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ORIGINAL PAPER

Spontaneous dislocation of the posterior chamber intraocular lens

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Abstract
Aim To evaluate the possible risk factors for posterior chamber intraocular lens dislocation either in-the-bag (ITB) dislocation or out-of-the-bag (OOTB) dislocation.
Methods All subjects who sustained late intraocular lens dislocation from January 2011 until May 2014 and presented to the Nagasaki University Hospital were included in the study. This study is a retrospective evaluation of all cases of posterior chamber intraocular lens dislocation in this defined period. All cases had history of uncomplicated cataract surgery with implantation of posterior chamber intraocular lens. Patients with history of trauma (before cataract surgery) were excluded from the study. The main outcome measures of the study were evaluation of risk factors for dislocation of both groups and determination of the interval between cataract surgery and dislocation.
Results Thirty-six eyes (69.23%) suffered ITB dislocation, and 16 eyes (30.77%) suffered OOTB dislocation. Intraocular lens dislocation was common in males (42 eyes = 80.77%) than females (10 eyes = 19.23%). Patients of ITB dislocation group were significantly older than OOTB dislocation group at the time of initial intraocular lens implantation and at the time of exchange surgery.
Conclusion The most prevalent risk factors in both groups were axial myopia in 18 eyes (34.61%), vitreoretinal surgery in 16 eyes (30.77%), and pseudoexfoliation in 13 eyes (25%) in all cases.

Keywords Posterior chamber IOL dislocation · Vitrectomy · Pseudoexfoliation syndrome · High myopia

Introduction

Although dislocation of intraocular lenses (IOLs) is a rare complication of cataract surgery, the problem is well known to cataract surgeons and several cases have been reported in the past 30 years [1]. Many previous studies reported that the incidence of dislocation of posterior chamber (PC) IOLs ranged from approximately 0.2 to 2% [2]. Early IOL dislocation generally is secondary to poor IOL fixation; its rate has decreased since the implementation of continuous curvilinear capsulorhexis (CCC). Late spontaneous in-

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the-bag (ITB) dislocation (more than 3 months after surgery) generally stems from zonular weakness, not from inadequate fixation [3]. Until the 1980s, dislocation of the IOL usually occurred outside of the capsule and was often referred to as the sunset or sunrise syndrome. It has been suggested that this out-of-the-bag (OOTB) dislocation is predominantly due to asymmetrical fixation of the IOL or to complicated surgery particularly if the dislocation occurs in the early postoperative period [4].

Nevertheless, the pseudophakic population has been growing very quickly in recent years as a result of the longer lifespan, the new phacorefractive procedures, and the improvement in the quality and safety of phacoemulsification surgery. As a result of this, late ITB dislocation may become a more common issue in the future. ITB dislocation is due to a progressive zonular dehiscence many years after uneventful surgery [5].

A predisposition to zonular dehiscence and capsular contraction is identified in the great majority of ITB dislocation cases, pseudoexfoliation (PEX) being the most common risk factor [2, 3, 6]. Others include axial myopia [7, 8], previous vitreoretinal surgery (VRS) [3, 8, 9], uveitis [3, 9, 10], trauma [3, 9, 11], and retinitis pigmentosa (RP) [8, 9, 12].

The present study is a retrospective evaluation of patients who had secondary IOL fixation surgery. Our aim in this study is to evaluate the possible risk factors for either ITB or OOTB dislocation. The time between the cataract extraction and IOL dislocation was also analyzed.

Patients and methods

The records of all subjects who sustained late IOL dislocation from January 2011 until May 2014 and presented to the Nagasaki University Hospital were retrospectively reviewed. Late IOL dislocation was defined as any case requiring IOL repositioning surgery that occurred after primary cataract surgery in which the initial postoperative IOL position had been noted as good, thus excluding dislocations occurring during cataract surgery or detected at the first postoperative visit. Indications for repositioning surgery were IOL dislocation causing visual symptoms or distinct dislocation. The patients' medical charts were reviewed, including the initial ophthalmology consultation notes, hospital records, details of the primary and subsequent surgical interventions, and follow-up outpatient records.

All cases had history of uncomplicated cataract surgery with implantation of PC IOL. Primary cataract surgeries with history of trauma (preoperative trauma) that could potentially contribute to zonular instability or IOL dislocation were excluded from the study. All patients were divided into ITB and OOTB dislocation groups.

