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Clinical Study of Intraocular Lens Implantation by Scleral Suture Fixation after Lensectomy and Vitrectomy

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Abstract **Original Research Article**

Objective: To investigate the surgical techniques and clinical significance of intraocular lens implantation by scleral suture fixation after lensectomy and vitrectomy. ***Methods:*** According to the inclusion and exclusion criteria, 19 cases (20 eyes) were selected for IOL implantation by scleral suture fixation after lensectomy and vitrectomy. The uncorrected visual acuity (VA), best-corrected visual acuity (BCVA), intraocular pressure (IOP), preoperative IOL position and surface clarity, and complications were recorded, analyzed and compared. ***Results:*** In 20 eyes of 19 patients who underwent IOL implantation by scleral suture fixation in this study, both VA and BCVA after surgeries were significantly improved compared with those before surgeries ($P<0.05$). 11 eyes of 10 patients had IOP $\geq$ 21mmHg before surgeries. Three months after surgeries, IOP of all these affected eyes were within 21 mmHg, and no affected eyes required the application of ocular hypotensive drugs. Three months after surgeries, 17 eyes of 16 patients (85%) had centered IOL position and 3 eyes of 3 patients (15%) had slightly tilted IOL, all of these tilted IOLs were in patients with ocular trauma and all of them were found to be caused by scar adhesion in the peripheral part. In two eyes, the IOL optical edge was completely blocked by the pupil, which was only found after dilating the pupil. The pupil of one eye was traumatic and irregularly dilated, and the edge of the optical part of IOL was exposed. In two eyes of two patients who underwent silicone oil removal and IOL fixation during the same surgery, a small number of silicone oil droplets were found on the surface of IOL in the early stage after surgeries, and in the later stage, small flakes of pigment granules were observed. During the 3-month postoperative follow-up period, no patient had complications such as IOL dislocation, exposure of fixation suture, retinal detachment and corneal endothelial decompensation. ***Conclusion*:** For patients with traumatic cataracts or primary subluxation or total dislocation of their own lens or intraocular lens, if the capsular support is inadequate or absent, IOL implantation after lensectomy with total capsulectomy and vitrectomy by scleral suture fixation technique can effectively correct aphakia and improve vision with relatively low complications.

Keywords: intraocular lens implantation; scleral sutured fixation; the absence of posterior capsule; clinical study.

INTRODUCTION

Cataract surgery is one of the most widely recognized and efficacious surgeries performed today. Even though aphakia after cataract surgery is normally not intended and is brought about by a complication during surgery, postoperative aphakia is expected at times. The postoperative aphakia can seriously affect the visual outcome of the patients [1, 2]. Ideally, the lenticular matter is extracted and an intraocular lens (IOL) is placed in the native capsular bag or ciliary sulcus and this is achieved as a single procedure resulting in a stably placed, well centered IOL [3, 4]. However, many a time when the capsular support is compromised due to trauma or rupture of the posterior capsule during complicated cataract surgery and lens dislocation in Marfan's syndrome or pseudo-exfoliation syndrome, makes the implantation of IOL complicated and difficult and it necessitates creative surgical methods for implanting a stably placed IOL for better visual outcome [4, 5]. In order to correct aphakia, ophthalmologists have conducted many research and clinical trials and come up with mainly three different techniques of IOL implantation; anterior chamber IOL implantation, iris fixed IOL implantation and scleral-fixated posterior chamber IOL implantation [6-8]. There are many different IOL types and implantation techniques for various IOL implantations. At present,

scleral suture fixation of a posterior chamber IOL is the most widely recognized surgical approach with a good visual outcome [7]. However, some complications need to be addressed and investigated by clinical trials. It is more difficult and complex to implant an IOL by scleral suture fixation technique, especially when the affected eye requires or has undergone lensectomy and vitrectomy for various reasons without capsule preservation [9, 10]. In this study, we investigated the therapeutic effect of IOL implantation by scleral suture fixation after lensectomy and vitrectomy, completed by the same surgeon from January to December 2019, hoping to lay the foundation for future clinical works.

