

Modified balanced two-string technique of internal scleral fixation of posteriorly dislocated intraocular lens

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Posterior dislocation of the intraocular lens (IOL) is a rare but potentially dangerous complication encountered by a cataract surgeon. We describe a modified balanced two-string technique of internally fixing a posteriorly dislocated rigid IOL using the pars plana approach in eyes which lack adequate capsular support. Five eyes of five patients underwent the procedure. All eyes had successful IOL refixation. One eye had mild temporal decentration. BCVA improved in all patients. Our technique is an alternate method of scleral fixation of posteriorly dislocated IOL with advantages of minimal postoperative astigmatism, minimal anterior segment manipulation, and good IOL centration.

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Website:
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DOI:
10.4103/ijo.IJO_922_20

Quick Response Code:



Key words: Balanced two-string, intraocular lens, internal fixation, posterior dislocation, sclera

Posterior dislocation of the intraocular lens (IOL) is a rare but potentially dangerous complication encountered by a cataract surgeon.^[1] Numerous techniques have been described to handle a posteriorly dislocated IOL. The technique of being employed in tackling the dislocated IOL depends on the adequacy of capsular support. In the presence of adequate capsular support, pars plana vitrectomy with the placement of IOL in the ciliary sulcus can be performed. In the absence of capsular support, the IOL has to be explanted and can be replaced by an iris or scleral fixated lens.^[2-4] We describe a modified balanced two-string technique of internal fixation of a posteriorly dislocated rigid IOL using the pars plana approach in eyes which lack adequate capsular support.

This is a prospective case series. Institutional review board and ethical review board approval were obtained. All patients with posteriorly dislocated IOL following routine cataract surgery/secondary to blunt trauma from January 2017 to June 2017 were included in the study. We excluded eyes with foldable IOLs, rigid IOLs without dialling hole, preexisting amblyopia, pediatric patients, and concurrent posterior segment pathology precluding visual improvement. All patients underwent a complete ophthalmic examination.

Best-corrected visual acuity (BCVA), automated keratometry, and detailed fundus evaluation were done for all patients at

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Received: 10-Apr-2020

Revision: 08-Jul-2020

Accepted: 09-Sep-2020

Published: 17-Feb-2021

each visit. The primary outcomes were change in BCVA and corneal astigmatism; and secondary outcomes were incidences of intraoperative and postoperative complications. All patients were followed up at 1 week, 1 month, 3 months, and 6 months. All the surgeries were performed by a single surgeon.

Surgical Technique

Eligible patients underwent a standard three-port pars plana vitrectomy with 25G system. Conjunctival peritomy was done, two diagonally opposite scleral grooves were made 2 mm from the limbus and parallel to it depending on the location of the primary incision and 25G ports were placed. After core vitrectomy, the posterior vitreous detachment was induced. The vitreous around the IOL was trimmed free of surrounding adherent vitreous with the cutter. The IOL was levitated using perfluorocarbon liquids (PFCL) and brought up to the anterior vitreous. Later, 9-0 polypropylene sutures with straight needles were passed through one edge of the scleral groove. The IOL was then held obliquely with a forcep and the needle was passed through the IOL dialling hole. The needle was then brought out through the opposite scleral groove with a 26G

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Cite this article as: Kumar RM, Konana VK, Kanakamedla A, Gudimetla J, Poluri S, Potti S. Modified balanced two-string technique of internal scleral fixation of posteriorly dislocated intraocular lens. Indian J Ophthalmol 2021;69:762-4.

needle using the rail-road technique. The same needle was again reintroduced through the other end of the scleral groove forming a loop. The needle was then passed through the other dialling hole and brought out through the scleral groove using a 26G needle. Care should be taken that the needle is passed from below upwards through one dialling hole and from above downwards through the other dialling hole, thus balancing the IOL. The polypropylene suture was tied with multiple throws in the scleral groove ensuring IOL centration. The knot was buried in the scleral groove to prevent exposure. This was followed by fluid-PFCL exchange and closure of sclerotomies and conjunctiva [Figs. 1,2 and Video clip 1].