The patients' demographics, including mean age of cataract extraction, mean age of secondary implantation, gender, coexisting eye disease, and which eye operated were included in this study. The interval between cataract surgery and subsequent IOL dislocation, cause of IOL dislocation, history of postoperative trauma (documented blunt trauma) and other ocular surgeries, and associated systemic problems were also determined.

The explantation surgeries were performed by different experienced surgeons, and no specific protocol was followed during the surgery. Implanting the IOL with scleral sutures was performed using an ab externo scleral fixation technique.

This study adhered to the tenets of the Declaration of Helsinki. Informed consent was obtained from all individual participants included in the study. The main outcome measures of the study were evaluation of risk factors for dislocation of both groups and determination of the interval between cataract surgery and dislocation. Also, comparison of our results with previous reports was discussed.

Statistical methods

Student's two-tailed t test was used to compare quantitative variables. Values of $P < 0.05$ were considered statistically significant. Chi-square test was used to evaluate possible risk factors for IOL dislocation.

Results

In total, 52 eyes of 52 patients were included into the study. Thirty-six eyes (69.23%) suffered ITB dislocation and 16 eyes (30.77%) suffered OOTB dislocation. IOL dislocation was common in males (42 eyes = 80.77%) and in right eye (32 eyes = 61.54%).

Patient characteristics of ITB and OOTB dislocation groups and possible risk factors are listed in Table 1. Patients of ITB dislocation group were significantly older than OOTB dislocation group at the time of initial IOL implantation ($P = 0.044$) and at the time of exchange surgery ($P = 0.013$). The possible risk factors for ITB dislocation group (36 eyes) were VRS in 12 eyes (33.33%), PEX in 11 eyes (30.56%), axial myopia (axial length more than 26 mm) in 11 eyes (30.56%), atopic dermatitis in 3 eyes (8.33%), and postoperative trauma in 2 eyes (5.55%). The possible risk factors for OOTB dislocation group (16 eyes) were axial myopia in 7 eyes (43.75%), VRS in 4 eyes (25.0%), postoperative trauma in 3 eyes (18.75%), PEX in 2 eyes (12.50%), and atopic dermatitis in 2 eyes (12.50%). Overlap between the possible risk factors was determined in some cases.

The main risk factors in both groups for IOL dislocation were determined. The most prevalent risk factors were axial myopia in 18 eyes (34.61%), VRS in 16 eyes (30.77%), and PEX in 13 eyes (25%) in all cases.

The characteristics of cases of axial myopia are listed in Table 2. There were no statistically significant differences between axial myopia cases and other cases as regards age of cataract and primary IOL implantation ($P = 0.29$), age of IOL exchange ($P = 0.26$), and duration between cataract surgery and IOL exchange ($P = 0.46$). Axial myopia cases were common in males but with no statistically significant difference with other cases ($P = 0.69$). Also, there were no significant differences between axial myopia cases and other cases as regards right or left eye ($P = 0.08$), presence of postoperative trauma ($P = 0.79$), association with atopic dermatitis ($P = 0.21$), and presence of dislocated lens OOTB or ITB ($P = 0.36$).

In all VRS cases (Table 3), only one eye had association with PEX. The reasons for vitrectomy include rhegmatogenous retinal detachment, epiretinal membrane, and proliferative diabetic retinopathy. There were no statistically significant differences between VRS cases and other cases as regards age of cataract and primary IOL implantation ($P = 0.50$), age of IOL exchange ($P = 0.45$), and duration between cataract surgery and IOL exchange ($P = 0.36$). VRS cases were common in males but with no statistically significant difference with other cases ($P = 0.13$). Also, there were no significant differences between VRS cases and other cases as regards right or left eye ($P = 0.92$), presence of postoperative trauma ($P = 0.64$), association with atopic dermatitis ($P = 0.14$), and presence of dislocated lens OOTB or ITB ($P = 0.55$).