PATIENTS AND METHODS

1: Patients

1.1: General information

The clinical data of 19 patients (20 eyes) who were hospitalized in the Department of Ophthalmology of the Second Hospital of Hebei Medical University between January and December 2019 underwent IOL implantation by scleral suture fixation after lensectomy and vitrectomy by the same surgeon and met the inclusion and exclusion criteria of this study were collected and analyzed. There were 16 males (17 eyes) and 3 females (3 eyes). The age of these patients at the time of surgery ranged from 31 to 74 years, the mean age was 55.30 ± 12.99 years. There were 11 right eyes and 9 left eyes. The reasons for IOL implantation by scleral suture fixation surgery: 7 cases (7 eyes) were aphakic after trauma. These included 3 cases (3 eyes) after silicone oil removal, 2 cases (2 eyes) with silicone oil filling and 2 cases (2 eyes) after lensectomy + anterior vitrectomy. 6 cases (7 eyes) had self-lens subluxation, among them 4 cases (5 eyes) had secondary glaucoma. 3 cases (3 eyes) had total dislocation of their own lens. Among them 2 cases (2 eyes) were caused by trauma, and 1 case (1 eye) was caused by Marfan's syndrome. 2 cases (2 eyes) had total dislocation of the intraocular lens and 1 case (1 eye) was aphakic after phacoemulsification + anterior vitrectomy. IOL implantation by scleral suture fixation surgery was performed by the same surgeon in all patients, and the patients were informed of the surgical risks and signed an informed consent form before the surgery. All patients were followed up for more than 3 months after IOL implantation.

1.2: Inclusion and exclusion criteria of patients

1.2.1: Inclusion criteria (Patients who met all the following conditions were included in the study.)

a) Patients who underwent IOL implantation by scleral suture fixation for aphakia due to cataract removal, lens dislocation, or trauma.
b) Patients whose medical records were relatively complete and could be used for statistical analysis for relevant data.

1.2.2: Exclusion criteria (Patients who met the above inclusion criteria but had one of the followings were excluded.)

a) The analysis of medical records showed that there was a possibility of inaccuracy.
b) Patients with other severe systemic or ocular diseases that could affect the accuracy of statistical data.
c) Patients who did not show up for follow-up or were unavailable for data collection.

2: Methods

2.1: Collecting of clinical data

After admission, the patients underwent a detailed medical history survey, systemic and ocular examinations were done, and then the surgical approach was decided based on the examination results. Patients who were aphakic before surgery and met the inclusion and exclusion criteria were directly included in the study, and patients who had lens before surgery and underwent lensectomy + vitrectomy + scleral suture fixation of IOL were also included in the study after the surgery. For all patients included in the study, the data of preoperative examination and postoperative follow-up were collected in detail, and then the clinical data were analyzed.

2.2: Clinical management before and after surgery

Before IOL implantation by scleral suture fixation surgery, all patients were examined for routine hematuria, bleeding and clotting time, hepatitis B, syphilis and AIDS screening, electrocardiogram, chest x-ray, uncorrected visual acuity (VA), best-corrected visual acuity (BCVA), intraocular pressure (IOP), corneal endothelial cell count, optical biometry, ultrasound biomicroscopy (UBM), optical coherence tomography (OCT), color ultrasound, etc. The lacrimal duct was irrigated one day before the surgery, and Gatifloxacin ophthalmic gel was applied four times and Diclofenac sodium eye drops were applied four times. On the day of operation, Tropicamide eye drop was used to fully dilate the pupil, and the patients were given a sedative, hemostatic drugs, and antibiotic treatment.

Choice of operation: For the patients after silicone oil removal, IOL implantation by scleral suture fixation under transparent corneal incision was performed directly. For post-traumatic aphakic eyes after phacoemulsification + anterior vitrectomy, total vitrectomy was performed first, the retina was examined in detail, then IOL implantation by scleral suture fixation was performed if the retina had no tear or hole. For eyes with silicone oil filling, removal of the silicone oil under transparent corneal incision was performed first and then a detailed inspection of the retina was done and IOL implantation by scleral suture fixation was performed if the retina had no tear or hole. For patients with subluxation of their own lens,

phacoemulsification was performed first. If a large area of zonular rupture was found and there was not enough capsule to support the IOL, three-incision pars plana vitrectomy was immediately performed, then the retina was examined thoroughly, and IOL implantation by scleral suture fixation was performed if the retina had no tear or hole. For patients with total dislocation of the intraocular lens, standard three-incision pars plana vitrectomy and removal of the dislocated intraocular lens were performed first, then the retina was examined in detail, and IOL implantation by scleral suture fixation was performed if the retina had no abnormalities.

