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CLINICAL STUDY

Primary retinal reattachment surgery: anatomical and functional outcome in phakic and pseudophakic eyes

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Abstract

Aim **To compare the anatomical and functional success of primary scleral buckling, performed either alone or in combination with vitrectomy, for primary retinal detachment (RD) in phakic eyes and in eyes had undergone uneventful phacoemulsification and had received posterior chamber lens implantations.**

Methods **A total of 243 consecutive patients were included in this retrospective, nonrandomized comparative study. In all, 165 phakic and 78 pseudophakic individuals with primary RD underwent scleral buckling alone or in combination with vitrectomy and were followed up for 6 months. Pre-, intra- and postoperative findings including anatomical success, best-corrected visual acuity (BCVA), complications, and the development of proliferative vitreoretinopathy (PVR), macular pucker, or secondary cataracts were recorded. Cases requiring more than one surgical intervention were defined having failed, although further surgical intervention might have led to success.**

Results **At 6 months after scleral buckling alone, the anatomical success was similar in phakic (88.98%) and pseudophakic (87.65%) eyes (log rank = 0.310). The corresponding results after scleral buckling with vitrectomy were 82.13 and 77.63% for phakic and pseudophakic eyes, respectively (log rank = 0.799). At 6 months after scleral buckling alone, BCVA was similar in phakic and pseudophakic eyes (0.62 ± 0.30 *vs* 0.70 ± 0.29; *P* = 0.227). Likewise, after scleral buckling with vitrectomy, BCVA did not differ significantly (*P* = 0.322) between phakic (0.34 ± 0.32) and pseudophakic eyes (0.50 ± 0.27).**

Conclusion **The anatomical and functional outcome of primary retinal reattachment surgery, involving scleral buckling alone or in combination with vitrectomy, is similar in phakic and pseudophakic eyes.**

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Introduction

Retinal detachment (RD) after cataract extraction and the implantation of an intraocular lens has remained a frequent problem to vitreoretinal surgeons since initially described by Tasman and Annesley in 1966.[1] A quarter of patients referred to vitreoretinal surgeons for retinal reattachment surgery are pseudophakic.[2] In several previous studies, the features of RD in pseudophakic eyes have been described to differ from those in phakic ones.[3–7] In pseudophakic RD, the preoperative evaluation and surgical treatment are rendered more difficult by a restricted view of the peripheral fundus,[3] and, for this reason, the anatomical outcome of reattachment surgery in pseudophakic eyes is deemed to be poorer than in phakic ones.[6–8] A comparison of data gleaned from previous studies is difficult, owing to the inclusion of cases with anterior chamber lenses or even patients with aphakia after intracapsular cataract extraction. Improvements in microsurgical techniques, such as extracapsular cataract extraction by

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phacoemulsification, have led to a substantial lowering of the incidence of pseudophakic RD down to 0.4–1.3%.[9,10] This technical progress may correspond with a change in the clinical picture and in the outcome of primary retinal reattachment surgery. However, a recent risk-assessment study still revealed differences in the appearance of pseudophakic compared to phakic RD.[5] Since RD is more extensive in pseudophakic eyes,[5] the macula has been described to be detached more frequently.[8,11] Consequently, the visual recovery after reattachment surgery is supposed to be poorer in pseudophakic eyes.[11,12] In a recent study, the influence of posterior capsulotomy on the anatomical and functional outcome of retinal reattachment surgery in pseudophakic eyes has been well described.[13] However, a direct comparison between the functional results achieved after primary retinal reattachment surgery in phakic eyes and those attained after uneventful extracapsular cataract extraction by phacoemulsification and the implantation of a posterior chamber lens has not been published to date.

Hence, the aim of the present study was to compare the anatomical and functional outcome of primary retinal reattachment surgery in phakic eyes and in pseudophakic ones that had undergone uneventful phacoemulsification and posterior chamber lens implantation.