The characteristics of cases of PEX are listed in Table 4. There were statistically significant differences between PEX cases and other cases as regards mean age of cataract and primary IOL implantation ($P = 0.001$), age of IOL exchange ($P = 0.0001$), and duration between cataract surgery and IOL exchange ($P = 0.03$). PEX cases were common in males but with no statistically significant difference with other cases ($P = 0.42$). Also, there were no significant differences between PEX cases and other cases as regards right or left eye ($P = 0.51$), presence of

Table 1 Patient characteristics of the in-the-bag and out-of-the-bag IOL dislocation groups and possible risk factors

Characteristics	In-the-bag	Out-of-the-bag	Total no.	*P* value
Number	36	16	52	
Mean age in years	68.86 ± 13.62	57 ± 17.13		0.013
Mean age at primary IOL implantation in years	57 ± 14.37	47.31 ± 20.00		0.044
Duration in years	10 ± 6.58	6.13 ± 6.95		0.085
Male	28	14	42	0.41
Right	16	4	20	0.18
Postoperative traum (+)	2	3	5	0.79
Atopic dermatitis (+)	3	2	5	0.21
Vitrectomy (+)	12	4	16	0.55
Axial myopia (+)	11	7	18	0.36
PEX (+)	11	2	13	0.17

Table 2 Patient characteristics of cases of axial myopia

Characteristics	Axial myopia (+)	Axial myopia (−)	*P* value
Number	18	34	
Mean age in years	63.17 ± 15.99	66.09 ± 15.44	0.26
Mean age at primary IOL implantation in years	54.11 ± 15.97	56.85 ± 16.81	0.29
Duration in years	9.06 ± 4.78	9.24 ± 7.68	0.46
Male	14	28	0.69
Right	14	18	0.08
Postoperative trauma (+)	2	3	0.79
Atopic dermatitis (+)	3	2	0.21
Vitrectomy (+)	6	10	0.77
In-the-bag	11	25	0.36
Out-of-the-bag	6	10	
PEX (+)	3	10	0.31

Table 3 Patient characteristics of cases of vitreoretinal surgery

Characteristics	Vitrectomy (+)	Vitrectomy (−)	*P* value
Number	16	36	
Mean age in years	64.69 ± 14.15	65.25 ± 16.31	0.45
Mean age at primary IOL implantation in years	55.94 ± 15.94	55.89 ± 16.85	0.50
Duration in years	8.75 ± 4.48	9.36 ± 7.62	0.36
Male	15	27	0.13
Right	10	22	0.92
Postoperative trauma (+)	2	3	0.64
Atopic dermatitis (+)	3	2	0.14
PEX (+)	1	12	0.0374
In-the-bag	12	24	0.55
Out-of-the-bag	4	12	

Table 4 Patient characteristics of cases of pseudoexfoliation syndrome

Characteristics	PEX (+)	PEX (−)	*P* value
Number	13	39	
Mean age in years	79.70 ± 7.41	60.21 ± 14.47	0.0001
Mean age at primary IOL implantation in years	66.46 ± 11.74	52.38 ± 16.36	0.001
Duration in years	13.23 ± 9.51	7.82 ± 5.05	0.03
Male	9	33	0.42
Right	9	23	0.51
Postoperative trauma (+)	0	5	0.17
Atopic dermatitis (+)	0	5	0.17
Vitrectomy (+)	1	15	0.0374
In-the-bag	11	25	0.17
Out-of-the-bag	2	14	

postoperative trauma ($P = 0.17$), association with atopic dermatitis ($P = 0.17$), and presence of dislocated lens OOTB or ITB ($P = 0.17$).

Discussion

Our study showed that the possible frequent two risk factors for ITB and OOTB dislocation groups were axial myopia and VRS. The third possible major risk factor for ITB dislocation group was PEX, whereas postoperative trauma was the third possible risk factor for OOTB dislocation group.

Axial myopia has always been mentioned as a subsidiary risk factor for late IOL dislocation in some case reports [13, 14]. Fernandez et al. [5] had the first long-term case series of late ITB dislocation showing high myopia as the main risk factor. In our study, axial myopia is the most prevalent risk factor in both groups (18 eyes = 34.61%).

In this study, we agreed with Fernandez's hypothesis that myopic eyes may be more prone to zonular failure due to excessive elongation of the zonular fibers that have to support greater stress than in normal axial length eyes. This theory is supported by the outcomes of a study using high-resolution magnetic resonance imaging, which demonstrated that myopic eyes are larger in all three dimensions (i.e., equatorial, anteroposterior, and vertical axes) [15]. Moreover, this fact is also evident in the lens–iris diaphragm retropulsion syndrome that usually occurs when performing cataract surgery in high-myopic eyes [16].

