(38)

Results of implantation a new type of foldable anterior chamber intraocular lens

Wyniki implantacji nowego typu zwijalnej wewnątrzgałkowej soczewki przedniokomorowej

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Summary: In aphakic patients, lack of capsular support or insufficient capsular support require an implantation of an anterior chamber intraocular lens or a sclerally fixated lens. Rigid PMMA (polymethylmetacrylate) anterior chamber intraocular lenses or transscleral intraocular lenses require an incision 6.0-7.0 mm wide.

Purpose: Of this study was to evaluate anatomic and functional results of a new foldable acrylic anterior chamber intraocular lens (Acri.Lyc 15A, Acritec) through a small incision (2.8 mm).

Material and methods: The examined group consisted of 30 eyes in 30 patients, at the age from 48 to 87 years (mean 70.90 years, SD ± 10.57 years), who received a new type foldable acrylic anterior chamber intraocular lens (AC IOL). Examinations were performed before operation and 1-3 days, 1-2 weeks, 3-4 months, 6-8 months after the surgery. During all control examinations visual acuity, intraocular pressure, refraction, corneal endothelium density, pachymetry, keratometry, anterior and posterior segment of the eye were evaluated.

Results: Preoperative mean best corrected visual acuity (BCVA) was 0.32 ± 0.36 and increased to 0.63 ± 0.33, 6-8 months after the surgery. We observed that mean corneal endothelial cell density (ECD) gradually decreased in the postoperative period. We observed some minor complications after implantation of the AC IOL (e.g. corneal edema, Descemet folds, raised IOP, hyphaema, distorted pupil shape, "iris bombe", blood in the vitreous, displaced IOL and cystic macular edema), most of them were minor and did not influence the final results.

Conclusions: The application of foldable anterior chamber intraocular lenses through a small incision is a safe alternative for rigid PMMA anterior chamber intraocular lenses and transscleral intraocular lenses.

Key words: Aphakia, intraocular lenses, anterior chamber lenses, foldable lens, secondary implantation.

Streszczenie: Wstęp: w oczach bezsoczewkowych niedostateczne podparcie torebkowe lub jego brak powodują konieczność zastosowania soczewki wewnątrzgałkowej przedniokomorowej albo soczewki mocowanej do twardówki. Wszczepienie soczewki sztywnej z PMMA (polimetametakrylat) wymaga wykonania cięcia o szerokości 6,0-7,0 mm.

Cel: celem badania była ocena wyników anatomicznych i czynnościowych implantacji nowego typu zwijalnej akrylowej soczewki wewnątrzgałkowej (Acri.Lyc 15A, Acritec/Zeiss) wszczepianej przez małe cięcie (2,8 mm).

Materiał i metody: badaną grupę tworzyło 30 pacjentów (30 oczu) w wieku od 48 do 87 lat (średnio 70,90; SD ± 10.57), którzy mieli wszczepioną akrylową, zwijalną soczewkę przedniokomorową nowego typu.

Pacjentów badano przed zabiegiem, w okresie 1-3 dni po zabiegu, 1-2 tygodnie po zabiegu, 3-4 miesiące po zabiegu oraz 6-8 miesięcy po zabiegu. Badano skorygowaną ostrość wzroku, ciśnienie wewnątrzgałkowe, refrakcję, gęstość komórek śródbłonka, pachymetrię, a także oceniano odcinki gałki ocznej – przedni i tylny.

Wyniki: przedoperacyjna średnia ostrość wzroku z najlepszą korekcją (BCVA) wyniosła 0,32 (SD ± 0.36), a badanie końcowe (6-8 miesięcy po zabiegu) potwierdziło, że nastąpiła istotna poprawa – średnia BCVA wyniosła 0,63 (SD ± 0.33).

Stwierdzono stopniowy ubytek komórek śródbłonka rogówki po zabiegu. Zaobserwowano wystąpienie nielicznych powikłań pooperacyjnych – większość z nich była przejściowa i nie wpłynęła na końcową ostrość wzroku.

