

Characteristics of rhegmatogenous retinal detachment in pseudophakic eyes: A retrospective cohort study

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Abstract

Purpose: To evaluate the characteristics of rhegmatogenous retinal detachment (RD) in pseudophakic eyes compared with phakic eyes, including baseline clinical features, retinal characteristics, and postoperative outcomes.

Methods: All patients who underwent surgery for primary RD between October 2017 and September 2022 were retrospectively enrolled. Clinical manifestations of RD in pseudophakic and phakic eyes were comparatively analyzed. Capsular-related complications during prior cataract surgery and the duration between cataract and RD surgery were also evaluated.

Results: A total of 874 eyes were included, of which 144 were pseudophakic and 730 were phakic. Univariable analysis revealed that the mean age and HbA1c levels were higher in patients with pseudophakic RD ($p < 0.01$). Pseudophakic RD was characterized by higher prevalence of inferior ($p < 0.001$) and nasal ($p < 0.05$) retinal breaks, missed break ($p < 0.001$), foveal detachment ($p < 0.001$), bilateral involvement ($p < 0.05$), and more extensive detachment ($p < 0.001$). These eyes also exhibited poorer anatomical and visual outcomes ($p < 0.001$). Mean duration between cataract surgery and RD surgery was 50.4 ± 51.6 months. No association was observed between the duration from cataract surgery to RD surgery and RD characteristics. Eyes with capsular complications during cataract surgery were associated with shorter axial length ($p < 0.05$) and a lower anatomical success rate ($p < 0.01$).

Conclusions: Pseudophakic RD demonstrated distinct clinical features that were not influenced by the time duration after cataract surgery. Capsular complications during cataract surgery may contribute to a poorer prognosis.

Introduction

Cataract extraction is one of the most commonly performed ocular surgeries globally, and its frequency has increased due to population aging and longer life expectancy [1, 2]. Moreover, recent technological advances have enhanced surgical safety and improved visual outcomes, resulting in an increased number of procedures being performed, even in eyes with mild lens opacities and for refractive purposes. However, although cataract surgery is generally safe, rhegmatogenous retinal detachment (RD) remains an uncommon but serious vision-threatening complication. Cataract surgery is a known risk factor for RD because it accelerates vitreous degeneration and posterior vitreous detachment (PVD) [3–6]. Moreover, previous reports indicate that approximately 20%–40% of RD cases are associated with prior cataract surgery [7–11].

Numerous studies have followed up cohort of patients who underwent cataract surgery and compared patients who developed RD with those who did not [12–15]. Reported risk factors for RD include younger age, long axial length, male sex, and the presence of PVD [12–15]. Additionally, intraoperative complications during cataract surgery—specifically posterior capsule rupture—have been shown to increase the risk of RD [11, 14, 15]. However, relatively few studies have assessed cohort of patients who

underwent RD surgery and compared outcomes between pseudophakic and phakic eyes. Comparative analyses of RD in pseudophakic and phakic eyes have demonstrated distinct clinical features. In pseudophakic eyes, foveal involvement is more frequent; the extent of RD is greater, and inferior retinal involvement and breaks are more common [9, 16–19]. However, their results are not identical, and there are some differences from one report to another.

The duration from cataract surgery and RD onset has also been investigated. Hermann et al. [20] reported that most patients developed RD shortly after cataract surgery and that the risk decreased over time. Other studies have shown an increased risk of RD within follow-up periods of up to 8 years [21, 22] or 11 years [20]. Furthermore, Sheu et al. suggested that the types and locations of retinal tears may vary depending on the time elapsed after cataract surgery [23].

The present study aimed to analyze the impact of lens status (phakia vs. pseudophakia) on RD characteristics. We further evaluated pseudophakic RD, focusing on the influence of posterior capsular complications during prior cataract surgery. Additionally, we investigated whether the duration between cataract surgery and RD surgery affects RD characteristics.

Methods

Patients and study design

This retrospective, single-center, case–control study included the medical records of all consecutive patients who underwent surgical treatment for uncomplicated primary rhegmatogenous RD between October 2017 and September 2022 at the Department of Ophthalmology, Kitasato University Hospital. In patients with bilateral RD, only the first eye that underwent RD surgery was included in the analysis. The study was approved by the Research Ethics Committee of Kitasato University Hospital (No. B22-217). All procedures adhered to the tenets of the Declaration of Helsinki.

