

Method for Intraocular Lens Reposition with Suture Fixation in the Sulcus Ciliaris

Kislitsyna NM^{1*} and Sultanova DM²

¹MD Vitreoretinal Surgery, Ophthalmologist, S.N. Fyodorov Eye Microsurgery Federal State Institution of the Russian Ministry of Health, Russia

²Resident Doctor, S.N. Fyodorov Eye Microsurgery Federal State Institution of the Russian Ministry of Health, Russia

***Corresponding Author:** Kislitsyna NM, MD Vitreoretinal Surgery, Ophthalmologist, S.N. Fyodorov Eye Microsurgery Federal State Institution of the Russian Ministry of Health, Russia.

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Abstract

Introduction: Implantations of intraocular lenses (IOL) after cataract phacoemulsification surgeries are performed in the capsular bag of the lens, fixing and centering them by haptic elements.

However, there is a number of complicated cases in the cataract surgery when there is a need for additional suture fixation of IOL: in case of capsular rupture, the absence of a capsular bag, weakness and failure of the ligamentous capsular apparatus of the lens, as well as a dislocation of a previously IOL, not excluding a partial or total luxation into the vitreous body.

The ophthalmic surgeon depending on a whole range of clinical factors and the IOL model chooses a specific method.

Existing methods of IOL fixation have some disadvantages that is why the development of new approaches to this problem is relevant.

Purpose: To provide a technique for IOLs reposition with a suture fixation to the sclera in the ciliary sulcus area.

Materials and Methods: The article presents the method for suture fixation of IOL dislocation (Rayner model). It covers the description of a method of IOL reposition with the suture fixation into the ciliary sulcus.

Surgery stages: This method of the suture fixation of IOL is performed using two needles connected by a thread of polypropylene 10-0 (mani sutures polypropylene 10-0). Using a 30G guide-needle through the paracentesis, the needles are inserted above and below the IOL haptic element at the 6 o'clock position. The resulting thread loop fixes the IOL in the projection of the ciliary sulcus to the sclera.

Results: Visual acuity on the first day after surgery was 0.7, IOP 19.0 mm Hg. At the control check-up after 7 days, visual acuity is 0.9 without additional correction, IOP 18 mm Hg.

Conclusion: The proposed method of IOL repositioning by suture fixation into the ciliary sulcus is characterized by atraumatic, simple implementation and allows achieving of good functional and anatomical results in the treatment of patients.

Keywords: Intraocular Lens (IOL); IOL Reposition; The Ciliary Sulcus Area; Transscleral Fixation; IOL Dislocation

Introduction

Implantations of intraocular lenses (IOL) after cataract phacoemulsification surgeries are performed into the capsular bag of the lens, fixing and centering them due to haptic elements.

Currently, a perfect IOL imposes a variety of requirements: the possibility of implantation through a minimal incision, very good fixation, centration and its position stability in the capsular bag of the lens, the presence of large and complete optical zone of the IOL, ability to adhesion to the back capsule of the lens, high refractive index, ensuring protection of the retina, not excluding the presence of special design of the IOL edge, preventing the development of secondary cataract, as well as a number of other complications.

There is also a number of complicated cases in the cataract surgery when there is a need for additional suture fixation of IOL. This is a capsular rupture, the absence of a capsular bag, weakness and failure of the ligamentous capsular apparatus of the lens, and the dislocation of a previously implanted IOL, not excluding a partial or total luxation into the vitreous body.

There are various ways to fix dislocated IOLs depending on the model and the degree of their luxation [1,2].

In the cases of the dislocation of a previously implanted IOL, suture fixation of IOL haptic elements to the iris or to the sclera in the projection of the ciliary sulcus is used that result in a more correct and stable position of the IOL [3-7]. The ophthalmic surgeon depending on a whole range of clinical factors and the IOL model chooses a specific method. Existing methods of IOL fixation have a number of disadvantages. When IOL is fixed to the iris, an inflammatory reaction may occur in the postoperative period due to permanent trauma of the iris tissue [8]. In addition, the pupil shape may be deformed and its function may be impaired. There is a high risk of iris atrophy, uveitis, pigment dispersion, pigmentary glaucoma, and cystic macular edema [9].

IOL fixation to the sclera is associated with difficult surgical procedures during suturing, complexity of fixation, and is accompanied by the risk of intraoperative hemorrhagic complications.

The authors developed a method of dislocated IOL repositioning that has the following positive characteristics - reliable fixation of the IOL, exclusion of decentralization, and low traumaticity. It provides a good technical result against the background of postoperative complication rate reduction. An example for this method was the method of suture fixation of IOL proposed by A. Behnding and M. Otto in 1997. Their idea was to use a guide needle to insert the thread. This technique has been slightly modified by us. It can be effectively used not only for fixing a new IOL, but also for hemming a previously dislocated IOL, and also differs in the simplicity of technical execution.

Purpose of the Study

Provide a method for IOL repositioning with suture fixation to the sclera in the ciliary sulcus area on the example of a clinical case.