Wnioski: nowego typu zwijalna soczewka przedniokomorowa, wszczepiana przez małe cięcie, jest bezpieczną alternatywą dla sztywnych soczewek z PMMA przedniokomorowych lub mocowanych do twardówki.

Słowa kluczowe: bezsoczewkowość, soczewki wewnątrzgałkowe, soczewki przedniokomorowe, soczewka zwijalna, implantacja wtórna.

Introduction

The phacoemulsification technique of cataract surgery used in the recent years, which utilizes a small incision, as well as intracapsular implantation of intraocular lenses (IOLs) is currently perceived as the best practice pattern in cataract removal (1).

Nevertheless, there are cases in which intracapsular implantation of IOL is impossible. In aphakic patients, who have had an intracapsular cataract extraction (ICCE), in cases of posttraumatic cataract, in patients with subluxated or luxated crystalline lenses or IOLs and in eyes in which there was an intraoperative capsular rupture during phacoemulsification, the lack or insufficiency of capsular support make the implantation of IOL in the bag impossible. Such situations require using an alternative method of implant fixation.

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Implantation of an anterior chamber IOL, an IOL sutured to the iris, an iris-claw lens (according to Worst) or a sclerally fixated IOL is possible (2). To date, anterior chamber lenses and sclerally fixated lenses have gained the biggest number of advocates. Anterior chamber single piece PMMA IOLs require creating a wide incision for implantation (6.0 to 7.0 mm). It is possible to implant foldable posterior chamber IOLs sutured to the sclera through a 3 mm to 4 mm incision, however this technique is complex and time-consuming (2-4).

Taking into account the above mentioned information, it seemed reasonable to design and introduce to clinical practice a foldable anterior chamber lens, which could be used in aphakic eyes, with the optical power ranging from 10 D to 30 D, and which could be implanted through a 2.8-3.0 mm incision. The IOL was designed by W. Omulecki and M. Wilczynski, and it was given the name Acri.Lyc 15A. The next step was to introduce it to clinical practice as the first foldable anterior chamber lens for aphakic eyes. Such an IOL could be used either as a secondary implant in aphakic patients or as a primary implant for eyes with severely subluxated or luxated crystalline lens and after complicated phacoemulsification.

The purpose of the study was to evaluate prospectively the results of implantation of a new type foldable acrylic anterior chamber intraocular lens (Acri.Lyc 15A, Acritec).

Material and methods

Data were gathered and analysed prospectively from a non-randomised series of consecutive patients in whom a novel type anterior chamber lens was implanted and who were operated in the years 2006–2009 in the Department of Ophthalmology, Medical University of Lodz, Poland.

The study was conducted after receiving approval of institutional Ethics Committee. All patients gave a written informed consent to participate in the study.

The examined group consisted of 30 patients (30 eyes), 10 women (33.3%) and 20 men (66.6%) at the age from 48 to 87 years old (mean 70.9 years, SD $\pm$ 10.6).

All surgeries were performed by two experienced surgeons (W.O., D.P.D) under local (peribulbar) anaesthesia.

Inclusion criteria were: patients age over 45 years, primary or secondary IOL implantation, endothelial cell count above 1500 cells/mm^2, IOL power between +15.0 D and +23.0 D, full patients compliance (which ensured postoperative examinations).

Exclusion criteria were: previous keratoplasty, iris destruction, uveitis, silicone oil tamponade, macular- and corneal disorders and other processes, which may impair and restrict the vision permanently, previous refractive or glaucoma surgery, eyes with very short axial length, with a history of glaucoma and with shallow anterior chamber.