Surgical procedure for IOL scleral suture fixation: All the procedures were performed in a sterile operating room. The patient was placed in a supine position, the skin of the operating eye was disinfected with 10% povidone-iodine cotton balls, sterile sheets were placed around the eye, and 4 ml of 2% lidocaine solution was injected for retrobulbar anesthesia + topical anesthesia with proparacaine hydrochloride. The surface of the operated eye was draped with a sterile drape, the eyelids were opened, the conjunctival sac was disinfected with 5% povidone-iodine solution for 30 seconds and the conjunctival sac was thoroughly rinsed with normal saline. The above-mentioned operation steps were applied to complete all the previous surgical procedures such as lensectomy and vitrectomy and the irrigation channel was established.

Scleral suture fixation of IOL implantation techniques: Two partial-thickness triangular scleral flaps were made opposite to each other at 3 and 9 o'clock position. A corneal limbus incision was made at 11 o'clock position. After achieving hemostasis by electrocoagulation, a viscoelastic substance was injected into the anterior chamber through the superior limbal incision. 1.5 mm behind the corneal limbus at 3 o'clock position a 10-0 polypropylene suture with a straight needle (Alcon laboratories, USA) was passed perpendicularly through the full thickness of the sclera. The straight needle was then docked in a hollow 25G needle on the opposite side and the suture was pulled out from the flap made at 9 o'clock position. The center part of the stretched suture was then pulled out using a hook-like instrument through a previously made corneal limbus incision. The middle part of the suture was then cut, and the equidistant sutures were tied to the corresponding haptics of the IOL (IOL: Matrix Acrylic® Aurium, Medennium Inc. France). The lens was then inserted and placed on the ciliary sulcus. The sutures were pulled to secure the IOL in the center of the pupil and knots were tied and buried under the scleral flaps. The triangular scleral flap as well as the conjunctival incision were intermittently sutured with 8/0 absorbable sutures, and the irrigation tract was withdrawn to restore the normal intraocular pressure. Tobramycin and Dexamethasone eye ointment was applied on the conjunctival sac, and ocular bandaging was done. The dressing was opened every alternative day, then the visual acuity, intraocular pressure, corneal edema, IOL position, intraocular fluid opacification, and fundus findings were checked. Tobramycin and Dexamethasone eye drops, and Diclofenac Sodium eye drops and deproteinized calf blood extract eye gel was used after surgery.

2.3: Postoperative observations

The eyes were checked daily for 1-3 days after surgery, and visual acuity, intraocular pressure, corneal edema, whether the IOL position was centered or tilted, intraocular fluid opacification and fundus findings were observed meticulously. Follow-up examinations were performed at 1, 2, 4, 8 and 12 weeks after surgery, focusing on visual acuity, intraocular pressure, healing of the incision, whether the fixation line was exposed, whether the IOL position was centered and without tilt, and the development of complications such as retinal detachment. At the end of the 12^{th} postoperative week, the patients were thoroughly checked for VA and BCVA, IOP, whether the IOL position was centered or tilted, and whether the fixation suture was exposed.

2.4: Statistical Analysis

All statistical analyses were performed using SPSS 20.0. According to the visual acuity statistical method of Guan and Holladay *et al*. [11,12], the 2-feet finger count was recorded as 0.01, the 1-foot finger count was recorded as 0.005, the 2-feet hand motion was recorded as 0.001, the 1-foot hand motion was recorded as 0.0005, the light perception was recorded as 0.0001. All the vision data were translated to the logarithm of minimal angle of resolution (LogMAR) for statistical analysis. All observation indicators of general data were expressed as mean ± standard deviation. A paired *t*-test was used for the VA and BCVA comparison before and after surgeries. The level of statistical significance was at $P<0.05$.