Materials and Methods

Description of the method

Surgery stages: this method of the suture fixation of IOL is performed using two needles connected by a thread polypropylene 10-0 (mani sutures polypropylene 10-0) and a 30 G guide-needle.

The first stage in the lower segment at 5-7 o'clock is performed with a spear-shaped knife paracentesis, through which the anterior chamber is filled with viscoelastic. In the upper segment 2 mm from the limb in the projection of the ciliary sulcus, the sclera is punctured with a 30 G guide-needle, then the needle is inserted into the anterior chamber and held under the haptic element of the IOL or can be

tucked into the IOL haptic ring (as in this case, IOL Rayner) or into the ring on the capsular ring. The next step is to insert one of the polypropylene 10-0 needles (mani sutures polypropylene 10-0) through the paracentesis into the anterior chamber, fix it in the hole of the guide-needle (Figure 1a) and remove it from the eye (Figure 1b).

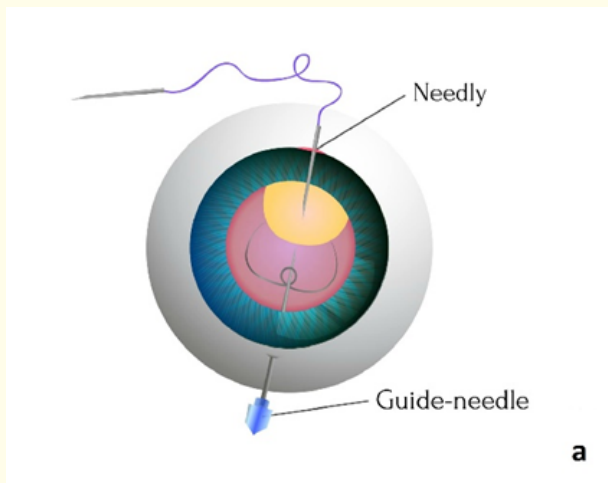


Figure 1a: Needle polypropylene 10-0, inserted through paracentesis and fixed in the hole of the 30G guide needle.

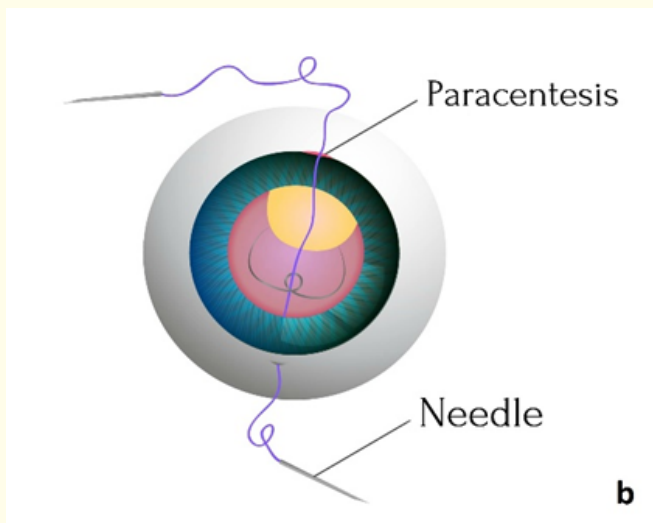


Figure 1b: The polypropylene 10-0 needle is placed in the zone of the ciliary sulcus.

After that, retreating 0.5 - 1 mm to the side or down, the 30 G guide-needle is inserted into the anterior chamber but is held above or below the IOL haptic or capsular ring, respectively (Figure 2a). The second straight needle through the previously performed paracentesis in the lower segment is passed through the anterior chamber and inserted into the lumen of the 30 G guide-needle with which it is withdrawn, while the resulting thread loop captures the IOL haptic (capsular ring) (Figure 2b).

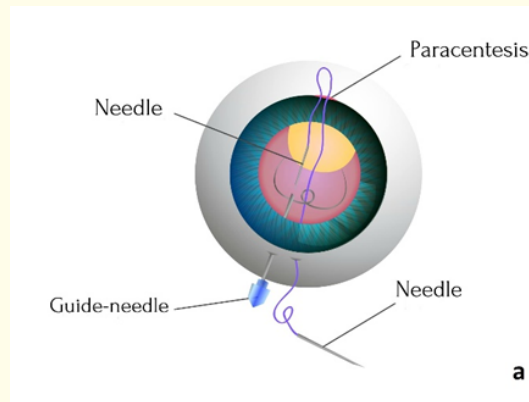


Figure 2a: Needle 2 polypropylene 10-0 is removed through the paracentesis above the haptic element fixed in the 30 G guide-needle.

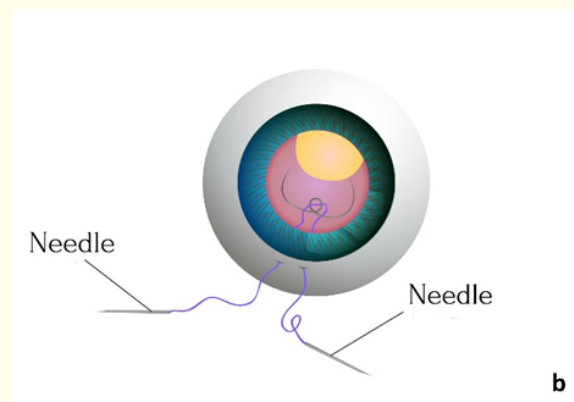


Figure 2b: Needle 2 polypropylene 10-0 is removed 2 mm from the limb in the projection zone of the ciliary sulcus.