The new type of AC IOL (Acri.Lyc 15A) is a single-piece acrylic foldable IOL with a diameter of the optic part 6.0 mm, total maximum diameter of 12.75 mm (6 patients, 20%), 12.25 mm (18 patients, 60%) and 12.00 mm (6 patients, 20%) (Fig. 1 and 2). The IOL was manufactured by AcriTec, Germany. In all cases, biometry was calculated using SRK 2 formula.

In all patients full ophthalmological examination was performed a day before and one day after the procedure (30 patients), approximately 1-2 weeks after the surgery (30 patients), 3-4 months (28 patients) and 6-8 months after the procedure (21 patients).

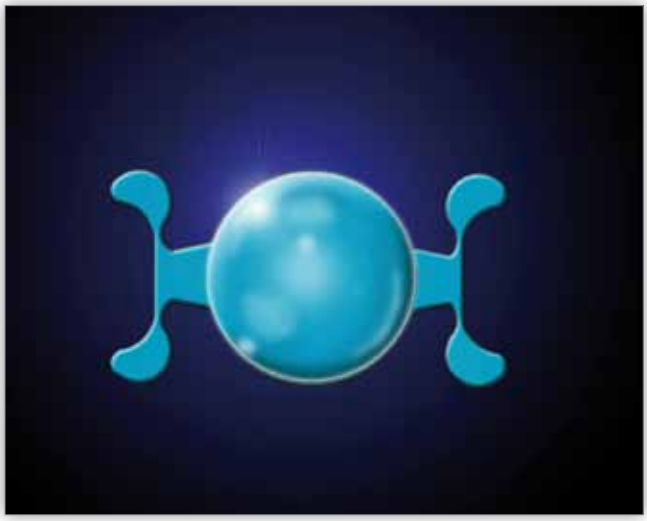

Fig. 1. Acrylic, foldable anterior chamber IOL Acri.Lyc 15A.
Ryc. 1. Akrylowa, zwijalna soczewka przedniokomorowa Acri.Lyc 15A.

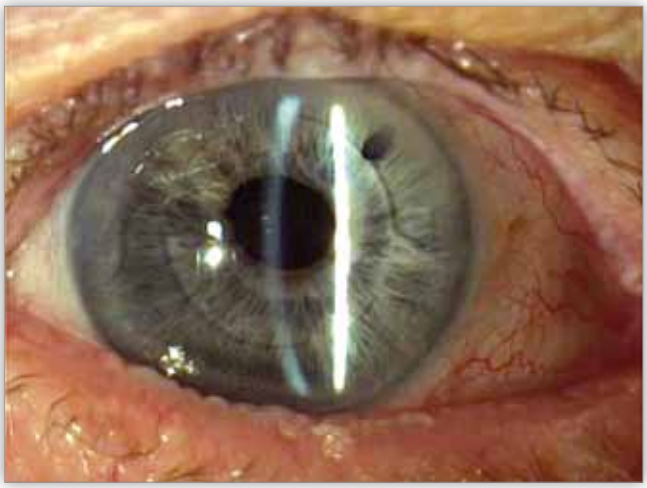

Fig. 2. An eye with implanted Acri.Lyc 15A anterior chamber IOL.
Ryc. 2. Gałka oczna po wszczepieniu soczewki przedniokomorowej Acri.Lyc 15A.

We recorded data regarding: patients' age and sex, pre- and postoperative best corrected visual acuity, intraocular pressure, state of the anterior and posterior segment (including corneal endothelial cell density), early postoperative complications and reason for the implantation of the anterior chamber IOL.

In addition, digital photography of the anterior segment was performed and white-to-white diameter measured. Moreover, in order to better evaluate the AC IOL position, ultrabiomicroscopy (UBM) of the anterior segment was performed under topical anesthesia (Alcaine eyedrops), with the patient in the supine position. UBM was performed using the commercially available Sonomed Vumax UBM device with a 50-MHz probe, with standard Vumax software which enables performing accurate measurements on UBM scans using digital calipers. Sizing of this AC IOL was not based upon any standardized pre-set value, but was based on AC internal diameter measurement using UBM (Fig. 3).