All surgeries were performed using standardized techniques by five experienced surgeons. The inclusion criteria were primary, uncomplicated RD treated with surgery as the initial procedure and a minimum follow-up period of 1 month. The exclusion criteria were as follows: concurrent macular breaks; aphakia; amblyopia; history of penetrating posterior segment injury; ocular dystrophy; retinopathy of prematurity; proliferative vitreoretinopathy grade C or higher; RD associated with proliferative diabetic retinopathy; previous intraocular surgery other than cataract surgery; prior vitreoretinal interventions; RD associated with inflammatory conditions (e.g., uveitis), age-related macular degeneration, retinal vascular occlusive disease, or neurodegenerative retinal disorders; advanced cataract precluding adequate fundus visualization; and patients unwilling to undergo ophthalmic examinations.

The following data were extracted from medical records: age, sex, laterality (right or left eye), date of RD surgery, date of prior cataract surgery, axial length, and history of RD in the fellow eye. The location of the largest retinal break (hole or tear) in detached retina, the extent of RD measured in clock hours, and the number of breaks were assessed based on intraoperative drawings completed by the surgeon at the end

of surgery and were confirmed using preoperative fundus photographs. Break size was categorized according to the greatest linear extent: small (<1 clock hour), medium (1–2 clock hours), and large (>3 clock hours). Preoperative macular status was evaluated using optical coherence tomography images obtained at the initial examination.

The primary outcome measures were single-operation anatomical success and functional outcome. Single-operation anatomical success was defined as complete retinal reattachment without tamponade and without additional reattachment procedures within 1 month after surgery. Functional outcome was defined as the best-corrected visual acuity (BCVA) at the final examination, conducted at least 1 month postoperatively.

Capsular complications were defined as posterior capsule-related events occurring during cataract surgery, such as posterior capsule rupture. A comparative analysis was conducted between pseudophakic RD eyes with capsular complications and those without such complications during prior cataract surgery. In the analysis, the eyes without capsular complications excluded those that underwent YAG laser capsulotomy.

Statistical analysis

Patients who underwent RD surgery were categorized into two groups according to lens status: pseudophakic and phakic. Demographic characteristics and RD features were compared between the two groups. Continuous variables were analyzed using the unpaired Student's *t* test or the Mann–Whitney *U* test, as appropriate. Categorical variables were compared using Fisher's exact test. Multivariable logistic regression analysis was performed to identify factors associated with pseudophakic RD. Odds ratios and 95% confidence intervals (95% CIs) were calculated for demographic characteristics, ocular features, intraoperative factors, and outcomes. Variables with a *p* value <0.20 in the univariable analysis were included in the multivariable model. The influence of capsular complications during prior cataract surgery and the duration between cataract and RD surgery on RD characteristics was also evaluated. Pearson's correlation coefficient or Spearman's rank correlation coefficient was used to assess associations between the time duration and RD-related parameters, as appropriate. A two-sided *p* value <0.05 was considered statistically significant. All statistical analyses were performed using EZR (Saitama Medical Center, Jichi Medical University, Saitama, Japan) [24].

Results

This study included 874 eyes from 874 patients. Among them, 144 eyes (16.5%) were pseudophakic, and 730 were phakic. The mean age was 54.9 ± 14.2 years (range, 12–92 years). Male patients accounted for 74.9% of the cohort, and 54.1% of the affected eyes were right eyes. Surgical treatment for RD consisted of pars plana vitrectomy or scleral buckling.

The univariable comparison of baseline or clinical characteristics between phakic and pseudophakic RD eyes is presented in Table 1. Multivariable logistic regression analysis was performed to identify factors

associated with pseudophakic RD compared with phakic RD. As shown in Table 2, pseudophakic RD was significantly associated with older age, bilateral RD, greater extent of RD, and a higher frequency of inferior and nasal breaks.

Nineteen pseudophakic RD eyes had experienced posterior capsule–related complications during prior cataract surgery. Of these, five eyes had posterior capsule rupture with vitreous loss, and 11 eyes had scleral-fixated intraocular lenses (IOLs). In three eyes, capsular complications were documented, but the presence of vitreous loss was not specified. The comparison of pseudophakic RD eyes with and without capsular complications during previous cataract surgery, based on univariate analysis, is shown in Table 3.