RESULTS

1. Uncorrected visual (VA) and best-corrected visual acuity (BCVA) before and after surgeries (Tab. 1).

In this study, 20 eyes of 19 patients underwent IOL implantation by scleral suture fixation, the VA before surgeries ranged from light perception to 0.3, including 9 eyes with light perception to finger count, 6 eyes with 0.02~0.08, and 5 eyes with 0.1~0.3; the BCVA before surgeries ranged from light perception to 0.4, including 3 eyes with light perception to finger count, 1 eye in 0.02~0.08, and 16 eyes in 0.1~0.3. At 3 months after surgeries, the VA ranged from 0.04 to 0.8, including 4 eyes in 0.04~0.08, 8 eyes in 0.1~0.3 and 8 eyes in 0.4~0.8; the BCVA ranged from 0.1 to 1.0, including 6 eyes in 0.1~0.3 and 14 eyes in 0.4~1.0. At 3 months after surgeries, both the VA and BCVA were significantly improved compared to the corresponding VA and BCVA before surgeries, and the differences were statistically significant ($P<0.05$). Among 6 eyes with BCVA under 0.3, 5 eyes were with traumatic

histories and corneal scars, and the other eye with amblyopia before.

2. Intraocular pressure (IOP) before and after surgeries:

In this study, 20 eyes of 19 patients underwent IOL implantation by scleral suture fixation, including 11 eyes of 10 patients with IOP ≥ 21mmHg before surgeries, including 5 eyes of 4 patients with secondary glaucoma due to self-lens subluxation, 1 eye of 1 patient with silicone oil tamponed, 2 eyes of 2 patients with total self-lens dislocation, 1 eye of 1 patient with total intraocular lens dislocation, 2 eyes of 2 patients with traumatic cataract removal and anterior vitrectomy. The IOP of the affected eyes were all within 21mmHg at 3 months after the surgery, and no hypotensive drugs were needed for the affected eyes.

3. IOL position and clarity after surgeries

In this study, 20 eyes of 19 patients underwent IOL implantation by scleral suture fixation. At 3 months after surgeries, the IOL position was found to be centered in 17 eyes (85%), slightly tilted in 3 eyes (15%), all of them were with trauma and found to be caused by scar adhesion in the peripheral part. In two eyes, the IOL optical edge was completely blocked by the pupil, which was only found after dilating the pupil. The pupil of one eye was traumatic and irregularly dilated, and the edge of the optical part of IOL was exposed. In addition, the IOL position of one eye was in the center, but the optical part was slightly tilted. In two eyes of the two patients, silicone oil removal and IOL fixation were done during the same surgery, a small number of silicone oil droplets were found on the surface of IOL in the early stage after the surgery, and in the later stage, small flakes of pigment granules were observed. Within 3 days after the surgery, the IOL position was found to be slightly tilted and the IOL pressure was low in two eyes. After treatment, the IOP returned to normal level, and the IOL position also returned to normal centered position.

4. Complications during and after IOL implantation surgeries

In this study, 20 eyes of 19 patients who underwent IOL implantation by scleral suture fixation method, presented no complications such as retinal tear or detachment. Within 3 days after the operation, the intraocular fluid of the three eyes had a moderate amount of diffuse opacity, and the intraocular pressure was low. After 3 days of corresponding treatment, such as dressing the eyes and keeping the patient in a half-sitting position, it significantly improved. During the follow-up 3 months after surgeries, no complications such as IOL decentration or tilt, fixation suture exposure, retinal detachment, corneal endothelial decompensations, etc., were observed in these studied patients.

5. Typical case

The 62-year-old male patient underwent left eye cataract extraction + vitrectomy + intraocular lens implantation by scleral suture fixation for subluxation of the left lens and with secondary glaucoma. Preoperative uncorrected visual acuity was 0.2; the best-corrected visual acuity was 0.3. Three months after surgery, the uncorrected visual acuity was 0.8, and the best-corrected visual acuity was 1.0. Three months after surgery, the anterior segment image (Fig. 1) and UBM (Fig. 2) showed a centered IOL position.

