Malaysian Journal of Ophthalmology

© Malaysian Journal of Ophthalmology 2020; 2:83-95
Original article

Iris-claw intraocular lens, scleral-fixated intraocular lens, and angle-supported anterior chamber intraocular lens in Hospital Melaka: a four-year retrospective analysis

Chin Sern **Chan**[1,2], Szu May **Chua**[1], Siti Zakiah **Md Khair**[1], Nor Fadzillah **Abdul Jalil**[1], Raja Norliza **Raja Omar**[1], Othmaliza **Othman**[2]

[1]Ophthalmology Department, Hospital Melaka, Melaka, Malaysia; [2]Ophthalmology Department, Hospital Canselor Tuanku Muhriz UKM, Kuala Lumpur, Malaysia

Abstract

Introduction: Cataract surgery with insufficient capsular support has become an intense challenge to surgeons in intraocular lens (IOL) selection. Anterior chamber IOL (ACIOL), iris-claw (Artisan) IOL, and scleral-fixated IOL (SFIOL) are the three common types of IOL used. However, each type of IOL has its own characteristics and different clinical requirements. IOL selection is important in ensuring good visual outcome.
Purpose: The purpose of this study is to compare the duration or surgery, visual outcomes, and complications among ACIOL, Artisan IOL, and SFIOL.
Study design: Retrospective comparative analysis.
Material and methods: This is a four-year retrospective analysis of patients who underwent either ACIOL, Artisan IOL, or SFIOL implantation between January 2014 and January 2018. Patients were divided into ACIOL, Artisan, and SFIOL groups. Demographic data, duration of surgery, preoperative and postoperative visual acuity, and postoperative complications were identified and compared among different groups.
Results: Sixty-four eyes from 58 patients were analysed: twenty (31.3%) eyes with ACIOL, 28 (43.8%) eyes with Artisan, and 16 (25%) eyes with SFIOL. Mean surgery

Correspondence: Dr. Chin Sern Chan, MBBS, Ophthalmology Department, Hospital Melaka, Jalan Mufti Haji Khalil, 75400 Melaka, Malaysia.
E-mail: cschancs@gmail.com

times for ACIOL, Artisan, and SFIOL were: 61 ± 27.8, 64 ± 26.9, and 104.1 ± 46.8, respectively. SFIOL showed significantly longer surgery time than the ACIOL and Artisan groups ($p < 0.05$). There was no significant difference in surgery time between the ACIOL and Artisan groups ($p > 0.05$). The Artisan group showed significantly better visual recovery at postoperative 1 week than both the ACIOL and SFIOL groups (Artisan *vs* ACIOL: 6/18 *vs* 6/24, $p < 0.05$; Artisan *vs* SFIOL: 6/18 *vs* 6/60, $p < 0.05$). However, final best-corrected visual acuity (BCVA) at two months was comparable among all three groups with a median BCVA of 6/9. Elevated intraocular pressure occurred in all IOL groups, retinal detachment developed in the Artisan and SFIOL groups, epiretinal membrane developed in the ACIOL and SFIOL groups, corneal decompensation developed in the ACIOL group only. Cystoid macular oedema and IOL tilt occurred in SFIOL only.
Conclusions: All three groups of IOL showed comparable good visual outcomes. The decision of IOL selection should be based on patients' clinical condition and availability of surgical skill and resources.

Keywords: anterior chamber intraocular lens, Artisan intraocular lens, capsular support, cataract surgery, scleral-fixated intraocular lens

Kanta intraokular cakar iris, kanta intraokular fiksasi scleral, dan kanta intraokular ruang anterior dengan sokongan sudut di Hospital Melaka: analisis retrospektif empat tahun