The mean duration between cataract surgery and RD surgery was 50.4 ± 51.6 months. RD developed within 1 month after cataract surgery in 7.2% of patients, within 6 months in 19.6%, within 1 year in 28.2%, and more than 10 years after surgery in 21.0% of patients. The maximum duration observed was 22 years (Figure 1).

We categorized eyes with RD into two groups based on the duration from cataract surgery to RD surgery: those that developed RD within 6 months after cataract surgery and those that developed RD more than 6 months after surgery. A comparison of the characteristics of these two groups is presented in Table 4. Additionally, no significant correlations were observed between the duration from cataract surgery to RD surgery and RD-related parameters.

Table 1 Comparison of baseline characteristics, intraoperative data, and outcomes between phakic RD and pseudophakic RD

<i>Variable</i>	<i>Phakic RD (n = 730)</i>	<i>Pseudophakic RD (n = 144)</i>	<i>p value</i>
<i>Age, years, range</i>	53.6 ± 13.4 (12–87)	61.7 ± 16.2 (18–92)	<0.001
<i>Gender, male (%)</i>	67.7	75.0	.094
<i>Studied eye, right (%)</i>	53.3	58.3	.274
<i>Bilateral RD, present (%)</i>	6.3	12.5	.014
<i>HbA1c, %</i>	5.79 ± 0.77	5.94 ± 0.84	.006
<i>Axial length, mm</i>	25.92 ± 2.11	26.06 ± 2.41	.442
<i>Intraocular pressure, mmHg</i>	13.1 ± 3.4	12.3 ± 4.1	.058
<i>Preoperative BCVA, logMAR</i>	0.47 ± 0.70	0.65 ± 0.78	.003
<i>Duration from a symptom onset to manifestation, days</i>	18.8 ± 73.8	10.0 ± 17.5	.044
<i>Duration from presentation to surgery, days</i>	6.0 ± 20.5	3.7 ± 7.6	.245
<i>Fovea off based on OCT (%)</i>	46.1	63.8	<0.001
<i>Total extent of RD, clock hours</i>	4.8 ± 2.3	6.1 ± 2.8	<0.001
<i>Number of breaks, n</i>	2.0 ± 1.7	2.1 ± 1.8	.430
<i>Size of the largest break, small (%)</i>	88.8	90.4	.665
<i>Type of the largest break, hole (%)</i>	26.5	42.2	<0.001
<i>Location of the largest break, inferior (%)</i>	24.4	44.4	<0.001
<i>Location of the largest break, nasal (%)</i>	31.1	40	.046
<i>Missed break (%)</i>	0.82	6.2	<0.001
<i>Surgical procedure</i>			
<i>Pars plana vitrectomy (%)</i>	84.1	94.4	<0.001
<i>Scleral buckling (%)</i>	15.9	5.6	<0.001
<i>Silicone oil tamponade (%)</i>	3.7	11.8	<0.001
<i>Final BCVA, logMAR</i>	0.10 ± 0.26	0.22 ± 0.42	<0.001
<i>Primary anatomical success (no relapse within 1 month after the surgery) (%)</i>	93	81.9	<0.001

RD retinal detachment, BCVA best-corrected visual acuity, HbA1c glycated hemoglobin, logMAR logarithm of the minimal angle of resolution, OCT optical coherence tomography. Values are presented as mean $\pm$ standard deviation or %. *p* values were calculated using Student's *t* test, Mann–Whitney *U* test, or Fisher's exact test, as appropriate.

Table 2 Multivariable logistic regression analysis for risk factors associated with pseudophakic RD eyes

<i>Variable</i>	<i>Odd ratio</i>	<i>95% Confidence interval</i>	<i>p value</i>
<i>Age, years</i>	1.05	1.03–1.07	<0.001
<i>Gender, male</i>	1.53	0.95–2.46	.080
<i>Bilateral RD, present</i>	3.00	1.48–6.07	.002
<i>Intraocular pressure, mmHg</i>	1.02	0.96–1.09	.491
<i>Preoperative BCVA (logMAR)</i>	0.72	0.47–1.11	.133
<i>Fovea off based on OCT</i>	1.12	0.63–1.98	.696
<i>Total extent of RD, clock hours</i>	1.13	1.02–1.25	.020
<i>Type of the largest break, hole</i>	2.22	1.42–3.47	<0.001
<i>Location of the largest break, inferior</i>	2.60	1.69–3.99	<0.001
<i>Location of the largest break, nasal</i>	1.63	0.03–2.49	.035
<i>Surgical procedure, pars plana vitrectomy</i>	1.82	0.77–4.37	.179
<i>Postoperative BCVA (logMAR)</i>	1.87	0.84–4.14	.121
<i>Primary anatomical success (no relapse within 1 month after the surgery)</i>	0.53	0.27–1.06	.073

RD retinal detachment, BCVA best-corrected visual acuity, logMAR logarithm of the minimal angle of resolution.