Table-1: Demographic data of scleral-sutured IOL implantation (n=19)

No.	Age	Eye	Sex	Causes of surgeries	Surgeries	Before VA	Before BCVA	After VA	After BCVA
1	68	OD	Male	Semi-dislocation of lens	Lensectomy+PPV+IOL	0.04	0.1	0.5	0.6
2	31	OS	Male	Aphakia after traumatic surgery	PPV+IOL	FC	0.12	0.1	0.15
3	45	OS	Male	Aphakia after traumatic surgery	IOL (silicone oil removal before)	FC	0.04	0.06	0.1
4	63	OS	Male	Aphakia after traumatic surgery	Silicone oil removal+IOL	HM	0.1	0.08	0.2
5	59	OD	Male	Semi-dislocation of lens	Lensectomy+PPV+IOL	0.3	0.4	0.8	1.0
6	37	OS	Male	Aphakia after traumatic surgery	IOL (silicone oil removal before)	FC	0.12	0.08	0.3
7	55	OS	Male	Aphakia after traumatic surgery	IOL (silicone oil removal before)	FC	0.06	0.04	0.15
8	74	OD	Male	Traumatic lens full-dislocation	Lensectomy+PPV+IOL	HM	HM	0.12	0.5
9	60	OS	Male	Traumatic lens full-dislocation	Lensectomy+PPV+IOL	HM	HM	0.5	0.6
10	62	OD	Male	Semi-dislocation of lens	Lensectomy+PPV+IOL	0.12	0.4	0.5	0.8
11	62	OS	Male	Semi-dislocation of lens	Lensectomy+PPV+IOL	0.2	0.3	0.6	1.0
12	54	OD	Male	Semi-dislocationof lens	Lensectomy+PPV+IOL	0.2	0.3	0.3	0.4
13	33	OD	Male	Full-dislocation due to Marfan's syndrome	Silicone Oil removal+IOL	0.02	0.04	0.1	0.3
14	58	OD	Male	Full-dislocation of IOL	Lensectomy+PPV+IOL	LP	LP	0.2	0.4
15	59	OS	Male	Semi-dislocation of lens	Lensectomy+PPV+IOL	0.04	0.1	0.4	0.6

No.	Age	Eye	Sex	Causes of surgeries	Surgeries	Before VA	Before BCVA	After VA	After BCVA
16	32	OS	Male	Aphakia after traumatic surgery	PPV+IOL	0.06	0.1	0.2	0.4
17	67	OS	Female	Full-dislocation of IOL	IOLremoval+PPV+IOL	0.04	0.2	0.4	0.5
18	67	OS	Female	Aphakia after traumatic surgery	PPV+IOL	0.02	0.25	0.3	0.5
19	53	OD	Female	No lens after Phacoemulsification	PPV+IOL	FC	0.4	0.3	0.6
20	67	OD	Male	Semi-dislocation of lens	Lensectomy+PPV+IOL	0.2	0.3	0.4	0.6

Before VA: visual acuity before IOL implantation surgeries; Before BCVA: best-corrected visual acuity before IOL implantation surgeries; After VA: visual acuity 3 months after IOL implantation surgeries; After BCVA: best-corrected visual acuity 3 months after IOL implantation surgeries; PPV: pars plana vitrectomy; IOL: intraocular lens; FC: finger count; HM: hand motion; LP: light perception.

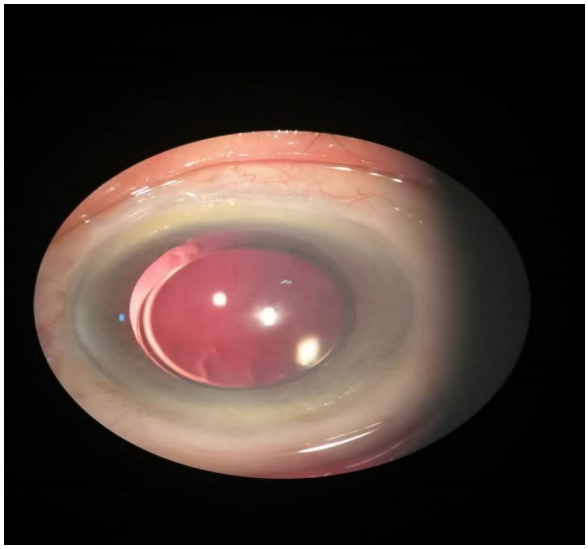

Fig-1: Photograph of the eye on 3 months after IOL implantation by scleral-sutured fixation shows a centered IOL.