Abstrak

Pengenalan: Pemilihan lensa intraokular (IOL) bagi komplikasi pembedahan katarak tanpa sokongan kapsular yang mencukupi merupakan cabaran besar bagi pakar oftalmologi.. Lensa intraokular kamar anterior (ACIOL), IOL cakar-iris (Artisan) , dan IOL fiksasi scleral (SFIOL) adalah tiga jenis IOL yang biasa digunakan. Walau bagaimanapun, setiap jenis IOL mempunyai ciri yang tersendiri dan keperluan klinikal yang berbeza. Pemilihan IOL penting dalam memastikan hasil visual yang baik.
Tujuan: Tujuan kajian ini adalah untuk membandingkan jangka masa pembedahan, hasil ketajaman penglihatan, dan komplikasi di antara ACIOL, Artisan IOL, dan SFIOL.
Reka bentuk kajian: Analisis perbandingan retrospektif.
Bahan dan kaedah: Ini adalah analisis retrospektif selama empat tahun ke atas

pesakit yang menjalani implantasi ACIOL, Artisan IOL, atau SFIOL antara Januari 2014 dan Januari 2018. Pesakit dibahagikan kepada kumpulan ACIOL, Artisan, dan SFIOL. Data demografi, tempoh pembedahan, ketajaman penglihatan sebelum dan pasca pembedahan, dan komplikasi pasca pembedahan dikenal pasti dan dibandingkan di antara kumpulan yang berbeza.
Dapatan: Enam puluh empat mata dari 58 pesakit dianalisis: 20 (31.3%) mata dengan ACIOL, 28 (43.8%) mata dengan Artisan, dan 16 (25%) mata dengan SFIOL. Purata jangka masa pembedahan untuk ACIOL, Artisan, dan SFIOL adalah: 61 ± 27.8, 64 ± 26.9, dan 104.1 ± 46.8 minit. Implantasi SFIOL mengambil masa pembedahan yang jauh lebih lama daripada kumpulan ACIOL dan Artisan ($p < 0.05$). Tidak ada perbezaan yang signifikan dalam jangkamasa pembedahan antara kumpulan ACIOL dan Artisan ($p > 0.05$). Kumpulan Artisan menunjukkan pemulihan penglihatan yang lebih baik pada 1 minggu selepas pembedahan daripadakumpulan ACIOL dan SFIOL (Artisan vs ACIOL: 6/18 vs 6/24, $p <0.05$; Artisan vs SFIOL: 6/18 vs 6/60, $p < 0.05$). Wal au bagaimanapun, ketajaman penglihatan dengan pembetulan yang baik (BCVA) pada dua bulan selepas implantasi adalah setara di antara ketiga-tiga kumpulan dengan BCVA sekitar 6/9. Peningkatan tekanan intraokular (IOP) berlaku pada semua kumpulan IOL, lekang retina didapati dalam kumpulan Artisan dan SFIOL, pembentukan membran epiretinal terjadi dalam kumpulan ACIOL dan SFIOL, dekompensasi kornea pula berlaku dalam kumpulan ACIOL sahaja. Edema makular sistoid dan IOL kedudukan senget berlaku dengan SFIOL sahaja.
Kesimpulan: Ketiga-tiga kumpulan IOL menunjukkan hasil ketajaman penglihatan yang baik setelah implantasi. Keputusan pemilihan IOL harus berdasarkan keadaan klinikal pesakit, kemahiran pakar oftalmologi dan sumber yang ada.

Kata kunci: kanta intraokular Artisan, kanta intraokular ruang anterior, kanta intraokular fiksasi skleral, pembedahan katarak, sokongan kapsular

Introduction

Cataract is the leading cause of blindness in the world. According to World Health Organisation (WHO) Global Initiative for the Elimination of Avoidable Blindness, Vision 2020, global cataract prevalence is estimated to be 50 million and the estimated number of cataract surgeries performed worldwide is approximately 32.0 million, with a rate of 4000 cases per million population per year by year, 2020.[1,2] The 11th Report of the National Eye Database reported that in 2017, the total number of cataract surgeries performed at hospitals under the Malaysian Ministry of Health was 58,273.[3] As a result, cataract surgery is the most commonly performed surgery among ophthalmologists worldwide. Intraocular lens (IOL) are preferentially implanted into the capsular bag in uncomplicated cataract surgery.