Table 3 Comparison of features of RD eyes with or without a capsular-related complication during prior cataract surgery

<i>Variable</i>	<i>RD eyes without capsular complication during cataract surgery (n = 122)</i>	<i>RD eyes with capsular complication during cataract surgery (n = 19)</i>	<i>p value</i>
<i>Age, years</i>	60.8 ± 16.9	65.2 ± 14.2	.280
<i>Gender, male (%)</i>	76.2	73.7	.779
<i>Study eye, right (%)</i>	59.0	47.4	.455
<i>Bilateral RD, present (%)</i>	10.7	26.3	.070
<i>HbA1c, %</i>	5.19 ± 0.85	6.15 ± 0.88	.084
<i>Axial length, mm</i>	26.30 ± 2.38	24.92 ± 2.12	.020
<i>Intraocular pressure, mmHg</i>	12.4 ± 3.9	11.5 ± 5.0	.347
<i>Duration from cataract surgery to RD surgery, months</i>	49.1 ± 50.3	51.5 ± 62.9	.567
<i>Preoperative BCVA, logMAR</i>	0.64 ± 0.76	0.77 ± 0.89	.401
<i>Number of breaks, n</i>	2.2 ± 1.8	1.9 ± 1.5	.761
<i>Fovea off based on OCT (%)</i>	62.0	63.2	1
<i>Total extent of RD, clock hours</i>	5.9 ± 2.7	7.3 ± 3.0	.071
<i>Size of the largest break, small (%)</i>	92.8	94.1	1
<i>Location of the largest break, inferior (%)</i>	42.6	58.8	.296
<i>Location of the largest break, nasal (%)</i>	41.7	35.3	.793
<i>Surgical procedure</i>			
<i>Pars plana vitrectomy (%)</i>	93.4	100	.598
<i>Scleral buckling (%)</i>	6.6	0	.598
<i>Silicone oil tamponade (%)</i>	10.7	21.1	.248
<i>Final BCVA, logMAR</i>	0.21 ± 0.36	0.36 ± 0.70	.250
<i>Primary anatomical success</i>	86.0	61.5	.007

(no relapse within 1
month after the surgery)
(%)

RD retinal detachment, *BCVA* best-corrected visual acuity, *HbA1c* glycated hemoglobin, *logMAR* logarithm of the minimal angle of resolution, *OCT* optical coherence tomography. Values are presented as mean $\pm$ standard deviation or %. *p* values were calculated using the Student's *t* test, Mann–Whitney *U* test, or Fisher's exact test, as appropriate.

Table 4 Comparison of characteristics of pseudophakic eyes with RD according to the duration from cataract surgery to RD surgery

<i>Variable</i>	<i>RD within 6 months after cataract surgery (n = 27)</i>	<i>RD more than 6 months after cataract surgery (n = 111)</i>	<i>p value</i>
<i>Age, years</i>	60.2 ± 14.4	61.1 ± 16.3	.780
<i>Gender, male (%)</i>	74.1	76.6	.804
<i>Study eye, right (%)</i>	37.0	62.2	.029*
<i>Bilateral RD, present (%)</i>	11.1	13.5	1
<i>Capsular complication during prior cataract surgery, present (%)</i>	25.9	9.9	.0496*
<i>Axial length, mm</i>	26.25 ± 2.49	26.05 ± 2.41	.710
<i>Intraocular pressure, mmHg</i>	11.8 ± 4.6	12.4 ± 4.0	.470
<i>Preoperative BCVA, logMAR</i>	0.61 ± 0.89	0.64 ± 0.75	.409
<i>Number of breaks, n</i>	2.2 ± 1.7	2.1 ± 1.8	.742
<i>Fovea off based on OCT (%)</i>	44.4	65.5	.050
<i>Total extent of RD, clock hours</i>	5.6 ± 3.3	6.2 ± 2.6	.154
<i>Size of the largest break, small (%)</i>	3.8	10.7	.457
<i>Location of the largest break, inferior (%)</i>	46.2	45.6	1
<i>Location of the largest break, nasal (%)</i>	53.8	62.1	.503
<i>Surgical procedure, pars plana vitrectomy (%)</i>	92.6	94.6	.654
<i>Final BCVA, logMAR</i>	0.17 ± 0.34	0.22 ± 0.42	.637
<i>Primary anatomical success (%)</i> (no relapse within 1 month)	81.5	82.0	1

