Sutureless scleral fixated three-piece intraocular lens in the management of dislocated capsular bag–capsular tension ring–intraocular lens complex

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A number of techniques have been described in the management of capsular bag (CB)–capsular tension ring (CTR)-intraocular lens (IOL) dislocation, including pars plana vitrectomy (PPV) with explantation of the CTR and IOL through a corneal section and exchange with a scleral suture-fixed IOL or anterior chamber IOL, and repositioning of the CB–CTR–IOL complex with scleral suture fixation. We describe a technique of managing CB–CTR–IOL dislocation which involves PPV with CTR removal and sutureless scleral fixation of the same three-piece IOL. This was performed in two patients with good visual outcome and well-centered IOLs postoperatively.

Key words: Capsular bag, capsular tension ring, scleral fixated intraocular lens

The capsular tension ring (CTR) is an endocapsular support device which allows for cataract surgery success in the setting of zonular instability.¹ Capsular tension rings are commonly used to manage cataract cases complicated by zonular weakness (pseudoexfoliation syndrome), zonular dehiscence (traumatic or iatrogenic), or ectopia lentis (idiopathic, Marfan syndrome, and Weill–Marchesani syndrome).²,³ They lower the incidence of capsule contraction, stabilize the capsular bag (CB), and enhance intraocular lens (IOL) centration.⁴,⁵ However, posterior dislocation of the CTR or CB–CTR–IOL complex can occur rarely postoperatively.⁶,⁷ In this report, we describe our technique of management of late dislocation of CB–CTR–IOL complex with sutureless scleral fixation of the same three-piece IOL.

Case Reports

Case 1
A 36-year-old male with Marfan syndrome was referred to our clinic for the management of spontaneous CB–CTR–IOL complex dislocation in his left eye (LE). Cataract surgery with CTR implantation was done 4 years prior to presentation for lens subluxation in his LE. His best-corrected visual acuity (BCVA) was 6/9 in the right eye (RE) and 6/24 in the LE. The RE had a clear lens which was mildly subluxated superonasally with a normal posterior segment. The LE had a dislocated CB–CTR–IOL complex inferiorly with a normal fundus. Intraocular pressure (IOP) measured 17 mmHg and 15 mmHg in the RE and LE, respectively. He underwent CTR removal via pars plana vitrectomy (PPV) with sutureless scleral fixation of the same three-piece IOL. Surgery and immediate postoperative period were uneventful. At 16 months after surgery, BCVA in the LE was 6/9. The IOL was well centered and the IOP measured 15 mmHg.

Case 2
A 52-year-old male presented with sudden visual loss and monocular diplopia in the RE of 1-week duration. There was no history of ocular trauma prior to presentation. Seven years earlier, he had undergone phacoemulsification with a CTR and three-piece IOL implantation in the RE. Surgery was complicated as a result of pseudoexfoliation. At presentation, the BCVA was 6/12 in the RE and 6/6 in the LE. The RE had an inferiorly decentered CB–CTR–IOL complex and a normal fundus with a cup–disc ratio of 0.3. The IOP measured 16 mmHg. The LE was essentially normal. The cup–disc ratio was 0.3 and IOP measured 17 mmHg. He underwent PPV with CTR removal and sutureless scleral fixation of the same three-piece IOL. Postoperative period was uneventful, and the IOL was well centered. After 1 month, the BCVA was 6/9 in the RE, and this was maintained at the last follow-up visit at 12 months. His IOP was within normal limits at every visit.

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Cite this article as: Kannan NB, Adenuga OO, Renu RP, Ramasamy K. Sutureless scleral fixated three-piece intraocular lens in the management of dislocated capsular bag–capsular tension ring–intraocular lens complex. J Clin Ophthalmol Res 2020;8:35-7.
After clinic visit during this period, and there was no evidence of glaucomatous optic nerve damage.

After administration of peribulbar anesthesia, conjunctival peritomies were created from 2 to 4 o’clock and 8–10 o’clock meridians at the temporal and nasal limbus. Two 3-mm partial-thickness scleral grooves were then made 1.5 mm from the limbus 180° apart at 3 and 9 o’clock meridians perpendicular to the limbus [Figure 1a and b]. The two tunnels were oriented in opposite directions and parallel to the limbus.

Standard 23G PPV ports were made, and total PPV was performed. Perfluorocarbon liquid (PFCL) was then injected over the macula, and vitreous adhesions between the CB–CTR–IOL complex were severed, thereby allowing the CB–CTR–IOL complex to float over the PFCL bubble. The CB was separated from the CTR and IOL, and the CTR was cut into two pieces with intravitreal scissors [Figures 2a, b and 3]. The dominant port was then converted to 20G using a 20G microvitreoretinal blade, and each CTR piece was removed through this port using Chang’s 25G inverse forceps. Through one end of each scleral groove at 3 and 9 o’clock meridians, scleral entry was made with a 24G needle. One IOL haptic was then grasped with Chang’s forceps introduced through the sclerotomy, externalized [Figure 3], and tucked in the scleral groove [Figures 4 and 5]. A similar maneuver was performed for the second haptic. The PFCL bubble was removed and replaced with balanced salt solution. The peripheral retina was evaluated for any breaks by indirect ophthalmoscopy. The sclerotomies and conjunctiva were then closed with 7-0 vicryl suture.

**Discussion**

Various techniques have been described in the management
of CB–CTR–IOL dislocation, including PPV with explantation of the CTR and IOL through a corneal section and exchange with a scleral suture-fixated IOL or anterior chamber IOL, and repositioning of the CB–CTR–IOL complex with scleral suture fixation.[4,6,7] The CTR can be removed in toto or by dividing it into two halves with intravitreal scissors or a vitrectomy cutter.[5] Dividing the ring into two halves prevents the potential complications of the ring hitting the retina or disturbing the vitreous base while retrieving it from the sclerotomy port.[5] In our case, removal of the CTR was done through the sclerotomy port after it was divided into two with intravitreal scissors. This was then followed by sutureless scleral fixation of the same three-piece IOL. Sutureless scleral posterior chamber IOL fixation has been shown to provide good visual outcomes in eyes with insufficient zonular support with minimal complications.[8] This report demonstrates that it can also be done along with CTR removal in cases of CTR–IOL dislocation with good results.

The main advantages of this procedure include early visual rehabilitation and ability to reposition the IOL without re-opening the corneal section, thus minimizing postoperative astigmatism. Corneal endothelial injury is avoided as no manipulation takes place in the anterior chamber, while using the same IOL for scleral fixation helps to save cost. The suture-related complications of the conventional scleral IOL fixation technique are also not encountered in this sutureless procedure. Other complications associated with scleral suture-fixated IOLs may, however, occur such as transient IOP rise, anterior chamber and vitreous hemorrhages, retinal detachment, and endophthalmitis.[9,10] We did not experience any of these complications in the cases presented.

Conclusion

Sutureless scleral fixation of the same three-piece IOL can be considered as a safe and effective option following CTR removal in cases of CTR–IOL complex dislocation. It allows the repositioning of the dislocated posterior chamber IOL without re-opening the corneal incision. Further studies will, however, be necessary to confirm the efficacy and long-term stability of this procedure.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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