Some authors have hypothesized that OOTB dislocation cases occur after complicated surgery or asymmetrical fixation of IOL [4]. In these cases, the IOL dislocation will be in early stage after the primary cataract surgery. In our study, only uncomplicated cases were included in this study, and all cases of OOTB dislocation were late in its onset. We think that zonular dehiscence that accompanies axial myopia leads to loss of back support of OOTB and subsequently can lead to its dislocation like posterior capsule rupture as determined by another report as a risk factor for OOTB dislocation [2].

Gimbel et al. [17] reported that 8 eyes (9.0%) out of 89 eyes ITB dislocation were due to prior VRS. Also, Davis et al. [3] determined that 19% of dislocated IOL were due to prior VRS. Matsumoto et al. [8] found that the most common cause of ITB dislocation (40%) was previous VRS.

Introduction of trocars through the overlying sclera and pars plana likely traumatizes zonules at their insertion. Port manipulation throughout the vitreoretinal procedure likely continues the mechanical trauma initiated by the introduction of trocars. Because of the geometry of the zonular apparatus, focal surgical disruption of zonules unevenly distributes the increases in stress on the remaining intact zonules [3]. Other factors like vitrector energy delivered indirectly to the zonules, intraoperative and postoperative pressure changes within the globe, and postoperative inflammation also may contribute to the zonular insufficiency [3]. Matsumoto et al. [8] suggested that damage to the anterior hyaloid membrane and the posterior zonules resulting from vitrectomy with scleral depression could have negative supportive effect of IOL leading to its dislocation. According to previous explanations, we also determined that previous VRS is considered to be one major risk factor for IOL dislocation.

PEX is an age-related systemic disorder of extracellular matrix with prominent manifestations in the eye [1, 18]. Overproduction, over-aggregation, and inadequate breakdown of extracellular fibrillin are all thought to be implicated in the deposition of pseudoexfoliative material (PXM) on anterior segment structures in eyes with PEX [19, 20].

PXM accumulations mechanically weaken the zonular lamella and impair zonular anchoring to the epithelial basement membrane at both its origin and insertion [21]. Because zonules mainly are composed of elastic fibers and patients with PEX exhibit an increase in elastinolysis, the disease likely also enzymatically weakens the zonules [22]. Zonular disarticulation, from the anchoring points at the basement membranes of the pars plicata, pars plana, or lens capsule initially produces phacodonesis and finally, when enough zonules are breached, lens capsule dislocation and displacement [3, 23, 24].

In a retrospective case series of 86 IOLs explanted because of late ITB dislocation, Davis et al. [3] reported that 50% of the IOLs were explanted after dislocation in the setting of PEX. Hayashi et al., found that out of the 38 eyes that experienced ITB dislocation, PEX was in 17 eyes (44.7%) and out of the 24 eyes that developed OOTB dislocation, only 2 eyes (8.3%) were diagnosed as PEX [2]. Fernandez

et al. [5] reported that PEX was present in 10 eyes (16.4%) and considered as the second most important risk factor in their sample after axial myopia. Fernandez et al. [5] mentioned that Lorente et al. [25], in another study also performed in Spain, showed that PEX was found in 66.6% of the cases (30 eyes). This emphasizes that PEX incidence depends highly on the geographical location, even within a small country such as Spain.

In our study, PEX was determined to be found in 13 eyes (25%) [the third major risk factor for all cases (52 eyes)]. PEX was mainly ITB dislocation group in 11 eyes (30.56%) and OOTB in two eyes (12.50%). Our incidence of PEX differs than other previous studies, and we agree with Fernandez et al' suggestion of geographical variance of PEX incidence.

Davis et al. [3] founded that the mean age of patients with VRS leading to spontaneous dislocation was 68 years, and the mean age of patients with PEX leading to spontaneous dislocation was 81 years. This age difference is statistically significant ($P = 0.01$). In our study, we confirmed that the mean age of patients with VRS leading to spontaneous dislocation was 64.69 years, and the mean age of patients with PEX leading to spontaneous dislocation was 79.7 years. Also, there is statistically significant difference between the mean age of patients with PEX and other patients due to other causes at the primary IOL implantation ($P = 0.0001$) and at the time of secondary implantation ($P = 0.001$). In addition, there was statistically significant difference between patients with PEX and other patients as regards the duration between primary IOL implantation and secondary IOL implantation ($P = 0.03$). Patients with PEX were significantly older than other patients because significant PEX is rare until age of 70 years.