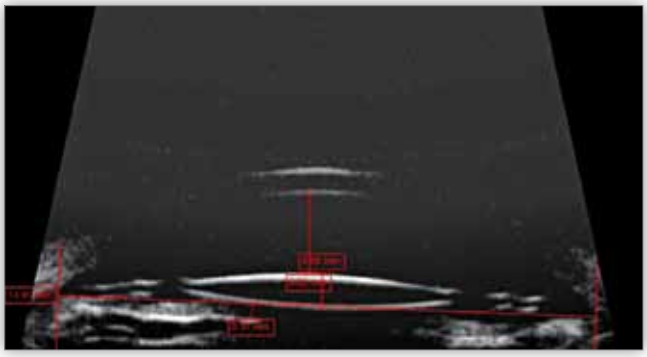

Fig. 3. Ultrabiomicroscopy of an eye with the Acri.Lyc 15A AC IOL.
Ryc. 3. Badanie UBM gałki ocznej z wszczepioną soczewką przednio-komorową Acri.Lyc 15A.

Statistical analyses were performed using nonparametric tests and all calculations were calculated using Microsoft Excel software with Addinsoft XLSTAT 2008 package. Pre- and postoperative values in the same group were compared using Wilcoxon's signed-ranks test. Statistical significance between unpaired data (independent samples) was determined using Mann-Whitney U test. In order to test correlations Spearman rank-order correlation test was applied. Differences were considered statistically significant at $p<0.05$.

Results

The causes of AC IOL implantation were as follows: severe crystalline lens subluxation in 12 eyes (40.0% of the whole group), crystalline lens luxation to the vitreous in 1 eye (3.3%), secondary implant in an aphakic eye in 5 cases (16.7%), severe capsular rupture during complicated phacoemulsification in 8 eyes (26.7%), dropped nucleus during complicated phacoemulsification in 1 eye (3.3%), and IOL exchange in case of an IOL luxation to the vitreous in 3 eyes (10.0%).

BCVA gradually increased in all examined patients (Fig. 4).

Intraocular pressure (IOP) increased on the 1st postoperative day in 7 cases, and it turned out to be transient in 3 cases. After the 1st week there were 4 patients with raised IOP and after 3 months still 2 patients having raised IOP remained.

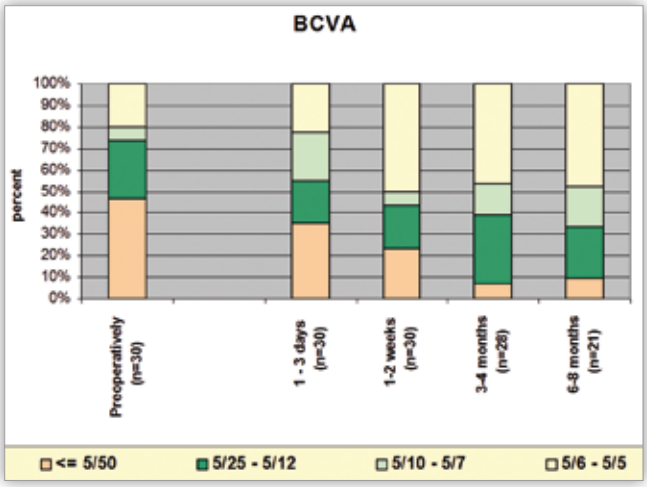

Fig. 4. Best corrected visual acuity (BCVA) before the procedure and within 6-8 months after the surgery.
Ryc. 4. Ostrość wzroku z najlepszą korekcją przed zabiegiem i w ciągu 6-8 miesięcy po zabiegu.

In 1 patient raised IOP resulted from "iris bombe" and it was necessary to perform iridectomy. In 3 cases trabeculectomy was necessary. In total, prolonged topical glaucoma medication was necessary in 5 cases. Mean IOP is shown in table I.