RD retinal detachment, BCVA best-corrected visual acuity, logMAR logarithm of the minimal angle of resolution, OCT optical coherence tomography. Values are presented as mean ± standard deviation or %. *p* values were calculated using the Student's *t* test, Mann–Whitney *U* test, or Fisher's exact test, as appropriate.

Discussion

In this study, patients with pseudophakic RD were older and had higher HbA1c levels than those with phakic RD. Pseudophakic RD was characterized by a higher prevalence of inferior, nasal, and missed

retinal breaks, more frequent foveal involvement, bilateral RD, and greater detachment extent, consistent with previous reports [9, 16-19]. We found no significant difference in the number of retinal breaks between phakic and pseudophakic RD eyes, as previously described [17]. Although male predominance was observed in both groups, the proportion did not differ significantly, in contrast to earlier studies [9, 17]. Similarly, axial length did not differ significantly between groups, although previous research has identified longer axial length as a risk factor for RD following cataract surgery.

The present study revealed that the mean HbA1c level was higher in pseudophakic RD eyes. The association between pseudophakic RD and diabetes remains controversial. Previous studies evaluating the impact of systemic diseases on pseudophakic RD reported no significant effect of diabetes on its development [23]. In contrast, Daien et al. [15] reported an increased risk of pseudophakic RD in patients with diabetes, whereas Kim et al. [25] observed a lower frequency of diabetes among patients with pseudophakic RD.

Cataract extraction increases the risk for PVD development [13, 14, 26, 27], which contributes to RD [3, 11]. After cataract surgery, the IOL has a much smaller volume than the original crystalline lens, resulting in an increase in vitreous cavity volume and anterior displacement of the vitreous body. Furthermore, pseudophakic eyes have altered biochemical vitreous composition and viscosity [28] and decrease of vitreous hyaluronate concentration [6], causing a higher risk of RD. Some authors have suggested that the protuberance of a posterior surface of a crystalline lens can be an important factor in reducing vitreous traction [3], and the lack of protuberance of the lens can increase the vitreous traction. As previously reported, in this study, pseudophakic RD was more extensive [18] and more often involved fovea [19, 29]. The explanation of this phenomenon is that anomalous PVD observed in pseudophakic eyes could induce stronger tractional force at a periphery [17, 19, 29].

The predominance of retinal breaks in the superior quadrants in RD is well-established [8]. In this study, pseudophakic RD eyes showed a higher distribution rate of inferior and nasal retinal breaks than phakic ones. These results are supported by those of the previous studies [16]. A plausible explanation for the increased rate of inferior and nasal breaks can be that natural PVD extension usually progresses first upward before moving temporally. Nasal and inferior quadrants are the last for PVD distribution [30]. While RD develops from retinal breaks appearing at a site of firm adhesion during PVD, cataract surgery was shown to induce PVD more likely in inferior regions, resulting in a higher risk of PVD-related inferior breaks and RD [31]. Wang et al. [32] have demonstrated that age-related widening of the posterior vitreous base is greater in a nasal half than in a temporal one of any eye and is maximal in the inferonasal quadrant. This finding can explain the difference in the direction of PVD extension, which progresses with age. Another explanation of inferior or nasal breaks is the location of incisions during cataract surgery, which are usually at superior or temporal quadrants [16].

Regarding the surgical procedure, pars plana vitrectomy and silicone oil tamponade were more frequently performed in pseudophakic RD. Pseudophakic RD was associated with worse final visual acuity and less promising anatomical outcome rate at 1 month post-surgery in univariable analysis,

consistent with the results of the most recent study [9], and with the exception of one report showing the opposite result [17]. The features of pseudophakic RD, such as inferior breaks, greater extent of RD, and more macular involvement, could have contributed to the worse prognosis. Inferior breaks had a weaker effect on the tamponade, vitreous shaving being more difficult in the lower half of an eye, thus leading to worse prognosis [17, 19]. Another factor that may be attributed to decreased anatomical success of pseudophakic RD is the difficulty in examining the peripheral retina and visualization of tiny retinal breaks. These difficulties are usually related to vitreous and IOL opacities, poor mydriasis, and optical aberrations related to IOL [3].

