of retinal detachment associated with CMV retinitis in AIDS patients. Eye 1992;6:28-34.
13. Nam Y, Chung H, Lee JY, Kim JG, Yoon YH. Comparison of 25- and 23-gauge sutureless microincision vitrectomy surgery in the treatment of various vitreoretinal diseases. Eye 2010;24:869-74.
14. Kumar V, Kumawat D, Bhari A, Chandra P. Twenty-five-gauge pars plana vitrectomy in complex retinal detachments associated with giant retinal tear. Retina 2018;38:670-7.
15. Sato T, Emi K, Bando H, Ikeda T. Faster recovery after 25-gauge microincision vitrectomy surgery than after 20-gauge vitrectomy in patients with proliferative diabetic retinopathy. Clin Ophthalmol 2012;6:1925-30.
16. Holladay JT. Proper method for calculating average visual acuity. J Refract Surg 1997;13:388-391.
17. Thorne JE, Jabs DA, Kempen JH, Holbrook JT, Nichols C, Meinert CL, *et al*. Causes of visual acuity loss among patients with AIDS and cytomegalovirus retinitis in the era of highly active antiretroviral therapy. Ophthalmology 2006;113:1441-5.
18. Mohamed S, Claes C, Tsang CW. Review of small gauge vitrectomy: Progress and innovations. J Ophthalmol 2017;2017:6285869.
19. Jabs DA, Engler C, Haller J, de Bustros S. Retinal detachment in patients with cytomegalovirus retinitis. Arch Ophthalmol 1991;109:794-9.
20. Davis JL, Serfass MS, Lai MY, Trask DK, Azen SP. Silicone oil repair of retinal detachment caused by necrotising retinitis in HIV infection. Arch Ophthalmol 1995;113:1401-9.
21. Regillo CD, Vander JF, Duker JS, Fischer DH, Belmont JB, Kleiner R. Repair of retinitis-related retinal detachment with silicone oil in patients with acquired immunodeficiency syndrome. Am J Ophthalmol 1992;113:21-7.
22. Vashist P, Senjam SS, Gupta V, Gupta N, Kumar A. Definition of blindness under national programme for control of blindness: Do we need to revise it? Indian J Ophthalmol 2017;65:92-6.
23. Sittivarakul W, Prapakornkovit V, Jirarattanasopa P, Bhurayanontachai P, Ratanasukon M. Surgical outcomes and prognostic factors following vitrectomy in acquired immune deficiency syndrome patients with cytomegalovirus retinitis-related retinal detachment. Medicine 2020:23;99:e22889.
24. Garcia RF, Flores-Aguilar M, Quiceno JI, Capparelli EV, Munguia D, Kuppermann BD, *et al*. Results of rhegmatogenous retinal detachment repair in cytomegalovirus retinitis with and without scleral buckling. Ophthalmology 1995;102:236-45.
25. Freeman WR, Quiceno JI, Crapotta JA, Listhaus A, Munguia D, Aguilar MF, *et al*. Surgical repair of rhegmatogenous retinal detachment in immunosuppressed patients with cytomegalovirus retinitis. Ophthalmology 1992;99:466-74.
26. Lim JI, Enger C, Haller JA, Campochiaro PA, Campochiaro PA, Meredith TA, de Bustros S, *et al*. Improved visual results after surgical repair of cytomegalovirus-related retinal detachments. Ophthalmology 1994;101:264-9.
27. Barca F, Caporossi T, Rizzo S. Silicone oil: Different physical proprieties and clinical applications. Biomed Res Int 2014;2014:502143.
28. Dugel PU, Liggett PI, Lee MB, Ziogas A, Forster DJ, Smith RE, *et al*. Repair of retinal detachment caused by cytomegalovirus retinitis in patients with the acquired immunodeficiency syndrome. Am J Ophthalmol 1991;112:235-42.
29. Federman JL, Schubert HD. Complications associated with the use of silicone oil in 150 eyes after retina-vitreous surgery. Ophthalmology 1988;95:870-6.
30. Morrisson VL, Labree LD, Azen SP, Goldberg DE, Freeman WR. Results of silicone oil removal in patients with cytomegalovirus retinitis related retinal detachments. Am J Ophthalmol 2005;140:786-93.
31. Dave VP, Mathai A, Pappuru RR. Results of silicone oil removal in post-cytomegalovirus retinitis-related retinal detachment. J Ophthal Inflamm Infect 2012;2:153-5.