Methods

Between July 1994 and February 2000, all phakic eyes, and pseudophakic ones that had developed primary RD after an uneventful implantation of a posterior chamber lens, without incurring posterior capsule defects, zonular dialysis, or vitreous complications, were reviewed retrospectively in terms of surgical outcome. The clinical features of a subgroup of these patients at the time of initial presentation are published in detail elsewhere.[5] The minimal postoperative follow-up period was 6 months. Exclusion criteria included: blunt trauma within a 6-month period prior to surgery, previous posterior segment trauma or surgery, antiproliferative therapy, uveitis, giant retinal tears, and stage B[14] or more advanced proliferative retinopathy (PVR) of any origin. In all, 243 consecutive, nonrandomized cases with primary RD met the inclusion criteria. The study group consisted of 165 phakic and 78 pseudophakic eyes. All patients had undergone scleral buckling either alone or in combination with pars-plana vitrectomy, which was performed by one of the two experienced surgeons (FK and JGG) in our department. This study was approved by the Institutional Ethics Committee and was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

Preoperative best-corrected visual acuity (BCVA) was measured using a standard Snellen acuity chart at a distance of 5 m. Each patient underwent a thorough retinal examination using a binocular indirect ophthalmoscope and a Goldmann three-mirror lens. The medical and ophthalmological history of each individual was recorded.

In our department, all patients undergoing retinal reattachment surgery are routinely offered scheduled visits at 1 week, 1 month, and 6 months postoperatively, and data were available on this basis. The primary outcome parameters were BCVA and the status of the retina (completely attached or detached). However, intraocular pressure (IOP), the development of PVR, the occurrence of macular pucker, and the manifestation of a postoperative cataract or of capsular fibrosis were also assessed. A macular pucker had been defined as either a cellophane macular reflex or an epiretinal membrane. Treatment success was defined as stable and complete retinal reattachment 6 months after the first surgical intervention. Surgery was deemed to have failed if more than one surgical intervention on the posterior segment (including laser retinopexy on an out-patient basis) was required to stabilize or reattach the retina, but not if secondary cataract surgery or Nd:YAG-laser capsulotomy was subsequently performed.

Generally, surgery aimed to include all breaks within a single buckle (Table 1). To this end, a radial or circumferential silicone sponge, with a diameter of 3–4 mm and a length in accord with that of the break, and/or a silicone encircling band (2 mm in diameter) were employed. Retinal breaks were treated by exocryotherapy. If necessary, subretinal fluid was drained off following sclerotomy, either after needle-puncture or by electrolysis. Vitrectomy was performed using a standard two- or three-port pars-plana access and retinopexy using either endolaser, cryopexy, or both. An internal tamponade was achieved using air or a 20/80% SF_6/air mixture. Air was utilized if the retina attached intraoperatively without persisting tractional forces and/or if a break pathology occurred within the upper 4 clock times. SF6 was used if residual tractional forces were suspected and if breaks occurred in the lower 4 clock times. In these cases, retinal changes that were supposed to be critical additionally underwent exocryocoagulation or endolaser photocoagulation. Silicone oil (5000 CSi) was injected only if nonrelievable tractional forces were operative in conjunction with an unstable retinal situation. An encircling silicone band (2 mm in diameter) was applied during vitrectomy. The simultaneous implantation of an intraocular lens was never required.