In this study, the mean overall period from cataract surgery to RD surgery was 50.4 months. It was within 6 months in 19.6% of cases, within 1 year in 28.2%, and over 10 years in 21.0% and up to 22 years in the rest of cases. This period has been noted by other authors. Morano et al. [13] stated that 59.9% of RD developed within the first 6 months after cataract surgery. Kim et al. [25] found that 80% of RD occurred within 1 year. Moorfields Eye Hospital found that 75% of RD developed within 2 years [33]. Sheu et al. [23] found that the mean time between cataract surgery to a RD diagnosis was 40 months, whereas Daien et al. [15] reported 237 days. Hermann et al. [20] noticed that 25% of all pseudophakic RDs developed within 1 year after cataract surgery, 50% within 3.2 years, and 90% within 9.9 years, where the risk was increased for at least 11 years. Sheu et al. [23] reported it for late pseudophakic RD 4 years after the surgery.

Many cases of RD in this study were characterized by the long duration of the condition after cataract surgery, and in 21% of them, RD developed more than 10 years after the intervention. We compared the characteristics of pseudophakic eyes with RD according to the duration from cataract surgery to RD surgery. No significant differences were observed between the groups, except for laterality and the presence of capsular complications during cataract surgery. This finding was in contrast with those of the former reports. Sheu et al. [23] showed that types and locations of retinal tears tended to be different between patients, in whom RD developed early or late after cataract surgery. The anterior tears that provoke most RDs long after cataract extraction were the result of a persistent chronic traction on a vitreous base [27, 34, 35]. They speculated that anomalous PVD developed years after cataract extraction and caused the late wave of an increased risk for pseudophakic RD [23].

Intraoperative complications related to a posterior capsule rupture during a previous cataract surgery have been designated as a significant risk factor for pseudophakic RD. The risk of RD after cataract surgery elevated two- to tenfold in a patient with a capsular complication [3, 5, 15, 25, 33, 36–39]. It is speculated that the forward movement of a vitreous body, resulted from posterior capsule rupture, may have produced vitreous liquefaction and posterior vitreous separation, increasing dynamic traction at a vitreous base and ora serrata with secondary retinal break formation [3, 25, 36, 38, 40]. However, only one study reported that the adjusted relative risk of RD with intraoperative capsular complications, vitreous loss, or both, was not significant [23].

We investigated the influence of capsular complications during cataract surgery on the characteristics of pseudophakic RD. The mean axial length of the eyes after a cataract surgery with capsular complications was shorter than of those after an uncomplicated cataract surgery, suggesting that after the former, even the non-myopic eyes can be at risk of RD, whereas those with long axial length are more likely to develop RD, even without a complication during cataract surgery. Although there was no significant difference in the extent of RD and the location of a retinal tear between eyes undergoing a capsular-complicated cataract surgery and an uncomplicated one, this study showed a less promising 1-month anatomical outcome for the former. This result is comparable with the previous studies [15, 33, 38, 39]. This can be explained by the anterior migration of a vitreous body and the induced traction provoked by a posterior capsule rupture. Furthermore, when the eyes were categorized according to the duration from cataract surgery to RD surgery as **6 months or less and more than 6 months**, the rate of capsular complications was higher in eyes that developed RD within 6 months after cataract surgery. This finding is consistent with previous studies indicating that posterior capsule rupture is associated with a shorter duration between cataract surgery and the development of pseudophakic RD [11, 20, 38]. One study reported that this duration was shortened only when posterior capsule rupture was accompanied by vitreous loss [14]. In the present study, **most eyes with capsular complications also had concomitant vitreous loss.**

Nevertheless, the risk of pseudophakic RD persisted for a long time, even in eyes without complications during cataract surgery. Another possible reason for this lack of differences in RD features between the period duration groups is the recent advancement of the minimally invasive cataract surgery technique over the past decade, with smaller incisions and more stable perfusion pressure. This advancement may have enabled reduced traction on a vitreous body, contributing to a lower incidence of RD after a recent cataract surgery.