Fig-2: UBM picture of the eye on 3 months after IOL implantation by scleral-sutured fixation shows a centered IOL position.

DISCUSSION

In clinical practice, many cases require cataract removal combined with vitrectomy. Sometimes the eye is left aphakic when capsular support is inadequate or absent and the visual outcome is poor. This is often seen in cases of ocular trauma where subluxation or total dislocation of the lens occurs [8, 13]. To overcome this state of aphakia, many IOL implantation methods have developed over the years which include anterior chamber, iris fixation, and scleral fixation of IOL implantation. Anterior chamber IOL implantation uses long haptics that is placed within the anterior chamber angle. This method has the advantage of being relatively easier and less time-consuming. However, over a long period, this causes friction between the IOL and the cornea leading to corneal endothelial decompensation. Constant rubbing of the haptics with the anterior chamber angle may cause angle structure damage, secondary glaucoma and other complications [14-16]. Iris fixation IOL mainly uses specially designed iris clips (claws) or surgical sutures that fix the IOL to the anterior or posterior surface of the iris. Its main advantage is a simple surgical technique and short duration of surgery. It has certain complications like iris and ciliary body inflammation, iris depigmentation, atrophy, and even perforation, which affects pupil movement. The iris-claw may release the chronically damaged iris tissue and cause dislocation of the IOL after a long period of the surgery, greatly affecting the postoperative visual outcome [1, 3, 17-19]. In comparison, the scleral suture fixation of IOL is the most suitable method for IOL implantation as the IOL is located in the physiological position of the natural lens. As early as in 1986, Malbran conducted clinical observations and reported that scleral suture fixation of IOL is getting better through continuous improvement and development for patients with inadequate or no capsular support. This method is popular when combining with classic phacoemulsification surgery combined with vitrectomy and by implanting a foldable IOL [20]. In this study for IOL implantation by scleral suture fixation, 19 patients with 20 eyes underwent surgeries. Their BCVA significantly improved after surgeries as compared to that before surgeries, suggesting a statistically significant difference (P<0.05). This may suggest that this method for IOL implantation can improve the visual acuity of patients with traumatic cataracts, intraocular lens subluxation, and IOL dislocation. But before clinically applying this process certain problems are worth studying and discussing. Firstly, it should be checked if there is any capsular support present. It is a matter of controversy whether to keep this capsule or not, usually, when the capsular support is inadequate. It is believed that