Student's *t*-test and the χ^2-test were employed in the statistical analysis, which was performed using SPSS for

Table 1 Indications for primary scleral buckling and vitrectomy plus scleral buckling

Primary scleral buckling
(1) Generally, surgery aimed to include all breaks within a single buckle (radial or circumferential)

Primary vitrectomy plus scleral buckling
(1) Poor fundus view due to vitreal opacities

(2) Difficult arrangement of breaks:
- Multiple breaks in more than one quadrant and at different anterior and posterior locations
- Central breaks far posterior to the equator
- Insufficient tamponade or incomplete closure of one or more breaks (despite adequate buckling) or substantial quantities of remaining subretinal fluid after exodrainage during buckle surgery

(3) PVR, stage A[14]
- If significant vitreal pigment clusters and/or haemorrhage were present, a primary vitrectomy was performed (even if breaks would have been treatable without vitrectomy) because these vitreal changes were deemed to be risk factors for missing retinal breaks or for the development of PVR

(4) Insufficient reduction of tractional forces after buckling

(5) Primary vitrectomy was not attempted
- In schisis-associated retinal detachment
- If the situation was sufficiently supportable by external buckle surgery

Windows version 11.5 (Chicago, IL, USA). In amblyopic cases with a known BCVA of less than 0.2 prior to detachment, only the anatomical outcome was statistically analysed. The BCVA values were converted to logarithms of the minimum angle of resolution ($-\log$ MAR). To better compare and understand the results, the values were then reconverted to Snellen equivalents. Visual acuities that were restricted to finger counting or hand movements were the allocated values of 0.02 and 0.01, respectively. Patients who underwent cataract surgery during the postoperative follow-up period were excluded from the analysis of postoperative changes in refractive error. The mean change of refractive error is given as mean diopter $\pm$ standard deviation. The cumulative probability of anatomical success after primary surgery during the 6-month follow-up period was calculated for each group according to the Kaplan–Meier product-limit method and data were compared using the Mantel log-rank test. Cox's proportional hazard model was used to evaluate the effects of possible risk factors for adverse outcomes in phakic and pseudophakic eyes up to 6 months while adjusting for other covariates. Specific correlations were calculated using Spearman's rho (r) factor. Differences between sets of data were considered to be statistically significant if P-values were $\leqslant 0.05$ (on the basis of two-tailed tests).

Results

Preoperative

On average pseudophakic individuals were older ($P<0.001$) and more often male ($P<0.001$) than were phakic ones (Table 2). The BCVA (0.40 ± 0.46 *vs* 0.40 ± 0.38; $P=0.928$) and the frequency of macula detachment ($P=0.744$; Table 2) did not differ between phakic and pseudophakic eyes. Regarding the characteristics of RD, pseudophakic eyes more frequently showed preoperative PVR ($P<0.001$) and vitreoretinal tractions without breaks ($P<0.001$), whereas phakic ones evinced a higher number of breaks with traction ($P<0.001$) and a higher total number of breaks ($P<0.001$). The size of the RD was, however, greater in pseudophakic than in phakic eyes ($P=0.042$; Table 2).

The incidence of preoperative macular pucker was likewise similar in each group of patients ($P=0.851$). The duration of symptoms (shadows, floaters, photopsia) prior to surgery did not differ significantly between phakic and pseudophakic individuals ($P=0.110$). At the instance of macular detachment, the duration of symptoms (visual loss) prior to surgery was similar in each group of patients ($P=0.119$; Table 2).

Intraoperative

The percentage of cases requiring scleral buckling alone or scleral buckling plus vitrectomy was similar in each group ($P=0.353$;. Table 3). In the phakic group, primary vitrectomy was performed in 33/165 cases (20%). As an internal tamponade, silicone oil was used in 3/33 individuals (9.1%), an SF_6/air mixture in 20/33 (60.6%) and air in 10/33 (30.3%). In the pseudophakic group, primary vitrectomy was performed in 20/78 cases (25.6%). As an internal tamponade, silicone was used in 3/20 individuals (15%), an SF_6/air mixture in 11/20 (55%) and air in 6/20 (30%). The frequency with which the different kinds of internal tamponade were used did