Atopic dermatitis was present in 3 eyes (8.33%) of ITB group and in 2 eyes (12.50%) of OOTB group. The prevalence of atopic dermatitis has been increasing, with most of the patients we see being young. In a young person, rubbing and slapping the eyes can cause a break in the peripheral retina [26], whereas in an elderly person, zonular rupture can result [27]. The rupture of Zinn's zonule was likely caused by the trauma produced by slapping the eyelids and the weakness of the zonule associated with aging and atopic disease [27]. Surgeons perform cataract surgery in an elderly patient with facial atopic dermatitis should be aware of this possible complication.

Fernandez et al. [5] found that most of the patients who underwent explantation due to late IOL dislocation were males (68.9%). Their results were confirmed by our study in which males were more common (42 eyes = 80.77%) than females (10 eyes = 19.23%) in both groups. This surprising result has also been found by other authors [2, 9, 28]. This is difficult to explain because more women than men undergo cataract surgery and have PEX [29, 30]. Thus, some investigators suggest that there may be a gender-related difference that results in weaker zonules in men or may be that males are more prone to ocular trauma that might have happened a long time ago and was forgotten at the time of cataract surgery [28].

In conclusion, patients of ITB dislocation group were significantly older than OOTB dislocation group at the time of initial IOL implantation and at the time of exchange surgery. IOL dislocation is more common among males than females in both groups. The possible risk factors for ITB dislocation group were VRS (33.33%), PEX (30.56%), axial myopia (30.56%), atopic dermatitis (8.33%), and postoperative trauma (5.55%). The possible risk factors for OOTB dislocation group were axial myopia (43.75%), VRS, postoperative trauma (18.75%), PEX (12.50%), and atopic dermatitis (12.50%). Overlap between the possible risk factors was determined in some cases. The most prevalent risk factors for all cases were axial myopia (34.61%), VRS (30.77%), and PEX (25%).

Compliance with ethical standards

Conflict of interest We wish to confirm that there are no known conflicts of interest associated with this publication, and there has been no significant financial support for this work that could have influenced its outcome.

Ethical approval All procedures performed in study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.

References

1. Jakobsson G, Zetterberg M, Lundstrom M, Stenevi U, Grenmark R, Sundelin K (2010) Late dislocation of in-the-bag and out-of-the bag intraocular lenses: ocular and surgical characteristics and time to lens repositioning. J Cataract Refract Surg 36:1637–1644