retaining this residual capsule may simplify the surgery and play a certain role in providing support and stability to the IOL [4]. In our surgical approach, we preferred removing the remaining capsule entirely along with the vitreous body as these may cause hindrance during the process of IOL implantation and may also cause retinal detachment due to vitreous traction. Moreover, the IOL position may be shifted postoperatively due to capsular proliferation and contraction. Removing the capsule entirely gives a clear view and makes the procedure simpler. In the post-operative follow up of 3 months, in 17 eyes (85%) the lens was in the center position and in only 3 eyes (15%) the IOL was tilted, this occurred in those patients with ocular trauma. After further examination, it was found that the lens tilt was caused by scar adhesion which occurred in the peripheral part. This suggests that this operation method has advantages over others. Secondly, treating the vitreous is important before planning to implant an IOL by scleral suture fixation. A complete vitrectomy can simplify the surgical procedure and avoid repeated pulling of the vitreous during surgery resulting in serrated edge detachment. If only anterior vitrectomy is done during IOL implantation, the posterior part of the vitreous body constantly moves forward and easily gets embedded in the incision site. This causes difficulty during surgery. Postoperatively the pupil may be deformed due to adhesion of the transparent vitreous with the incision. Moreover, the residual vitreous may liquefy and block the trabecular meshwork and aqueous humor outflow, leading to secondary glaucoma. Therefore, before the scleral suture fixation of IOL was performed in this study, the vitreous was completely removed to ensure that there was no interference of residual vitreous during the IOL implantation. In this study, 15 eyes (75%) underwent complete vitrectomy before IOL implantation. Lensectomy was performed in all cases including a dislocated lens. No retinal tear or abnormal pupil shape was found during the surgery. There was no postoperative retinal detachment. This suggests that with the advancement of vitrectomy, this procedure can be safely performed with optimum results and meet the safety requirements. Moreover, before IOL implantation, IOP of 11 eyes of 10 patients was ≥ 21mmHg, and the intraocular pressure was all within 21mmHg during the follow-up of 3 months after the operation. No patients needed to be treated with IOP lowering drugs, which further demonstrated the superiority of this surgical technique. Thirdly, in some aphakic patients with vitrectomy and silicone oil filling before due to many reasons, after the condition of the fundus stabilizes, IOL implantation can be carried out by two surgical methods. The first surgical plan is to remove the silicone oil first and wait and observe the fundus condition. If the condition is stable and there is no retinal detachment or other complications, then perform scleral suture fixation of IOL in another operation. The second surgical plan is silicone oil removal combined with IOL implantation by scleral suture fixation. This study believes that the first operation plan is more advisable for two reasons: firstly, it is safer to remove the silicone oil and wait for a while, and then perform IOL implantation surgery if there is no complication and the fundus is stable, so as to avoid the dilemma of reoperation if retinal detachment occurs after IOL implantation by scleral suture fixation surgery. Secondly, in the process of silicone oil extraction, even if the intraocular irrigation is sufficient, there still may be a small amount of silicone oil drops present in the eyes after the operation. If IOL is implanted at the same time, small silicone oil drops may adhere to the surface of the IOL, resulting in pigment adhesion to the surface of the IOL later, reducing the clarity of the IOL and affecting the visual prognosis of patients. In the first surgical plan, some days after silicone oil removal, it was observed that some remaining small silicone oil drops had completely floated behind the cornea, which was easily removed ensuring a clean IOL surface after IOL implantation. In this study, the first surgical protocol was applied in 3 eyes, and the IOL surface was clean at the 3-month follow-up after surgery. However, the second surgical protocol was applied in 2 two eyes due to the desire of the patients. Although enough intraocular irrigation and cleaning were carried out during the operation, there was still a small residual of silicone oil drops attached to the IOL surface after the operation and in the later period affecting the visual prognosis. To sum up, for the surgical management of traumatic cataract or primary subluxation or total dislocation of one's own lens or intraocular lens, the first step is to completely remove the lens along with the capsule and perform a total vitrectomy, and then scleral suture fixation of IOL can effectively correct aphakia, improve vision, and have fewer postoperative complications. However, before choosing the surgical technique, we must consider the experience and comfort level of the surgeon in attempting potentially surgically demanding techniques and keep in mind about the equipment available to the department, and choose the appropriate surgical technique according to their own conditions, instead of pursuing the same surgical method [2]. Due to the limitations of a short study period, the requirements of the same surgeon, the technical condition of these operations, and the influence of the novel coronavirus for data collection, the number of cases in this study is relatively smaller, and the follow-up time is relatively shorter. Because of these interference factors, the results and explanations of this study may be biased and misunderstood. It is necessary to do more work on improving the concept of clinical treatment and for a better understanding of how to improve the visual acuity of patients with similar conditions in this age of constantly upgrading technology.

CONCLUSION

For patients with traumatic cataracts or primary subluxation or total dislocation of their own lens or intraocular lens, if the capsular support is inadequate or absent, IOL implantation after

lensectomy with total capsulectomy and vitrectomy, by scleral suture fixation technique can effectively correct aphakia and improve vision with relatively low complications.

ABBREVIATION

IOL: Intraocular lens
BCVA: Best-corrected visual acuity
IOP: Intraocular pressure
FC: Finger count
HM: Hand motion
LP: Light perception
VA: Visual acuity
PPV: Pars plana vitrectomy
AC: Anterior chamber
PC: Posterior chamber
IF: Iris fixated
ISF: Intra-scleral fixated
TSF: Trans-scleral fixated
CME: Cystoid macular edema

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