Table 2 Frequency data respecting clinical risk factors

	Phakia (n = 165)	*Pseudophakia* (n = 78)	P-*value*
Age (years, mean ± SD)	55.7 ± 14.9	65.25 ± 11.95	< 0.001[a]
Gender (male, *n* (%))	97 (58.8%)	55 (70.51%)	< 0.001[b]
Duration of symptoms			
(Days, *n* (%))			0.110[b]
No symptoms	16 (9.7%)	7 (9%)	
0–4	52 (31.5%)	12 (15.4%)	
5–7	32 (19.4%)	16 (20.5%)	
8–14	23 (13.9%)	17 (21.8%)	
15–28	19 (11.5%)	14 (17.9%)	
> 28	23 (13.9%)	12 (15.4%)	
Traction without break			
(*n* (%))	11 (6.7%)	16 (20.5%)	< 0.001[b]
Traction with break			
(*n* (%))	156 (94.5%)	50 (64.1%)	< 0.001[b]
Number of breaks			
(mean (SD))	1.88 ± 1.68	1.04 ± 0.91	< 0.001[a]
Size of retinal detachment			
(clock segments (mean ± SD))	4.86 ± 2.36	5.72 ± 2.38	0.042[a]
Macula off	84 (50.9%)	37 (48.1%)	0.744[b]
(*n* (%))		m.v.: 1	
Duration of symptoms			
In case of macula off			
(Days (mean ± SD))	3.71 ± 1.57	3.21 ± 1.57	0.119[a]
Macular pucker (n (%))	5 (3%)	2 (2.6%)	0.851[b]
BCVA prior to scleral buckling			
(Snellen, decimal (mean ± SD))	0.41 ± 0.37	0.39 ± 0.31	0.718[a]
BCVA prior to vitrectomy			
(Snellen, decimal (mean ± SD))	0.19 ± 0.24	0.25 ± 0.35	0.575[a]
IOP (mmHg, (mean ± SD))	13.6 ± 4.0	13.1 ± 5.3	0.536[a]

[a]*t*-test; [b]χ^2-test; m.v.: missing value.

not differ significantly between the two groups ($P = 0.482$). The rates of intraoperative and early postoperative complications ($P = 0.080$) and the incidence of postoperative PVR ($P = 0.489$) were similar in phakic and pseudophakic eyes. In no instance did PVR develop after vitrectomy in both groups.

Surgical outcome

Irrespective of the surgical method employed, the cumulative probability of anatomical success 6 months after surgery was similar in phakic (86.68%) and pseudophakic (85.91%) eyes (log rank = 0.402). After scleral buckling alone, the anatomical success rate was similar in phakic (88.98%) and pseudophakic (87.65%) eyes (log rank = 0.310; Figure 1). The corresponding rates after scleral buckling plus vitrectomy were 82.13 and 77.63% for phakic and pseudophakic eyes, respectively (log rank = 0.799; Figure 1).

The development of PVR after scleral buckling correlated fairly well with the size of the RD in pseudophakic eyes ($r = 0.429$), but only weakly so with that in phakic ones ($r = 0.165$). Cox's proportional hazards model revealed the size of RD ($P = 0.002$) to have a higher negative impact on anatomical outcome in pseudophakic than in phakic eyes. However, the impact of PVR on anatomical outcome was similar in both groups ($P = 0.316$). After scleral buckling plus vitrectomy, PVR did not develop in either phakic or pseudophakic eyes.

Before scleral buckling alone, BCVA did not differ between phakic and pseudophakic eyes ($P = 0.718$; Table 2) and this situation remained unchanged 6 months after surgery ($P = 0.227$). However, 6 months after scleral buckling, BCVA was significantly better than before surgery in both groups ($P < 0.001$). Before scleral buckling alone, 47.2% (63/132) of phakic and 41% (24/58) of pseudophakic patients had a BCVA of at least 0.4 (20/50).