However, in cases with insufficient capsular support due to congenital or secondary causes such as trauma, pseudoexfoliation, iatrogenic zonulolysis, or intraoperative posterior capsule rupture, surgeons are under intense challenge in terms of intraocular lens (IOL) selection. The modern treatment modalities for cataract surgery without capsular support have been evolving for the past decade. Several types of IOL were developed, include the angle-supported anterior chamber IOL (ACIOL), the scleral-fixated IOL (SFIOL), and the iris-claw IOL (IC-IOL).

ACIOL history began in 1952 with the Baron IOL. However, the closed-loop design of this IOL has a tarnished reputation of causing a variety of complications such as pseudophakic corneal decompensation, pigment dispersion, chronic iritis, cystoid macular oedema, and uveitis glaucoma hyphema (UGH) syndrome.[4,5] Subsequent generations of ACIOL in the 1990s with improved design in terms of reducing fixation point to three- or four-point, well-polished and haptic without holes have demonstrated good surgical outcomes and a reduction in the above mentioned complications.[6,7]

Sutured SFIOL is implanted by suturing through the *pars plana*. This technique was first described by Girard in 1981.[7] This method can be used in patients who are contraindicated for ACIOL implantation, such as glaucoma patients or patients with inadequate iris support. The IOL is placed in its anatomical location and reduces ACIOL-related complications. However, complications such as suture erosion and exposure, IOL decentration or tilting, cystoid macular oedema, retinal detachment, and endophthalmitis have been reported.[9-11] In addition, this method is limited by the availability of surgical skill and requires a steep learning curve.

IC-IOL was initially developed by Worst in the 1980s.[12,13] The lens is used in aphakic eyes with insufficient capsular support. The implantation is technically less demanding compared to sutured SFIOL. It can be anchored on the anterior iris surface or by means of retropupillary placement. Theoretically, the anterior chamber IC-IOL is located nearer to the corneal endothelium and causes relatively more endothelial cell loss compared to retropupillary fixation. However, studies did not find any evidence of corneal decompensation or significant difference in endothelial cell loss between these two methods of fixation.[14-16] Both methods showed comparable visual acuity outcomes.

The above three methods are the current treatment modalities for cases with no capsular support in Hospital Melaka and none of the above lenses is without drawbacks. Currently, there is a paucity of studies that compare these three types of IOLs. The aim of this study was to analyse the outcomes and complications of these three lenses during primary implantation, where the IOL was implanted immediately after removal of the crystalline lens in a single procedure, and secondary implantation, in which the removal of the crystalline lens and IOL implantation were performed as two separate procedures.

Material and methods

Institutional review board approval was not required for the present study. This was a retrospective analysis reviewing all patients that underwent either ACIOL, SFIOL, or IC-IOL (Artisan, Ophtec BV, Groningen, Netherlands) implantation at the Department of Ophthalmology, Hospital Melaka, Malaysia from January 2014 to January 2018. Patients were identified by reviewing the past operations list and patients' clinical record were reviewed. Both primary and secondary implantations were included in this study. Patients with pre-existing corneal scar, maculopathy, optic neuropathy, retinal detachment, and advanced glaucoma were excluded. All patients had a minimum follow-up of at least three months postoperatively. The patients were divided into ACIOL, Artisan, and SFIOL groups. Preoperative data included demographic data, Snellen visual acuity, and full ophthalmic examinations. Postoperative data included unaided visual acuity at one week and two months postoperative. Final best-corrected visual acuity was assessed at two months postoperative. Postoperative complications were also included.