The procedure was performed on five eyes of five patients, during the study period. Two patients were male and three were females. Mean age was 62.18 ± 10.26 years. Three eyes had posterior dislocation due to complicated cataract surgery and two due to blunt trauma. Preoperative and postoperative characteristics were as mentioned in Table 1.

All eyes had successful IOL refixation [Fig. 3]. None of the patients had intraoperative complications. One eye (case 3) had mild temporal decentration. BCVA improved in all patients. No complications like retinal detachment and endophthalmitis were seen at the end of 6 months.

Discussion

Posterior dislocation of IOL is a commonly encountered clinical scenario in vitreoretinal practice. Explantation of the posteriorly dislocated IOL involves the creation of a new incision or, reopening of the primary incision to deliver out the IOL which is associated with unstable intraocular pressure control, corneal trauma, postoperative astigmatism, and related complications.^[5] It also means additional expenditure on the procurement of a new IOL for this purpose.

Balanced two-string technique for scleral fixation of the IOL in the absence of capsular support has been described.^[6] We modified this technique by using a pars plana route to fixate the IOL to the sclera. Scleral fixation of posterior dislocated rigid IOL by pars plana route has been previously described by the authors.^[7] Pars plana approach has been described to be a safe and efficient technique of IOL fixation with the advantage of avoiding a sclero-corneal incision which reduces the postoperative astigmatism. It also leads to minimal anterior segment manipulation, has better intraoperative fluidics and is economical.^[7] The balanced two-string technique described by Ibrahim *et al.* helps to achieve IOL centration.^[6]

Thus, combining a pars plana approach and balanced two-string technique would be an alternate technique of internal scleral fixation of posterior dislocated IOL. In the previously described technique of internal scleral fixation of IOL by the authors, the IOL was anchored to the sclera at two points, using a polypropylene suture. In this technique, the knot is tied only on one side and the IOL centration can be readjusted even after tightening the knot.^[7]

All eyes had improvement in the BCVA postoperatively. No sight-threatening complications were noted in this study except for minimal temporal decentration of the IOL in case 3 which did not need any further surgical intervention as the decentration was minimal. Ibrahim *et al.* noted lens decentration ranging from 0.21 mm and 0.9 mm (average 0.53 mm).

In our study, we have performed the procedure in eyes with rigid posteriorly dislocated IOL with dialling holes. Ibrahim *et al.* has described this technique on foldable IOL as well. Authors excluded eyes with foldable IOLs in this study, as manipulating the foldable IOL as described by Ibrahim *et al.* would be technically challenging with an internal approach.