Table 3 Intra- and postoperative data

	Phakia (n = *165*)	*Pseudophakia* (n = *78*)	P-*value*
Surgical procedure			
(*n* (%))			0.353[b]
Scleral buckling alone	132 (80%)	58 (74.4%)	
Additional vitrectomy	33 (20%)	20 (25.6%)	
Impaired fundus view			
(*n* (%))	12 (7.3%)	10 (12.8%)	0.230[b]
Intraop. detected breaks			
(patients, *n* (%))	24 (14.5%)	15 (27.3%)	<0.001[b]
Total no. of breaks			
(pre- & intraop.)			
(*n* (mean ± SD))	2.02 ± 0.15	1.51 ± 0.72	0.058[a]
Complications			
(intra- and early postop.; *n* (%))			0.080[b]
Total	17 (10.3%)	4 (5.1%)	
Vitreal haemorrhage	6 (3.6%)	2 (2.6%)	
Subretinal bleeding	9 (5.5%)	1 (1.3%)	
Retinal incarceration	2 (1.2%)	1 (1.3%)	
Development of macular pucker (n (%))	25 (15.2%)	6 (7.7%)	0.110[b]
Development of PVR	16 (12.4%)	11 (15.9%)	0.489[b]
(*n* (%))	m.v.: 36	m.v.: 9	
BCVA; 6 months after scleral buckling			
(Snellen, decimal (mean ± SD))	0.62 ± 0.30	0.70 ± 0.29	0.227[a]
BCVA; 6 months after vitrectomy			
(Snellen, decimal (mean ± SD))	0.34 ± 0.32	0.50 ± 0.27	0.322[a]
IOP (mmHg, (mean ± SD))	14.7 ± 2.60	14.9 ± 3.4	0.671[a]

[a]*t*-test; [b]χ^2-test, m.v.: missing value.

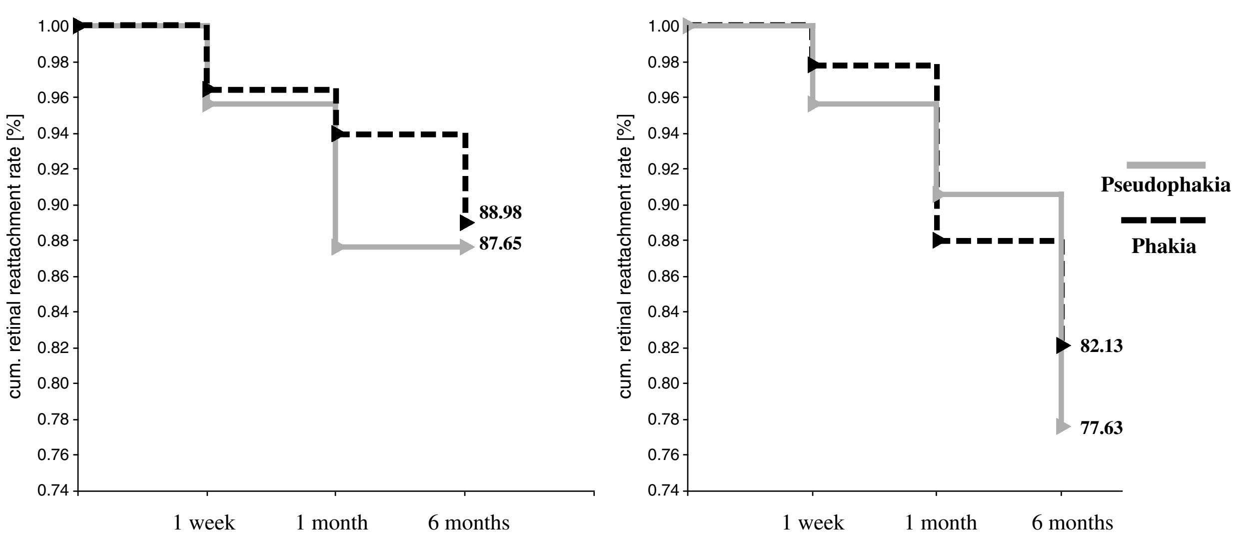

Figure 1 Retinal reattachment survival curve after scleral buckling alone (left) and after scleral buckling plus vitrectomy (right): phakic and pseudophakic eyes.