Results

From January 2014 to January 2018, a total of 64 eyes in 58 patients were implanted with either ACIOL, IC-IOL (Artisan), or SFIOL due to lack of capsular support. Seven eyes were excluded due to pre-existing corneal, optic nerve, or retinal pathology as mentioned above. The models of ACIOL used were J&J AC51L (Johnson & Johnson, New Jersey, United States), FREEDOM PMS 603 (Freedom Ophthalmic Pvt Ltd, Tamil Nadu, India), Zeiss CT13A (Carl Zeiss Meditec AG, Jena, Germany) and AUROLAB AUROLENS A5520 (Aurolab, Tamil Nadu, India). The models of IC-IOL used were OPHTEC ARTISAN 205 (Ophtec B.V, Groningen, Netherlands); and types of SFIOL used were MORCHER 90L, 67G (Morcher GmbH, Stuttgart, Germany) and ALCON CZ70BD (Alcon, Geneva, Switzerland). All the surgeries were performed by 14 different surgeons. All patients received a minimum follow-up time of three months.

All the ACIOLs were implanted in a primary setting. Twenty-two cases involving Artisan lens were primary implantation and six cases were secondary implantation. Ten SFIOL implantations were primary implantations and six were secondary implantations. The demographic data and clinical information for each group of patients is summarized in Table 1. There was no significant difference in distribution of sex among different groups of IOLs. Patients who underwent Artisan IOL implantation were significantly younger than patients who received ACIOL or SFIOL ($p < 0.05$). However, there was no significant difference in mean age between the ACIOL and SFIOL groups ($p > 0.05$). The duration of SFIOL implantation was significantly longer than for the ACIOL and Artisan IOL groups ($p < 0.05$), whereas there

was no significant difference in duration of surgery between the ACIOL and Artisan groups ($p > 0.05$).

Overall, surgeons with at least five years of experience spent less time in surgery than younger surgeons, but the difference was not statistically significant (66.6 min [± 37.4] *vs* 72.9 min [± 27.3], $p = 0.260$).

Table 1. Demographic and preoperative characteristics

Parameter	ACIOL	Artisan	SFIOL	Total
n (%)	20 (31.3)	28 (43.8)	16 (25.0)	64
Mean age (SD)	68.6 (8.2)	38.5 (30.1)	61.5 (9.0)	
Sex (n)				
Male	12	21	13	46
Female	8	7	3	18
Indications of surgery				
Aphakia post lens removal	3	6	6	15
Subluxated lens	9	12	7	28
Dislocated IOL	0	8	3	11
Posterior capsule rupture	3	0	0	3
Posterior capsule rupture +				
Zonulodialysis	5	0	0	5
Congenital cataract	0	2	0	2
Mean duration of surgery (SD)	61.0 (27.8)	64.0 (26.9)	104.1 (46.8)	
Primary implantation	61.0 (27.8)	66.4 (26.7)	101.5 (68.7)	
Secondary implantation	-	55.3 (28.2)	64.3 (15.3)	

Preoperative and postoperative outcomes among all three different IOLs are summarized in Table 2. There was a significant difference in visual acuity at preoperative and one week postoperative. However, there was no significant difference in terms of visual acuity at two months postoperative. The results were compared separately using the Mann-Whitney U test with Bonferroni correction. There was a significant difference in preoperative visual acuity when comparing between the ACIOL and SFIOL groups. However, there was no difference when comparing the Artisan group with ACIOL and SFIOL. At one week postoperative, the Artisan group

showed significantly better visual acuity than both the ACIOL and SFIOL groups (Artisan *vs* ACIOL: 6/18 *vs* 6/24, $p < 0.05$; Artisan *vs* SFIOL: 6/18 *vs* 6/60, $p < 0.05$). There was no difference in visual acuity between the SFIOL and ACIOL groups at one week postoperative (SFIOL *vs* ACIOL: 6/60 *vs* 6/24, $p > 0.05$). Final best-corrected visual acuity (BCVA) at two months after surgery did not show any significant difference among the three types of IOL. Seventy-five percent (75%) of eyes which were implanted with ACIOL achieved final BCVA of 6/12 or better, whereas for the Artisan and SFIOL groups, the eyes with final BCVA of 6/12 or better were 89.3% and 81.3%, respectively.