	Before operation/ Przed operacją (n = 30)	1-3 days after operation 1-3 dni po operacji (n = 30)	1-2 weeks after operation 1-2 tygodnie po operacji (n = 30)	3-4 months after operation 3-4 miesiące po operacji (n = 28)	6-8 months after operation 6-8 miesięcy po operacji (n = 21)
Mean	17.95	17.72	19.46	17.17	16.15
SD	7.19	9.24	11.92	6.02	2.16

Tab. I. Intraocular pressure before and after operation (mmHg).
Tab. I. Ciśnienie wewnątrzgałkowe przed operacją i po operacji (mmHg).

Mean corneal endothelial cell density (ECD) decreased in the postoperative period and polymegathism increased (increased SD) (Tab. II). Moreover, in the follow-up period there was a significant increase of corneal thickness (Wilcoxon's test) (Tab. III). The mean percentage of corneal endothelium density loss is shown in table IV.

	Before operation/ Przed operacją (n = 30)	1-2 weeks after operation/ 1-2 tygodnie po operacji (n = 30)	3-4 months after operation/ 3-4 miesiące po operacji (n = 28)	6-8 months after operation/ 6-8 miesięcy po operacji (n = 21)
Mean	2229.06	1829.5	1595.3	1477.1
SD	422.93	611.1	677.0	665.7
P (Wilcoxon)	---	<0.001	<0.001	<0.001

Tab. II. Corneal endothelial cell density before and after operation (cells/mm^2).
Tab. II. Gęstość komórek śródbłonka rogówki przed operacją i po operacji (komórki/mm^2).

	Before operation/ Przed operacją (n = 30)	6-8 months after operation/ 6-8 miesięcy po operacji (n = 21)	1-2 weeks after operation/ 1-2 tygodnie po operacji (n = 30)	3-4 months after operation/ 3-4 miesiące po operacji (n = 28)
Min.	0.44	0.45	0.46	0.45
Max.	0.67	0.64	0.68	0.67
Mean	0.53	0.55	0.57	0.55
SD	0.05	0.06	0.06	0.06
Wilcoxon test (p)	---	<0.01	<0.01	<0.01

Tab. III. Central corneal thickness (mm) before and after operation.
Tab. III. Grubość centralnej części rogówki (mm) przed operacją i po operacji.

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	1-2 weeks after operation 1-2 tygodnie po operacji (n = 30)	p (Wilcoxon)	3-4 months after operation 3-4 miesiące po operacji (n = 28)	p (Wilcoxon)	6-8 months after operation 6-8 miesięcy po operacji (n = 21)	p (Wilcoxon)
Mean	18.13%	<0.01	28.90%	<0.01	32.32%	<0.01
SD	19.80%	-	24.36%	-	27.67%	-

Tab. IV. Mean percentage of corneal endothelial density loss in comparison to preoperative values.
Tab. IV. Średnia procentowa utrata komórek śródbłonka rogówki w porównaniu z wartościami przedoperacyjnymi.

	1-3 days after operation/ 1-3 dni po operacji	1-2 weeks after operation/ 1-2 tygodnie po operacji	3-4 months after operation/ 3-4 miesiące po operacji	6-8 months after operation/ 6-8 miesięcy po operacji
Corneal edema/ Obrzęk rogówki	19	4	1	1
Descemet folds/ Pofałdowania Descemeta	9	-	-	-
Raised IOP/ Wzrost ciśnienia wewnątrzgałkowego	7	4	2	-
Hyphaema/ Krwistek	1	-	-	-
Distorted pupil shape/ Zniekształcenie źrenicy	8	8	8	5
"Iris bombe"	1	-	-	-
Blood in the vitreous/ Krew w ciele szklistym	2	-	-	-
Small IOL displacement/ Niewielka dyslokacja soczewki	-	-	1	2
Anterior synechiae/ Zrosty przednie	-	-	1	2
Cystic Macular Edema/ Torbielowaty obrzęk plamki	-	1	4	3
Retinal detachment/ Odwarstwienie siatkówki	-	3	-	-

Tab. V. Postoperative complications (number of patients).
Tab. V. Powikłania pooperacyjne (liczba pacjentów).