At 6 months postoperatively, the frequency of cases with a BCVA of at least 0.4 (20/50) was higher than before surgery in pseudophakic eyes (59.6% (29/52); $P = 0.180$) and significantly higher in phakic ones (61.7% (74/120); $P = 0.031$). However, a direct comparison of these frequencies revealed no significant difference between the two groups ($P = 0.469$; Figure 2).

Before scleral buckling plus vitrectomy, BCVA did not differ between phakic and pseudophakic eyes ($P = 0.575$; Table 2) and this situation remained unchanged 6 months

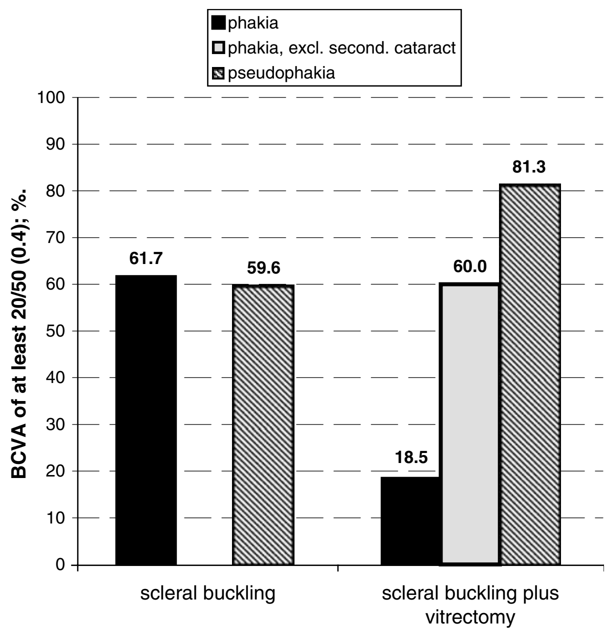

Figure 2 Postoperative frequencies of cases with a BCVA ⩾20/50 (0.4) after scleral buckling alone (left) and after scleral buckling plus vitrectomy (right) in phakic and pseudophakic eyes.

after surgery ($P=0.322$; Table 3). At this 6-month juncture, BCVA was better than before surgery in both phakic ($P=0.148$) and pseudophakic ($P=0.121$) eyes, but the improvement was not statistically significant in either group. Before scleral buckling plus vitrectomy, 21.2% (7/33) of phakic and 25% (5/20) of pseudophakic patients had a BCVA of at least 0.4 (20/50). At 6 months after scleral buckling plus vitrectomy in phakic eyes, the frequency of cases with a BCVA of at least 0.4 (20/50) had dropped from 21.2 to 18.5% ((5/27); $P=0.031$). At this 6-months juncture, 25/33 phakic eyes (75.8%) manifested vision-impairing cataracts. In the other eight cases (24.2%), the cataracts had been already extracted. After the exclusion of visually relevant cataracts that had developed after scleral buckling plus vitrectomy ($n=17$), the frequency of cases with a BCVA of at least 0.4 (20/50) had risen from 18.5 to 60% ($P=0.075$; Figure 2). However even after the exclusion of visually relevant cataracts following scleral buckling plus vitrectomy, the frequency of cases with a BCVA of at least 0.4 (20/50) was significantly higher in pseudophakic than phakic eyes ($P=0.014$; Figure 2).

After retinal reattachment surgery in phakic and pseudophakic eyes, the incidence of vision-threatening macular pucker (25/165 (15.2%) *vs* 6/78 (7.7%); $P=0.110$) and of postoperative PVR (16/129 (12.4%) *vs* 11/69 (15.9%); $P=0.489$) did not differ significantly between the two groups (Table 3).

