

## IOL Repositioning with Capsular Tension Ring Explanation 1 month post Complicated Cataract Surgery

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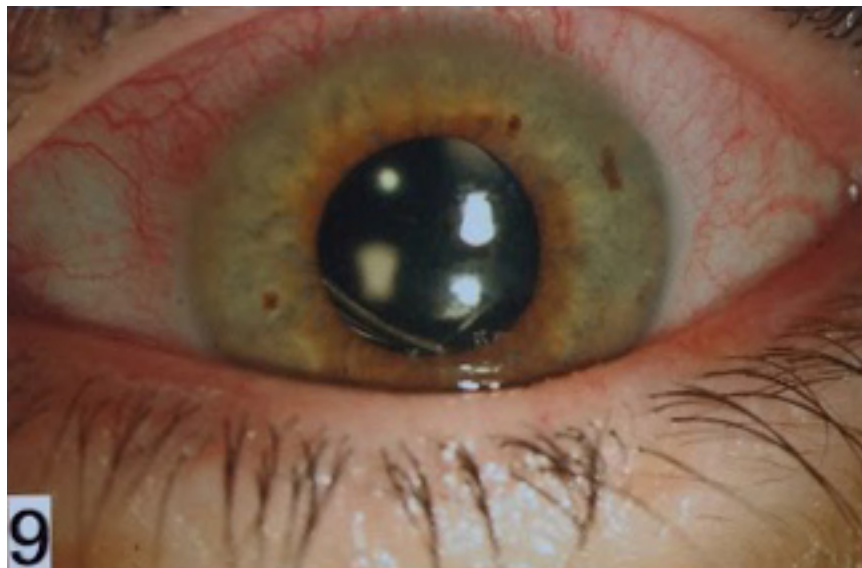
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**ISRS Introduction:** Dr. Atanas Bogoev received a 1-month Externship grant from the ISRS in 2019 and was matched with Prof. Burkhard Dick in the University hospital in Bochum, Germany. The center is treating the entire spectrum of ophthalmology care while being specially focused for anterior segment surgery (both cataract and refractive). Dr. Bogoev was expecting to improve his diagnostic and clinical skills and observing top-level surgical experience that he can implement later in his career. The case that Dr. Bogoev selected is complicated and very educational – it demonstrates several diagnostic, preoperative evaluation and intraoperative decision-making challenges.

**Introduction:** IOL repositioning is a challenging surgical technique, that requires excellent surgical planning. There are four conditions that usually require an IOL to be repositioned: (I) when the Intraocular lens (IOL) power calculation is not correct[1], (II) when a toric lens is off axis, (III) when a haptic of the IOL or a capsular tension ring (CTR) is displaced[2,3] in front of the capsular bag (which may cause pigment dispersion and secondary glaucoma) , (IV) when a multifocal lens is decentered, (V) when there is a one-piece lens in the sulcus. This article presents techniques for dealing with complicated surgical scenario through a case with prior complicated cataract surgery with decentered IOL and CTR.

**Case Presentation:** A 60-year-old man with a history of hypertension underwent a routine cataract surgery of the left eye with a capsular tension ring (CTR) implantation in another hospital. Two weeks after the operation, the patient presented with complaints of blurry vision and pain in the left eye.

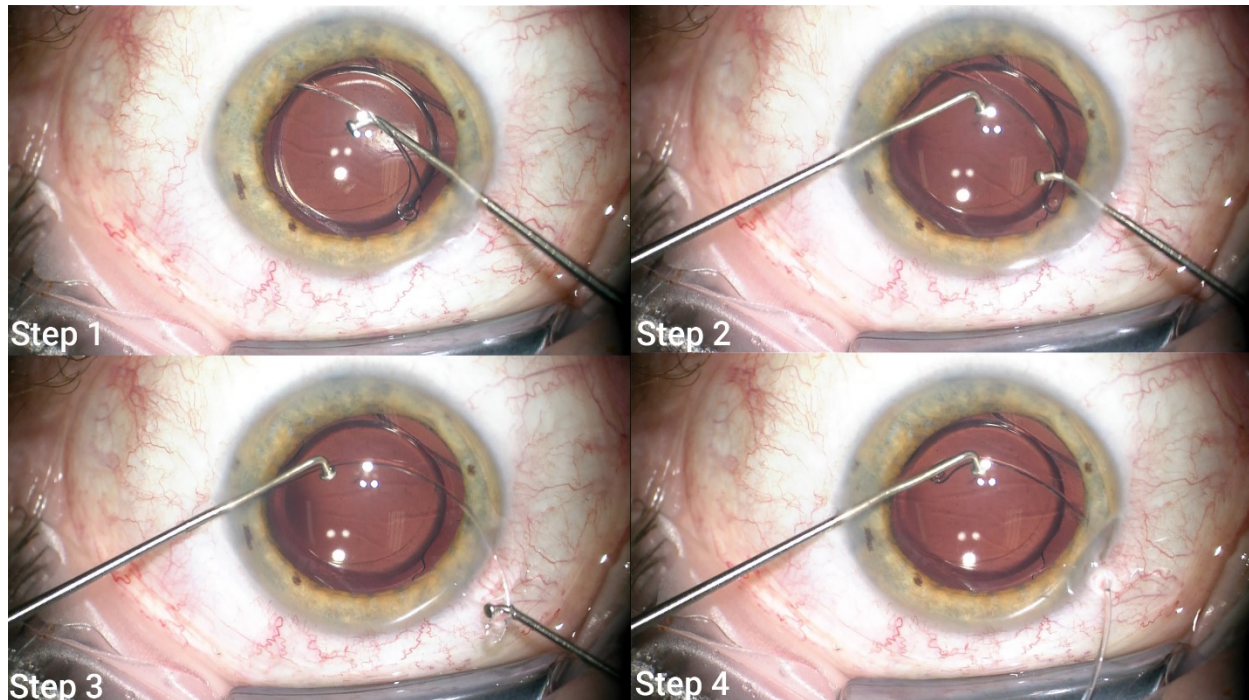
His Visual acuity was 0.05 and IOP was 25 mmHg. Objectively the patient had conjunctival hyperemia, cells in the AC. The lens was tilted and decentered. The capsule tension ring was partially displaced anteriorly and could be seen in front of the IOL from 6-9 o'clock [photo 1]. The serologic tests revealed borderline Cytomegalovirus-IgM and positive Cytomegalovirus- IgG. The patient was scheduled for surgery.