Table 2. Comparison of visual acuity between Artisan, SFIOL, and ACIOL groups

Group	**Median**		
	Preoperative	**Postoperative 1 week**	**Postoperative 2 months**
Artisan group	6/24 (6/6 – CF)	6/18 (6/9 – 2/60)	6/9 (6/6 – 2/60)
SFIOL group	6/12 (6/6 – CF)	6/60 (6/12 – PL)	6/9 (6/6 – 6/60)
ACIOL group	3/60 (6/9 – PL)	6/24 (6/18 – PL)	6/9 (6/6 – CF)
X^2 (df	13.308 (2)	12.858 (2)	0.997 (2)
p- value	0.001	0.002	0.607

Kruskal-Wallis test

The postoperative complications that were observed in this study are summarized in Table 3. The overall complication rate for these three types of IOL was 21.9%. Elevated intraocular pressure (IOP) was the most common complication encountered, accounting for 7.8% of the cases. Elevated IOP developed in all three IOL groups and was detected between two and eight weeks postoperative. IOP elevation was transient, and only required temporary topical antiglaucoma treatment, except for two eyes. Both eyes with persistent high IOP developed after SFIOL implantation. A total of four (6.25%) eyes developed epiretinal membrane in the ACIOL and SFIOL groups. One eye with ACIOL developed corneal decompensation at 15 months postoperative. One case of retinal detachment developed in Artisan and SFIOL group. In the SFIOL group, there was one case of cystoid macular oedema (CMO). There were two eyes with tilted or decentred IOL in the SFIOL group.

Table 3. Complications by IOL type

Complications	ACIOL (n)	Artisan (n)	SFIOL (n)	Total (n)
Elevated IOP	1	3	1	5
Retinal detachment	0	1	1	2
CMO	0	0	1	1
Corneal decompensation	1	0	0	1
ERM	2	0	2	4
IOL tilt	0	0	2	2

CMO: cystoid macular oedema; ERM: epiretinal membrane ; IOP: intraocular pressure

Discussion

Insufficient capsular support can develop prior to or during cataract surgery. Choosing an appropriate IOL is crucial for surgical outcomes. Angle-supported ACIOL, IC-IOL (Artisan), and SFIOL are the three modalities used for cases with poor capsular support in Hospital Melaka. This study compared the surgical time based on surgeon experience, visual outcomes, and complications among these three types of IOLs. All three lenses showed comparable visual outcomes, with different surgical times and different postoperative complications.

SFIOL implantation demonstrated significantly longer surgical time than ACIOL and Artisan. The secondary implantation SFIOL group again showed longer duration than the Artisan group, but the difference was not statistically significant. In studies by Teng *et al.*, Mahajan *et al.*, and a meta-analysis comparing IC-IOL and SFIOL in aphakic eyes, the authors concluded that IC-IOL implantation is a more "time-saving" surgery than SFIOL implantation.[17-19] SFIOL implantation demands considerable surgical skill, which contributed to the longer surgical time compared to IC- IOL implantation, which is relatively easier and requires a shorter learning curve. The insignificant result for secondary implantation in our study may be attributed by different surgeons performing the surgery, which was not the case in the above prospective studies. In terms of surgeon experience and duration of surgery, surgeons who had at least five years of experience spent less time in surgery compared to those with less than five years of experience, but the results were statistically insignificant.

At one week after the surgery, the Artisan group achieved better visual acuity than the ACIOL and SFIOL groups. Visual recovery was significantly better in the Artisan group than in the other groups. However, the final BCVA at two months after surgery was comparable among all three groups of IOL with a median visual acuity of 6/9. There is a paucity of trials comparing these three types of IOL in cases