In phakic eyes that were subjected to scleral buckling plus vitrectomy, macular detachment was observed more frequently than in those who underwent scleral buckling alone (23/33 (69.7%) *vs* 61/132 (46.2%); $P=0.023$). A similar result was obtained for pseudophakic eyes, but the data were not statistically significant (12/20 (60%) *vs* 25/58 (43%); $P=0.192$).

Prior to retinal reattachment surgery, the mean refractive error (given as mean diopter ± standard deviation) of phakic eyes revealed these to be significantly more myopic than pseudophakic ones (-3.31 ± 5.22 *vs* -1.12 ± 2.06; $P=0.048$). At 6 months after scleral buckling alone, the mean change in refractive error did not differ significantly between phakic and pseudophakic eyes (-1.59 ± 1.86 *vs* 1.14 ± 1.11; $P=0.218$). At 6 months after scleral buckling plus vitrectomy, the changes in refractive error likewise did not differ significantly between phakic and pseudophakic eyes (-2.11 ± 2.51 *vs* 1.41 ± 1.55; $P=0.340$).

Discussion

In the present study, the anatomical and functional outcomes of primary scleral buckling alone and of scleral buckling combined with vitrectomy were similar in phakic and pseudophakic eyes. This is an interesting finding, because in a risk-factor analysis which included 55 of the pseudophakic patients involved in the present study, the more extensive RD associated with pseudophakic eyes was found to be a major risk factor for anatomical failure after retinal reattachment surgery.[5] Furthermore, the development of PVR correlated fairly well with the extent of RD in pseudophakic eyes but only weakly so with that in phakic eyes. These findings are in accordance with those reported by other investigators.[4,9,12] Disagreement on the ideal intervention for pseudophakic RD is not uncommon, especially in cases which lie in the simple-to-complex range.[4,15–17] During cataract surgery, traumatization of the vitreous body,[18] lower concentrations of hyaluronic acid,[19] and liquefaction of the vitreal gel phase,[18] may heighten vitreoretinal traction, thereby leading to RD in an eye that already manifests peripheral degeneration of the retina. Vitrectomy is the logical treatment for this condition, since although scleral buckling would reduce traction, it would not prevent the vitreous body from undergoing further deleterious changes. However, vitrectomy will also have adverse consequences, owing to the unavoidable generation of peripheral vitreal remnants. For this reason, we routinely combine its performance with an encircling band. Although this undertaking has been reported to lower the redetachment rate due to new breaks,[20] investigators are not of one mind as to the benefits it confers.[16,21] However, although not statistically significant, the anatomical success rates after primary scleral buckling plus vitrectomy in phakic and pseudophakic eyes were lower than after scleral buckling alone. This may relate to the circumstance that vitrectomy was reserved for complicated cases of RD. The absence of PVR after primary vitrectomy in these complicated cases may be indicative of the procedure's effectiveness. Consequently, after vitrectomy plus scleral buckling, the negative impact of the correlation between the size of the RD and postoperative PVR development on surgical outcome did not attain significance. Possibly, the introduction of vitrectomy and scleral buckling in less complicated cases could have yielded to an improved surgical and functional outcome. Nevertheless, the rates of postoperative PVR development[22–24] and anatomical success[4,7,12,15,22–25] are in accordance with published data, although we found the differences in the latter between phakic and pseudophakic eyes to be somewhat smaller than those reported by other investigators.[24,26,27] One reason for the small difference in anatomical outcome between phakic and pseudophakic eyes could be that previous studies included predominately scleral buckling procedures without vitrectomy, or included eyes that were either aphakic, had received an anterior chamber lens or did not qualify for uncomplicated posterior chamber lens implantations.[4,6,7,16,17,22,23,25] The situation of the implant has already been shown to have an impact on the anatomical and functional outcome of reattachment surgery.[24] This influence is believed to be related to the clarity of fundus viewing, which is more often compromised in eyes with an anterior chamber lens, thereby resulting in a higher incidence of undetected retinal breaks.[7] Compared to earlier studies, the anatomical outcome after vitrectomy in pseudophakic eyes has increased dramatically,[8] even without additional cerclage.[16,17] This finding may reflect recent advancements in vitrectomy techniques, including indirect wide-angle optics and a means of removing capsular opacities.