This study has several limitations. Its single-center design may introduce selection bias, and the follow-up period was relatively short. The retrospective design limited the availability of certain data, including PVD grading, which is important in the pathogenesis of pseudophakic RD. Furthermore, only a limited number of complication types during cataract surgery could be identified.

In conclusion, pseudophakic RD is associated with higher risk features and less favorable short-term outcomes compared with phakic RD. RD characteristics were not significantly influenced by the period duration after cataract surgery. Capsular complications during cataract surgery were associated with an even poorer prognosis. These findings may have implications for surgical planning and postoperative risk assessment following cataract surgery.

Declarations

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Author contributions

All authors contributed to the study conception and design. Material preparation and data collection were performed by Yasuko Ikegami, Kunihiro Yanagita, Takahiro Haruki. Analysis was performed by Yasuko Ikegami and Kazunori Hirasawa. The first draft of the manuscript was written by Yasuko Ikegami, and all authors reviewed and commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Ethical approval

This study was performed in line with the principles of the Declaration of Helsinki for research involving human subjects and were approved by the Ethics Committee of the Kitasato University Hospital (No. B22-217).

Informed consent

The requirement for informed consent was waived by the institutional ethics committee due to the retrospective nature of the study.

Data availability statement

The datasets used and analyzed during this study are available from the corresponding author upon reasonable request.

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Figures

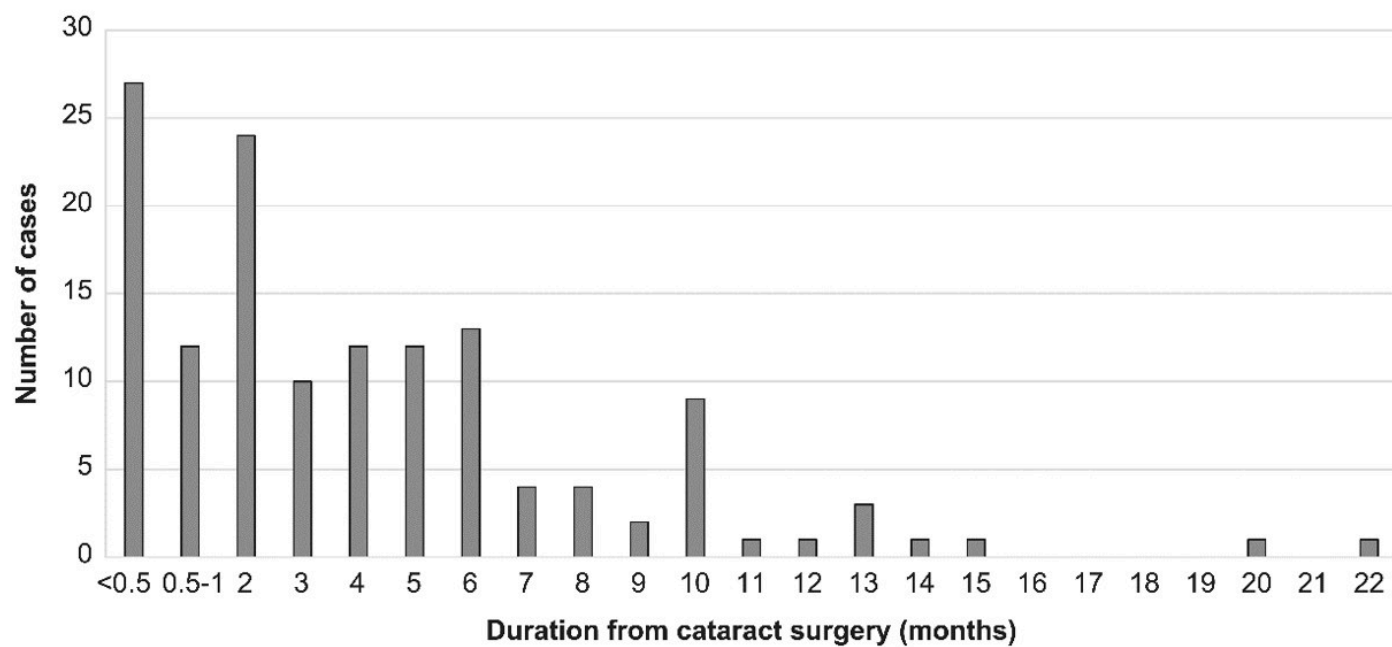


Figure 1

Distribution of the duration between cataract surgery and retinal detachment surgery