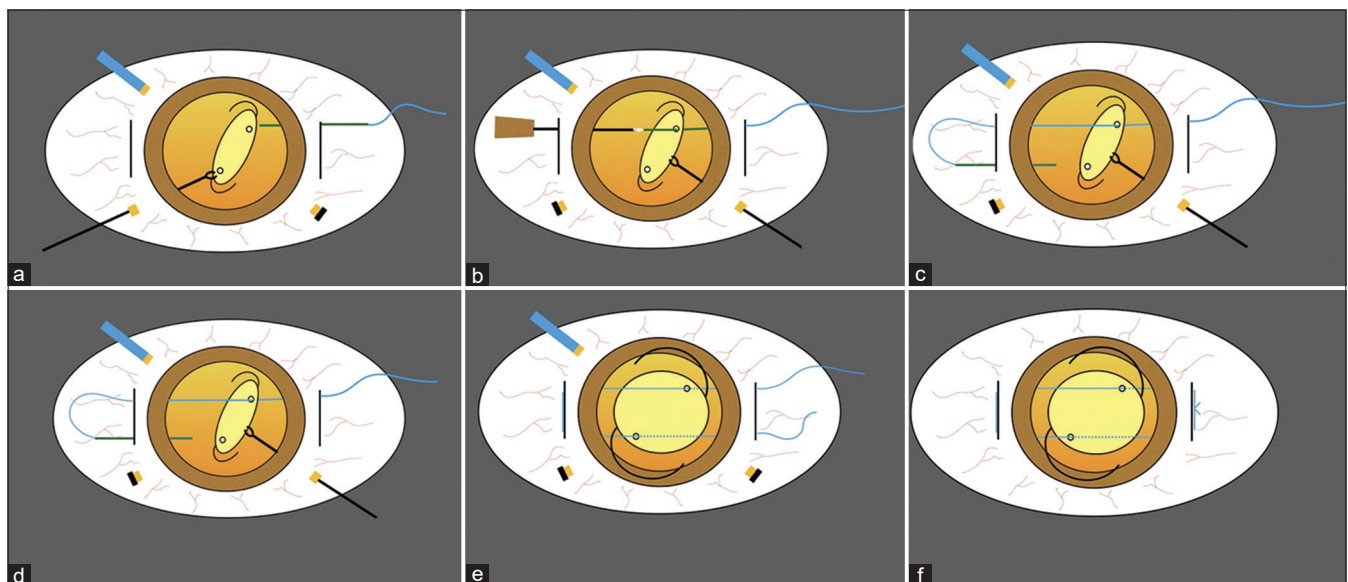


Figure 1: Schematic representation of the surgical technique (a): 9-0 polypropylene sutures with a straight needle is passed through one edge of the scleral groove. IOL is then held with a forceps and the needle is passed through the dialling hole. (b): The needle is then brought out through the opposite scleral groove using a 26G needle (c): The same needle is again reintroduced through the other end of the scleral groove forming a loop (d and e): The needle is then passed through the other dialling hole and brought out through the scleral groove using 26G needle (f): The suture is tied after confirming the IOL centration

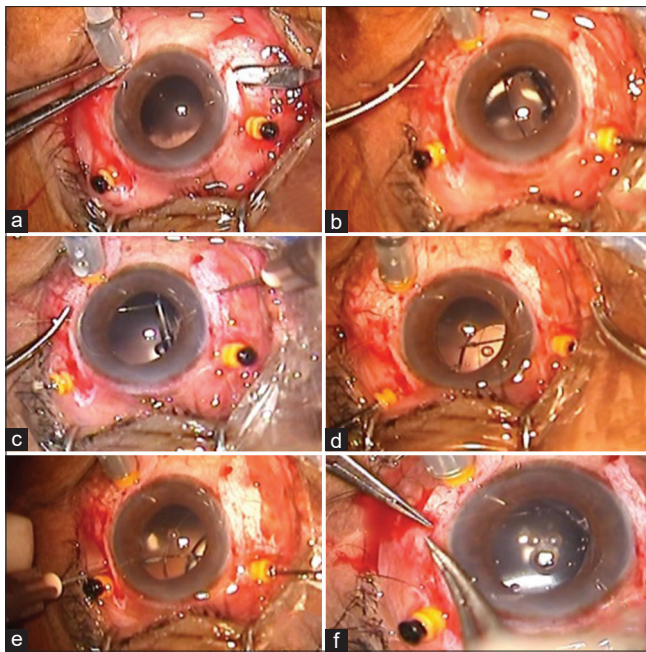


Figure 2: Intraoperative photos showing the technique (a): Scleral groove created 2 mm from the limbus (b): Straight needle of 9-0 prolene sutures are passed through one edge of the scleral groove. IOL is then held with a forceps and the needle is passed through the dialling hole (c): The needle is then brought out through the opposite scleral groove using 26G needle (d): The same needle is reintroduced through the other end of the scleral groove forming a loop (e): The needle is then passed through the other dialling hole and brought out through the opposite scleral groove using 26G needle (f): The suture is tied

Table 1: Preoperative and postoperative characteristics of eyes which underwent modified balanced two-string technique of internal scleral fixation of posteriorly dislocated intraocular lens

Cases	Pre-op BCVA	Post-op BCVA	Difference in Keratometer values	Chances in overall astigmatism
Case 1	6/60	6/18	<0.25 D	<0.5 D
Case 2	6/36	6/24	<0.25 D	<0.5 D
Case 3	6/18	6/18	<0.5 D	<0.75 D
Case 4	6/36	6/9	<0.25 D	<0.5 D
Case 5	6/12	6/6	<0.25 D	<0.5 D

BCVA - Best-corrected visual acuity

Further studies are required to assess the feasibility of this technique on foldable IOLs.