The use of SF6 as an internal tamponade and patient positioning were always combined with cryocoagulation of the supposed critical areas. After cryotherapy, a stable chorioretinal scar will develop within 10 days,[28] which lies within the duration that a SF6 tamponade is in place. Our own experience suggests that longer-acting gases are not necessary if tractional forces are completely relieved and its stable chorioretinal scars have developed after cryocoagulation. Especially, in cases of an immature or active PVR, the effects of longer-acting gases do not endure for a sufficient time to stabilize the retina. Moreover, the longer-acting gases may precipitate the onset of secondary glaucoma. Thus, we feel that longer-acting gases do not contribute positively to the panel of tamponades for retinal support. However, the low case numbers for each type of intraocular tamponade precluded a statistical subanalysis of its impact on surgical outcome in our study.

Before and 6 months after scleral buckling plus vitrectomy, BCVA did not differ significantly between phakic and pseudophakic eyes. After scleral buckling alone, BCVA was significantly better in both phakic and pseudophakic eyes. Likewise after scleral buckling plus vitrectomy, the mean BCVA improved, but the values did not attain statistical significance in either pseudophakic and phakic eyes, even after the exclusion of cases with secondary cataracts. The poorer visual recovery achieved after scleral buckling plus vitrectomy might be attributable to the higher frequency of macula detachment in phakic and pseudophakic eyes that underwent this combined treatment. Accordingly, prior to vitrectomy, the mean BCVA was poorer in phakic and pseudophakic eyes than before scleral buckling. The most important predictor of visual recovery is preoperative visual acuity, which relates largely to the attachment of the macula.[11,12,25] However, after scleral buckling plus vitrectomy, the frequency of cases with a BCVA of at least 0.4 (20/50) was significantly higher in pseudophakic than in phakic patients (both with and without secondary cataracts). This observation may be indicative of the effectiveness of primary vitrectomy in pseudophakic eyes.[11,16,17,22,25] The finding may relate to the fact that in pseudophakic eyes, there is no risk of secondary cataract formation. In pseudophakic eyes, a more thorough removal of vitreal opacities is possible, and the visual benefit thereby derived cannot be subsequently impaired by secondary cataract formation.

A comparison of the postoperative functional and anatomical success rates reported in the literature is rendered difficult due to differences, for example, in the types of intraocular lens used,[17,24] and in the inclusion and exclusion criteria adopted.[4,12,17,22,26] Consequently, we excluded patients with a history of complicated cataract surgery, those who where aphakic, and those who had received anterior chamber lens implantations.

A common problem associated with scleral buckling is a postoperative change in the refractive error, which has been described to range from −0.91 to −2.75 diopters.[29,30] In the present study, the myopic shifts induced by scleral buckling alone or scleral buckling combined with vitrectomy lay within this range. Due to the more pronounced development of secondary (nuclear) cataracts in phakic eyes that underwent vitrectomy, this group manifested the largest myopic shifts. We observed no cases of severe anisometropia. However, remarkably, Campo *et al*[16] noted a mean myopic shift of −0.15

diopters in pseudophakic eyes that underwent vitrectomy without scleral buckling.

In conclusion, utilizing the given surgical indications and methods, the presented study reveals similar anatomical and functional outcomes after scleral buckling alone or in combination with vitrectomy for primary retinal reattachment surgery in phakic and pseudophakic eyes. Owing to the retrospective nature of the study, the findings are of limited generalizability. Nevertheless, they support the observation that modern techniques of cataract extraction, with posterior chamber lens implantation, together with advances in vitreoretinal surgery, have reduced the previously mentioned differences in the outcome of pimary retinal reattachment surgery between phakic and pseudophakic eyes.

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