with impaired capsular support given that most trials compared only two out of the three groups. All the studies demonstrated insignificant differences in final visual outcome among different types of IOL.[17-19,20]Teng *et al.* conducted a prospective study in 45 eyes comparing visual outcomes between the Artisan IC-IOL and sutured posterior chamber intraocular lens (PCIOL) sulcus fixation. The results suggested that the Artisan IOL had significant BCVA at day one post-surgery, but subsequent review on corrected visual acuity at one month and three months after surgery did not find any significant difference among two groups of IOL.[17] This again suggests that the Artisan IOL provides better and faster visual recovery than SFIOL, but both IOLs ultimately achieved similar final visual acuity. A recent meta-analysis by Li *et al.* involving 14 studies and 845 eyes did not find any significant difference in postoperative BCVA between SFIOL and iris-fixated IOL.[20] Two retrospective studies comparing visual outcomes between ACIOL and SFIOL showed different results. Donaldson *et al.* did not find any significant difference in final BCVA in 181 eyes implanted with SFIOL or ACIOL.[6] However, a retrospective analysis of 36 eyes undergoing SFIOL or ACIOL implantation by Kwong *et al.* suggested that primary implantation of ACIOL achieved significantly better postoperative BCVA than SFIOL implantation.[21] The author suggested the possible cause of less favourable visual outcome in SFIOL was likely due to irreversible phototoxicity from the operating microscope, which had been proven by angiographic study, given the relatively longer operating time in SFIOL implantation or higher incidence of early pseudophakic cystoid macular oedema.[21,22] In addition, SFIOL implantation required relatively more intraocular manipulation intraoperatively, which ultimately resulted in more intense intraocular inflammation and higher risk of postoperative cystoid macular oedema.

Seventy-five percent (75%) of the eyes from the ACIOL group, 89.3% from the Artisan group, and 81.3% from the SFIOL group achieved a visual acuity of 6/12 or better. The results for ACIOL were similar to those reported in prospective and retrospective studies, which was between 68% and 79%.[23,24] For the SFIOL group, the percentage of eyes that had final BCVA of 6/12 or better was within the range for the outcomes of other studies, between 43% and 80.9%.[25-28] Lee *et al.* conducted a retrospective study that demonstrated that more eyes achieved BCVA of 6/12 or better in secondary implantation compared to primary implantation of SCIOL (58.6% *vs* 76.0%), but the result was statistically insignificant.[28]

The overall complication rate in our study was 21.9%. Elevated IOP was the most common complication, which was observed in all study groups, accounting for five (7.8%) of the overall cases. Three of the five cases required temporary antiglaucoma treatment. The remaining two eyes with persistent high IOP were from the SFIOL group. One developed prolonged postoperative inflammation requiring prolonged topical corticosteroid therapy and antiglaucoma therapy, another eye had to undergo glaucoma drainage device implantation to control IOP. The elevated IOP might be directly caused by prolonged inflammation or indirectly due to prolonged

corticosteroid use. The Laser Flare Cell Meter Study by Cellini *et al.*[29] compared the severity of intraocular inflammation among ACIOL, SFIOL, and iris-fixated IOL using a laser cell flare meter, which is a more objective and quantitative measurement. The results demonstrated that SFIOL had significantly more severe subclinical intraocular inflammation than the other two IOLs up to 90 days.[29] The eye that underwent glaucoma drainage device implantation was diagnosed preoperatively as primary angle-closure suspect. The narrowed anterior chamber angle might be further compromised in subclinical intraocular inflammation after surgery, causing persistent IOP elevation. One eye from each of the SFIOL and Artisan groups developed postoperative retinal detachment (RD). Our results for postoperative RD rates in the SFIOL group were less favourable compared to other studies which range between 3.7% to 4.8%.[21,24] This is due to our study having a relatively smaller sample size compared to other studies. Anterior vitrectomy was performed in both surgeries, which might contribute to development of retinal break and eventually RD. In addition, SFIOL implantation involves more intraocular manipulation, which may cause vitreous traction to retina which further increases the risk of retinal break and RD. Corneal decompensation developed in one eye (4.7%) with ACIOL 15 months after surgery. IOL was tilted or decentred in two eyes from the SFIOL group, but both IOLs were stable and patients had a BCVA of 6/12.