Early postoperative complications are listed in table V. The complications were not dangerous and most of them withdrew gradually within months from surgery.

The AC IOLs were produced in three different diameters (12.0 mm, 12.25 mm and 12.75 mm), and were implanted according to the white-to-white values measured in UBM examination. Values of white-to-white diameter measured in the slit lamp digital photography were compared with values obtained in UBM examination. Moreover, iridocorneal angles (medial and temporal), distance between corneal endothelium and anterior surface of the AC IOL and distance between posterior surface of the AC IOL and anterior surface of the iris were measured in UBM. Measurements obtained in the UBM examination are shown in table VI.

	Mean (SD)
White-to-white (Photograph)	11.65 (0.38)
White-to-white (UBM)	13.53 (0.83)
Iridocorneal angle – medial	42.43 (6.44)
Iridocorneal angle – temporal	41.39 (10.69)
Distance from endothelium to AC IOL	2.44 (0.71)
Distance from AC IOL to iris	0.23 (0.09)

Tab. VI. Various measurements made in UBM examination (mm).
Tab. VI. Różne pomiary w badaniu UBM (mm).

We found that there was a significant difference in mean white-to-white diameter measurements done on digital photography and measurements performed with UBM. Moreover, these values were relatively highly correlated (Spearman coefficient = 0.70, $p<0.001$). There was no significant difference between mean medial and temporal iridocorneal angle values (Mann-Whitney test, $p>0.05$). There was a correlation between the difference of white-to-white diameter measurements in UBM examination and measurements in digital photography and the distance of corneal endothelium to anterior surface of AC IOL (Spearman coefficient = 0.45, $p<0.05$). Nevertheless, no correlation was found in the respect of distance of AC IOL from the iris.

There was a correlation between white-to-white diameter and the distance of corneal endothelium and AC IOL (Spearman coefficient = 0.45, $p<0.05$), which most probably reflects the fact that in bigger eyes AC IOLs were located deeper.

We also found that there was no significant correlation between white-to-white diameter measured using UBM or using digital photography and autorefractometry ($p>0.05$).

Keratometry was performed preoperatively and three months after surgery by Javal keratometer. Surgically induced astigmatism was calculated using vector analysis and Naeser's polar values method. Values of SIA are shown in table VII.

Methods/ Metody	SIA mean	SD
Vector analysis (D)/ Analiza wektorowa (D)	0.58	0.10
Naeser's polar values (ΔKP-90)/ Wartości biegunowe Naesera (ΔKP-90)	0.57	0.10

Tab. VII. Mean surgically induced astigmatism 3 months post operation.
Tab. VII. Średni astygmatyzm indukowany chirurgicznie w okresie 3 miesięcy po zabiegu.

Discussion

In eyes without adequate capsular support several implantation approaches are possible: the angle supported anterior chamber IOL, the iris fixated or iris sutured posterior chamber IOL and a transsclerally sutured posterior chamber IOL.

At present, commercially available single-piece AC lenses require creating a wide incision for implantation (6.0 to 7.0 mm). We designed and introduced to clinical practice the first foldable anterior chamber lens for aphakic eyes, which could be implanted through a 2.8-3.0 mm incision. The IOL design was made by Prof. Omulecki W. and Dr Wilczynski M. Such a lens could be used either as a secondary implant in aphakic patients or as a primary implant for eyes with subluxated crystalline lens and after complicated phacoemulsification. This type of AC IOL could be also used in eyes with crystalline lens luxated into the vitreous. Performing pars plana ultrasound phacofragmentation, combined with the implantation of foldable anterior chamber IOL enables performing the whole procedure in a closed system, which increases its safety and decreases surgically induced astigmatism.