2. Hayashi K, Hirata A, Hayashi H (2007) Possible predisposing factors for in-the-bag and out-of-the-bag intraocular lens dislocation and outcomes of intraocular lens exchange surgery. Ophthalmology 114:969–975
3. Davis D, Brubaker J, Espandar L, Stringham J, Crandall A, Werner L et al (2009) Late in-the-bag spontaneous intraocular lens dislocation: evaluation of 86 consecutive cases. Ophthalmology 116:664–670
4. Smith SG, Lindstrom RL (1985) Malpositioned posterior chamber lenses: etiology, prevention, and management. J Am Intraocul Implant Soc 11:584–591
5. Fernandez-Buenaga R, Alio JL, Perez-Ardoy AL, Larrosa-Quesada A, Pinilla-Cortes L, Barraquer R et al (2013) Late in-the-bag intraocular lens dislocation requiring explantation: risk factors and outcomes. Eye (Lond) 27:795–801 **(quiz 802)**
6. Jakobsson G, Zetterberg M, Sundelin K, Stenevi U (2013) Surgical repositioning of intraocular lenses after late dislocation: complications, effect on intraocular pressure, and visual outcomes. J Cataract Refract Surg 39:1879–1885
7. Shigeeda T, Nagahara M, Kato S, Kunimatsu S, Kaji Y, Tanaka S et al (2002) Spontaneous posterior dislocation of intraocular lenses fixated in the capsular bag. J Cataract Refract Surg 28:1689–1693
8. Matsumoto M, Yamada K, Uematsu M, Fujikawa A, Tsuiki E, Kumagami T et al (2012) Spontaneous dislocation of in-the-bag intraocular lens primarily in cases with prior vitrectomy. Eur J Ophthalmol 22:363–367
9. Gross JG, Kokame GT, Weinberg DV (2004) In-the-bag intraocular lens dislocation. Am J Ophthalmol 137:630–635
10. Brilakis HS, Lustbader JM (2003) Bilateral dislocation of in-the-bag posterior chamber intraocular lenses in a patient with intermediate uveitis. J Cataract Refract Surg 29:2013–2014
11. Yamazaki S, Nakamura K, Kurosaka D (2001) Intraocular lens subluxation in a patient with facial atopic dermatitis. J Cataract Refract Surg 27:337–338
12. Hayashi K, Hayashi H, Matsuo K, Nakao F, Hayashi F (1998) Anterior capsule contraction and intraocular lens dislocation after implant surgery in eyes with retinitis pigmentosa. Ophthalmology 105:1239–1243
13. Laude A, Agrawal A (2011) Spontaneous partial dislocation of an aphakic capsular bag in high myopia. J Cataract Refract Surg 37:427–428 **(author reply 428–429)**
14. Hirata A, Okinami S, Hayashi K (2011) Occurrence of capsular delamination in the dislocated in-the-bag intraocular lens. Graefes Arch Clin Exp Ophthalmol 249:1409–1415
15. Cheng HM, Singh OS, Kwong KK, Xiong J, Woods BT, Brady TJ (1992) Shape of the myopic eye as seen with high-resolution magnetic resonance imaging. Optom Vis Sci 69:698–701
16. Wilbrandt HR, Wilbrandt TH (1994) Pathogenesis and management of the lens-iris diaphragm retropulsion syndrome during phacoemulsification. J Cataract Refract Surg 20:48–53
17. Gimbel HV, Condon GP, Kohnen T, Olson RJ, Halkiadakis I (2005) Late in-the-bag intraocular lens dislocation: incidence, prevention, and management. J Cataract Refract Surg 31:2193–2204
18. Clark A, Morlet N, Ng JQ, Preen DB, Semmens JB (2011) Whole population trends in complications of cataract surgery over 22 years in Western Australia. Ophthalmology 118:1055–1061
19. Sein J, Galor A, Sheth A, Kruh J, Pasquale LR, Karp CL (2013) Exfoliation syndrome: new genetic and pathophysiologic insights. Curr Opin Ophthalmol 24:167–174
20. Lee RK (2008) The molecular pathophysiology of pseudoexfoliation glaucoma. Curr Opin Ophthalmol 19:95–101
21. Conway RM, Schlotzer-Schrehardt U, Kuchle M, Naumann GO (2004) Pseudoexfoliation syndrome: pathological manifestations of relevance to intraocular surgery. Clin Exp Ophthalmol 32:199–210
22. Zenkel M, Poschl E, von der Mark K, Hofmann-Rummelt C, Naumann GO, Kruse FE et al (2005) Differential gene expression in pseudoexfoliation syndrome. Invest Ophthalmol Vis Sci 46:3742–3752
23. Leung VC, Singh H, Ahmed II (2015) Inter-eye differences in patients with pseudoexfoliation syndrome presenting with intraocular lens dislocation. Ophthalmology 122:480–485
24. Shingleton BJ, Yang Y, O'Donoghue MW (2013) Management and outcomes of intraocular lens dislocation in patients with pseudoexfoliation. J Cataract Refract Surg 39:984–993
25. Lorente R, de Rojas V, Vazquez de Parga P, Moreno C, Landaluce ML, Dominguez R et al (2010) Management of late spontaneous in-the-bag intraocular lens dislocation: retrospective analysis of 45 cases. J Cataract Refract Surg 36:1270–1282
26. Azuma N, Hida T, Katsura H, Takeuchi S, Danjo S, Tano Y (1996) Retrospective survey of surgical outcomes on rhegmatogenous retinal detachments associated with atopic dermatitis. Arch Ophthalmol 114:281–285
27. Iijima Y, Wagai K, Matsuura Y, Ueda M, Miyazaki I (1989) Retinal detachment with breaks in the pars plicata of the ciliary body. Am J Ophthalmol 108:349–355
28. Monestam EI (2009) Incidence of dislocation of intraocular lenses and pseudophakodonesis 10 years after cataract surgery. Ophthalmology 116:2315–2320
29. Klein BE, Klein R, Moss SE (1997) Incident cataract surgery: the Beaver Dam eye study. Ophthalmology 104:573–580
30. Astrom S, Linden C (2007) Incidence and prevalence of pseudoexfoliation and open-angle glaucoma in northern Sweden: I. Baseline report. Acta Ophthalmol Scand 85:828–831