All three types of IOLs in this study were the common IOLs available for cataract surgery with impaired capsular support. At times, there is no consensus on which is the most suitable IOL to choose in cases without lens capsule in view of their comparable visual outcome. All three lenses have their own advantages and disadvantages. ACIOL and Artisan IOL implantations are technically less demanding and less sophisticated procedures, ultimately reducing the duration of surgery and postoperative inflammation. The Artisan IOL has faster postoperative visual recovery compared to the other two groups of IOL. This characteristic is especially important for patients that need faster postoperative visual recovery, such as paediatric patients, to minimize the risk of amblyopia. In addition, the Artisan IOL is relatively easier in terms of IOL exchange when necessary. ACIOL has been less commonly used due to its history of sight-threatening complications such as UGH and corneal decompensation, but with improved lens design that minimizes the risks of complications and satisfactory visual outcome, the role of ACIOL in cases with insufficient capsular support should not be overlooked. However, both lenses require adequate iris support and are contraindicated in eyes with shallow anterior chambers and glaucoma. SFIOL preserves the eye anatomy its placement in the posterior chamber. It is located further away from the corneal endothelium and ultimately reduces the risk of endothelial cell loss. It can be used in cases with inadequate iris support on top of the absence of capsular support. However, it requires a steep learning curve and is more technically demanding in terms of surgical skill. It is more time-consuming and manipulation of the vitreous increases the risk of posterior segment complications.

The limitations of this study are its retrospective nature, small sample size for each group, different age groups between the IOL groups, surgeries being performed by different surgeons, and wide range of follow-up duration. Documentation of the clinical findings was done by different individuals and data collection was not standardized. This may have led to bias and incomplete data collection. However, this is the first analysis of all three types of different IOLs in Malaysia that are commonly used in cases without capsular support.

Conclusions

All three types of IOL provide good visual outcomes in cataract surgeries with poor capsular support when the appropriate IOL is used. Decision on IOL selection should be based on the patient's clinical condition together with available surgical skills and resources.

Acknowledgments

We wish to thank PPK Jamaliah Ahmad for her valuable assistance in searching for the patients' medical records.

The authors have no conflicts of interest to declare. Institutional review board approval was not required for the present study.

References

1. World Health Organisation. Global initiative for the elimination of avoidable blindness. An informal consultation. WHO/PBL/97.61. WHO:Geneva;1997.
2. Pararajasegaram R. Vision 2020 - the right to sight: from strategies to action. Am J Ophthalmol. 1999:128:359-360.
3. Mohamad Aziz Salowi, Goh PP, editors (Eds) Eleventh Report of the National Eye Database 2017. Kuala Lumpur;2017.
4. Smith PW, Wong SK, Stark WJ. Complications of semiflexible, closed-loop anterior chamber intraocular lenses. Arch Ophthalmol 1987;105:52-57.
5. Dahee KP, Abbey AM, Williams GA. Management of dislocated intraocular lenses in eyes with insufficient capsular support. Curr Opin Ophthalmol. 2016;27:191-195.
6. Clemente P. Sekundäre Vorderkammerlinsenimplantation-Erfahrungen bei 305 Implantationen über 10 Jahre. In: Neuhann T, Hartmann C, Rochels R, editors. Trans of the 6th Congress of the German Intraocular Lens Implant Soc (DGII). Berlin, Springer-Verlag; 1993. p. 199–204.
7. Donaldson KE, Gorscak JJ, Budenz DL, et al. Anterior chamber and sutured posterior chamber intraocular lenses in eyes with poor capsular support. J Cataract Refract Surg 2005;31:903-909