Internal fixation of dislocated IOL using our technique offers several advantages. Firstly, the IOL can be fixated without creating an astigmatic incision. Secondly, there is no manipulation in the anterior chamber, thus minimizing corneal endothelial cell loss. Thirdly, since no incision is made, the intraoperative IOP control is excellent.

Limitation of this technique is that rigid IOL without dialling holes cannot be fixated using this technique and the

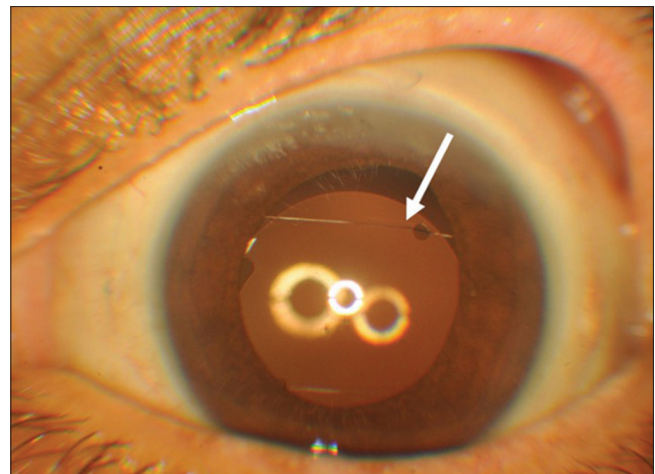


Figure 3: Postoperative anterior segment photograph showing well-centered intraocular lens. The prolene suture used as a sling can be seen passing through the superior dialling hole can be seen (white arrow)

procedure has to be performed by an experienced vitreoretinal surgeon.

Conclusion

Our technique of modified balanced two-string technique is an alternative method of scleral fixation of posteriorly dislocated IOL with advantages of minimal postoperative astigmatism, minimal anterior segment manipulation, and good IOL centration.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Pueringer SL, Hodge DO, Erie JC. Risk of late intraocular lens dislocation after cataract surgery, 1980–2009: A population-based study. *Am J Ophthalmol* 2011;152: 618-23.
- Narang P, Agarwal A. Glued intrascleral haptic fixation of an intraocular lens. *Indian J Ophthalmol* 2017;65:1370-80.
- Soiberman U, Gehlbach PL, Murakami P, Stark WJ. Pars plana vitrectomy and iris suture fixation of posteriorly dislocated intraocular lenses. *J Cataract Refract Surg* 2015;41:1454-60.
- Mensiz E, Aytuluner E, Ozerturk Y. Scleral fixation suture technique without lens removal for posteriorly dislocated intraocular lenses. *Can J Ophthalmol* 2002;37:290-4.
- Kwon HJ, Nam SM, Stulting SD, Lim CY, Seo KY. Comparison of surgically induced astigmatism following iris-claw PIOL insertion with scleral, limbal, or corneal incisions. *J Refract Surg* 2014;30:330-3.
- Ibrahim HA, Sabry HN. The balanced two-string technique for sulcus intraocular lens implantation in the absence of capsular support. *J Ophthalmol* 2015;2015:153963. doi: 10.1155/2015/153963.
- Rajanna MK, Konana VK, Kanakamedla A, Sagar P, Gudimetla J. A novel technique of internal scleral fixation of posteriorly dislocated intraocular lens. *Retina* 2019. doi: 10.1097/IAE.0000000000002529.