By pulling the ends of two threads removed from the eye, the IOL is repositioned in the correct position in the pupil area, while the loop fixes the haptic in the upper segment in the ciliary sulcus. The two ends of the thread are connected to each other, the ends are left long enough and tucked under the conjunctiva or fixed in a previously formed scleral pocket. At the end of the surgery, the conjunctiva is sutured with a thread 8-0. The anterior chamber is washed with saline to evacuate the viscoelastic (Figure 3a and 3b).

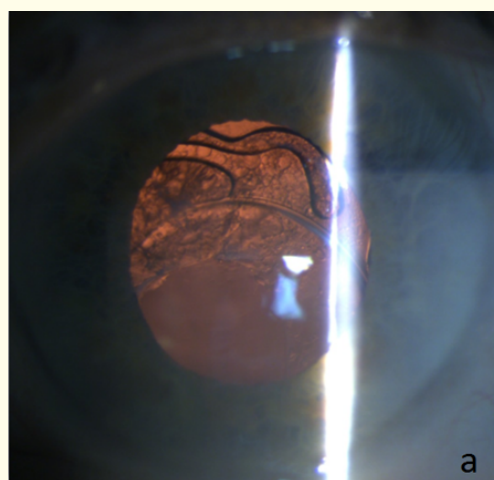


Figure 3a: Before surgery.

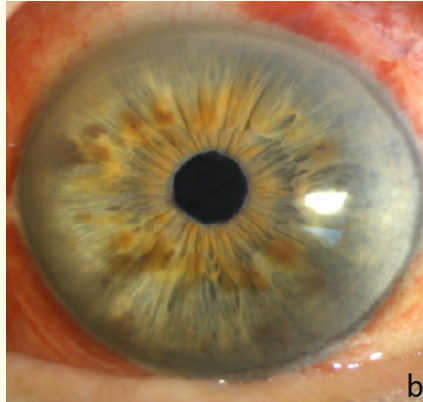


Figure 3b: After surgery.

This method allows you to perform IOL reposition without additional complex manipulations such as vitrectomy or IOL replacement that makes this manipulation less traumatic and faster.

The proposed technique of IOL reposition and fixation is shown and can be recommended when IOL is displaced into the capsular bag without significant vitreous loss and when the IOL block with the intracapsular ring is displaced.

According to this method, 12 patients (12 eyes) with IOL dislocation of various types were operated on. 3 patients (3 eyes) with IOL Rayner dislocation (C-flex Aspheric, Superflex Aspheric), 5 patients (5 eyes) Xcelens dislocation (Idea), 4 patients (4 eyes) Carl Zeiss dislocation (Asphina). In 6 cases (6 eyes), dislocation of the Capsular ring+ capsular bag+ IOL complex was observed.

The above-described surgical technique of suture fixation, dislocated IOL is explained by the following clinical case.

Patient R., 75 years old, retired. He made an appointment with an ophthalmologist at the Health Centre at his place of residence with complaints of low vision in the right eye. According to his medical history 25 years ago he was operated on for age-related cataract on the OD at the place of residence, a rigid model of IOL Rayner was implanted. Postop visual acuity was 0.9.

About 1 month ago, the patient noticed a significantly sharp decrease in vision, periodic “fog” in front of the right eye.

Biomicroscopy of OD revealed a partial dislocation of IOL with the capsular bag to the bottom without concomitant vitreous hernia. Visual acuity of the right eye - 0.03, IOP 20 mm Hg. Conjunctiva is not irritated. The cornea is transparent. The anterior chamber is deep, the moisture is clean. The pupil is rounded and the photoreaction is weakened. The IOL with the capsular bag is shifted downwards. The haptic element IOL Rayner is visible in the pupil lumen. The reflex from the fundus is pink, the details are behind the fleur. Ultrasound B-scan revealed floating opacities in the vitreous body, the membranes are attached.

IOL reposition followed by suturing into the ciliary sulcus was performed using the method described above. In the postoperative period, a standard course of anti-inflammatory and antibacterial therapy was prescribed.

Results and Discussions

Visual acuity on the first day after surgery was 0.7, IOP 19.0 mm Hg.

At the follow-up visit after 7 days, the visual acuity was 0.9 without additional correction, IOP was 18 mm Hg. The cornea was transparent, the anterior chamber was deep, and the moisture was clear. The pupil was rounded and the photoreaction was slightly weakened. The IOL was fixed in the correct position with suture fixation in the ciliary sulcus. The reflex from the fundus was pink. The membranes were attached.

Conclusion

The proposed method of the repositioning a dislocated IOL with suture fixation in the ciliary sulcus allows minimizing the risk of possible intraoperative complications and achieving good functional and anatomical results of the treatment.

Conflict of Interest

There is no conflict of interest.

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