As anterior chamber IOLs are located near the corneal endothelium, the iris and the anterior chamber angle, they are a risk factor for complications, such as: cystoid macular edema (CME), secondary glaucoma, keratopathy, uveitis, bleeding to the anterior chamber and disturbed pupillary function (2-6). These complications resulted mainly from using the old fashioned types of anterior chamber lenses especially after closed-loop AC IOLs (which are nowadays obsolete) (7). The main cause of these complications was excessive vaulting of the lens with chronic endothelial trauma (8). Fibrosis around the haptics in the chamber angle led to erosion of the uveal tissue and to intraocular release of inflammatory mediators (8). The only resemblance of the open-loop AC IOL to the closed-loop AC IOL is the anatomic site of implantation. Open-loop AC IOL design should ensure minimal vaulting under high decompression, thus minimizing injury to corneal endothelium (9). Current AC IOLs have a footplate which prevents erosion and prevents fibrous overgrowth around the haptics (9). The models of AC IOLs which are currently used, single-piece flexible PMMA lenses with open-loop haptics are tolerated better and they cause complications (especially corneal decompensation) less frequently. When compared to closed-loop AC IOLs, the rate of corneal decompensation, CME, glaucoma, hyphema and intraocular inflammation caused by open-loop AC IOLs is significantly lower (10). Their association with pseudophakic bullous keratopathy is, at least in part, a result of their use in complicated cataract surgery and post-traumatic cases, rather than inherent design influence (11).

We observed transient corneal edema in 18 patients. This complication was reported also by other investigators evaluating other AC IOLs (5,7). The pupil was distorted in 8 patients, and this complication was also described by some authors (12). We observed an increased of IOP during the 1st week, however in almost all patients the IOP successfully decreased after pharmacological treatment. There were also previous studies reporting the increased IOP and secondary glaucoma after AC IOL implantation (5,6,12,13). In our series one patient had bleeding into the anterior chamber, which is a complication also described in the literature (13). CME occurred in 4 patients 4 months after the surgery, in 1 patient 2 weeks and in 3 patients 6 months after the procedure. This complication is common and has been described by many authors (5,12-14).

We observed small dislocation of IOL in 2 patient and slight bleeding into the vitreous cavity in two patients. There is no information about these complications in the literature. Retinal detachment occurred in 3 patients, this complication was also reported in the literature previously (13,15).

There are many authors who advocate using AC IOLs (16,17), as their implantation is a simple procedure, technically less demanding and less time-consuming than implantation of a sclerally-fixated IOL. AC IOLs should not be used in eyes, in which there is a risk of corneal decompensation and should be used very carefully in eyes with not well controlled glaucoma. Such patients should be followed-up for the rest of their lives and have frequent intraocular pressure checks (13).

Iris sutured posterior chamber IOLs can be inserted in eyes without capsular support, but are not recommended for cases with significant disruption of the anterior segment, resulted from congenital anomalies or trauma. In case of iris fixated lenses, complications such as acute CME, intraoperative bleeding, pigmentary dispersion and artificial lens tremor are frequently encountered (2,13).

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Sclerally-fixated IOLs are an alternative to AC lenses and iris fixated PC lenses (18,19). Advantages of using PC lenses are: location of the lens near the nodal point of the eye, a decreased risk of an iris block and a lesser risk of a decrease in corneal endothelial cell density. Other advantages of PC IOLs are: minimal contact with the iris, limited iridodonesis and the fact that the haptics do not disturb the aqueous outflow from the anterior chamber and that the lens is a support for the vitreous base making it impossible for the vitreous to get displaced to the anterior chamber (19). In the absence of capsular support, the transsclerally sutured PC IOLs offer numerous advantages for certain eyes. Because of its anatomic location, the sutured PC IOL is more appropriate for eyes with compromised cornea, peripheral anterior synechiae, shallow anterior chamber, known or suspected cystoid macular oedema or glaucoma. Moreover, sutured PC IOLs are more appropriate if the patient with aphakia is young or has a life expectancy of 10 years or more (9,18,20,21).