8. Girard JL. Pars plana phacoprosthsis (aphakic intraocular implant): a preliminary report. Ophthalmic Surg 1981;12:19-22.
9. Ebstein E. Suture problems. J Cataract Refract Surg 1989;15:116.
10. Davies EC, Pineda R. Complications of scleral-fixated intraocular lens. Semin Ophthalmol. 2018;33(1):23-28.
11. Sen P, S VK, Bhende P, et al. Surgical outcomes and complications of sutured scleral fixated intraocular lenses in pediatric eyes. Can J Ophthalmol. 2018;53(1):49-55.
12. Worst JGF. Iris claw lens. J Am Intraocul Implant Soc. 1980;6(22):166-167.
13. Worst JGF, Massaro RG, Ludwig HHH. The introduction of an artificial lens into the eye using Binkhorst's technique. Ophthalmologica. 1972;164(5):387-391.
14. Martinez AH, Gonzalez CVA. Iris-claw intraocular lens implantation: efficacy and safety according to technique. J Cataract Refract Surg. 2018;44(10):1186-1191.
15. Helvaci S, Demirduzen S, Oksuz H. Iris-claw intraocular lens implantation: anterior chamber versus retropupillary implantation. Indian J Ophthalmol. 2016; 64:45-49.
16. Choragiewicz T, Rejdak R, Grzybowski A et al. Outcomes of sutureless iris-claw lens implantation. J Ophthalmol 2016;2016: 7013709.
17. Teng H, Zhang H. Comparison of Artisan iris-claw intraocular lens implantation and posterior chamber intraocular lens sulcus fixation for aphakic eyes. Int J Ophthalmol. 2014;7(2):283-287.
18. Mahajam AR, Datti NP. Comparison of iris claw lens and scleral fixated intraocular lens in terms of visual outcome and complications. J Clin Biomed Sci. 2014;4(4):357-360.
19. Jing Wu, Guanlu Liang, Qianyin Zheng et al. Iris-claw intraocular lens and scleral-fixated posterior chamber intraocular lens implantation in correcting aphakia: A meta-analysis. Invest Ophthalmol Vis Sci. 2017; 58(9):3530-3538.
20. Li X, Ni S, Li S, et al. Comparison of three intraocular lens implantation procedures for aphakic eyes with insufficient capsular support: A network meta-analysis. Am J Ophthalmol. 2018;192:10-19.
21. Kwong YYY, Yuen HKL, Lam RF, et al. Comparison of outcomes of primary scleral-fixated versus primary anterior chamber intraocular lens implantation in complicated cataract surgeries. Ophthalmology 2007;114:80-85.
22. Lanzetta P, Menchini U, Virgili G, et al. Scleral fixated intraocular lenses: an angiographic study. Retina. 1998;18(6):515-20.
23. Bergman M, Laatikainen L. Long-term evaluation of primary anterior chamber intraocular lens implantation in complicated cataract surgery. Int Ophthalmol. 1996-97;20:295-299.
24. Collins JF, Gaster RN, Krol WF, et al. A comparison of anterior chamber and posterior chamber intraocular lenses after vitreous presentation during cataract surgery: The Department of Veterans Affairs Cooperative Cataract Study. Am J Ophthalmol. 2003;136:1-9.
25. Mittelviefhaus H, Witschel H. Transscleral suture fixation of posterior-chamber lenses after cataract extraction associated with vitreous loss. Ger J Ophthalmol. 1995;4(2):80-85.
26. Reddy JML. Scleral fixation IOL: outcome and complications. J Evolution Med Dent Sci. 2016;5(20):991-993
27. Haszcz D, Nowomiejska K, Oleszczuk A, et al. Visual outcomes of posterior chamber intraocular lens intrascleral fixation in the setting of postoperative and posttraumatic aphakia. BMC Ophthalmol. 2016;16(1):50.

28. Lee VYW, Yuen HKL, Kwok AKH. Comparison of outcomes of primary and secondary implantation of scleral fixated posterior chamber intraocular lens. Br J Ophthalmol. 2003;87:1459-1462.
29. Cellini M, Strobbe E, Toschi PG, et al. Secondary IOL implantation without capsular support: A laser flare cell meter study. ISRN Ophthalmol. 2012;2011:653246.