[Photo #1] Preoperative photograph of the anterior segment demonstrating the dislocated CTR

At presentation the patient was observed for beginning endophthalmitis, but after pupillary dilatation he was diagnosed with CTR and IOL decentration and was scheduled for AC – tap with CTR explanation and IOL repositioning.

The surgery consisted of locating and opening of the cataract surgery main incision. An additional 1.5 mm side port was created at 3 o'clock. A small sample of aqueous humor was taken for laboratory testing (PCR for CMV and HSV-1). Using 2 blunt instruments the CTR was mobilized and rotated using a bimanual no-grab, no-touch technique [see photo 2].



[Photo #2] Step by step demonstration of the bimanual blunt-instrument dialing out, no-touch technique for subluxated CTR explanation

After the CTR explanation, IOL was moved in all directions in the capsular bag (using one of the blunt instruments) to check for any zonular weakness. A zonular loss with vitreous prolapse was noticed from 1 - 3 o'clock. The AC was filled with ophthalmic viscosurgical device (OVD) and the corneal incisions were sealed with basic saline solution (BSS). A 4 mm perilimbal sclerotomy was performed followed by anterior vitrectomy initially with only OVD in the AC, and later with irrigation. The IOL was carefully centered in the capsular bag.

The patient had no complication in the postoperative period.

**Discussion:** Several publications including Sjolholm-Gomez concluded that the postoperative subluxation or dislocation of CTR-IOL-capsular bag complexes occurred approximately 5 - 6.8 years after in their case series.[4] In our case the decentration of the CTR was less than 1 month after the cataract surgery. We suppose that there were some complications during the surgery including zonular weakness and vitreous prolapse, that made the surgeon place the CTR in the first place. Due to the additional vitreous prolapse post-OP the subluxation occurred so early.

It is important to note that there are many causes of postoperative to anterior chamber (AC) inflammation. Despite that all patients should be carefully observed for signs of early endophthalmitis. The elevated CMV- IgM and CMV-IgG do not always correlate with elevated

intraocular CMV-IgM and CMV-IgG. Careful observation of the clinical presentation in addition to AC-tap is the most effective way to diagnose early endophthalmitis [5]. In this specific case the patient was younger than expected (60 years old) for cataract formation. Together with the positive for CMV serology we decided to take an AC and vitreous sample so that we can exclude the possibility CMV of Uveitis. It is theoretically possible for the CMV Uveitis to occur regardless of the CTR and IOL subluxation.

Picking the right explanation technique is key to minimize the risk of induced surgical trauma. This is why in this case two blunt-tip instruments were used to carefully dial out the CTR. This careful bimanual technique poses less risk of corneal touch and postoperative endothelial decompensation.

When switching to anterior vitrectomy it is important to achieve a good seal of the corneal incisions. In addition to that we routinely use a pressure plate instrument (see video) when performing the sclerotomies. In cases where it is required to perform anterior vitrectomy, we believe it is much better to perform a 1 port vitrectomy rather than using the vitrector through the main cataract incision. The first technique uses the vitrector to pull the vitreous back (this reducing traction), while the second technique drags the vitreous forward.

Maintaining the AC during anterior vitrectomy is crucial. It is best when the surgeon uses OVD to fill the AC, rather than keeping the Irrigation line in the AC. As you are removing the vitreous with the vitrector the whole IOL + capsular bag complex comes down and if there is an active positive pressure on top (Irrigation line in the AC) one may encounter a complication - lens touch. The OVD maintains the AC without applying excess pressure on the IOL and capsular bag complex.

**Conclusion:** Partial anterior dislocation of a CTR is rare and the mechanism may not be clear. A CTR explanation and an IOL repositioning can often present with surgical difficulties. In order to achieve an excellent outcome, a careful surgical planning should be performed.

#### References:

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