The disadvantages of sclerally-fixated PC IOLs are: the technical difficulty of performing the operation, prolonged time of the procedure, an increased risk of endophthalmitis resulting from an infection spreading along the sutures fixating the lens, the risk of bleeding at the time of introducing the sutures through the ciliary body, an increased risk of retinal detachment resulting from manipulations close to the vitreous, ciliary body erosion caused by the haptics and a frequent necessity to perform vitrectomy (19). Moreover, introducing the sutures through a vascularized ciliary body may cause uveal irritation which is associated with subclinical chronic inflammation and an increased frequency of cystoid macular edema (18).

Implanting sclerally-fixated lenses is a procedure which is more complex and time consuming than implantaion of AC lenses. An implantation of a sclerally-fixated lens is connected with a higher risk of intraoperative bleeding. The whole procedure involves more manipulations and is performed partially without visual control in the retroiridial space (19,22). Moreover, it is possible to injure the ciliary body inserting the needle through the wall of the eyeball (16,22). For these reasons, in elderly patients, in patients with blood clotting disorders and vascular diseases it is advisable to carefully consider using the sclerally-fixated lens (19,22). Moreover, transscleral implants may cause suture erosion and vitreous loss (6,18). Much publicity is given in the current literature to the problem of exposition of fixating sutures (18,23). This complication causes discomfort for the patient and poses a threat of endophthalmitis, as well as breaking of the suture and displacement of the implant (9,24).

Ultrasound biomicroscopy (UBM), developed by Pavlin and Foster (25), is new equipment that was applied in the clinic in the early 1990s for ocular examination. It can clearly display the structure of the anterior segment at microscopic resolution in the living eye. With UBM we evaluated the position of the IOL, its location and symmetry. We detected the haptics' position postoperatively and determined its relationship with adjacent intraocular structures. To the best of our knowledge, there was no article evaluating ultrasound biomicroscopy of AC IOLs. Baykara et al. (26) used UBM for evaluating the position of the iris-claw intraocular IOLs (the IOLs were parallel to the iris plane). The UBM study of Artisan iris-fixated IOLs performed by Dighiero (27) showed a deep anterior chamber and an open iridocorneal angle of 360 degrees in all cases. Walther et al. (28) evaluated the haptic position of iris fixated IOL and found that in most cases surgical placement of iris fixed lenses is a "blind" procedure. Sewelam et al. (29) evaluated the haptic position after transscleral fixation of posterior chamber IOLs with UBM. Ultrasound biomicroscopy showed the difficulty in reliability of placing the haptics in the ciliary sulcus using *ab externo* scleral fixation of PC IOLs. *Ab externo* scleral fixation of PC IOLs is recognized as a "blind" procedure. Thus, endoscopic visualization of the iridociliary angle during surgery is recommended.

To date, there is no unequivocal opinion as to the superiority of a particular method, however, it is generally thought that transscleral implants should be used in patients under the age of 50, as well as in eyes with anterior segment problems such as decreased corneal endothelial cell density, shallow anterior chamber, glaucoma, disturbed structure of the iridocorneal angle and disturbances of the iris structure (inborn or traumatic aniridia or iris lesions) (3,16,22).

In some complicated cases, placing the intraocular lens in the anterior chamber is a method of choice and using a foldable AC IOL implanted thorough a small incision, together with careful intraoperative and postoperative management allows to achieve good final results, both anatomical and functional. The application of foldable anterior chamber intraocular lenses through a small incision is a safe alternative for rigid PMMA anterior chamber IOLs and scleral-fixation IOLs.

We believe that our results support the use of the examined novel AC IOL for aphakic eyes. Further studies might help evaluate the new lens on a larger group of patients.

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