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Intraocular lens explantation: 3-year retrospective analysis

Abstract

Aim: Intraocular lens (IOL) in rare cases can be the cause of eye pathology and complications that indicate IOL explantation surgery. Removing of an IOL can be indicated at the time of primary IOL implantation or in early or late postoperative period. The aim of our study was to evaluate indications and efficacy of IOL explantation procedure.

Patients and methods: Our retrospective study included 14 eyes from 14 patients treated with IOL explantation with or without new IOL reimplantation in three year period from March 2010 to March 2013. The study included a review of medical records from patients treated with IOL explantation surgery with or without new IOL reimplantation. We analyzed intraoperative and postoperative complications related to the IOL exchange and their incidences.

Results: Indications for explantation were: subluxation or dislocation of the IOL implant in 6 eyes (43%), corneal decompensation in 4 eyes (29%), IOL damage in 3 eyes (21%) and incorrect IOL power in 1 eye (7%). Intraoperative treatment after IOL explantation was IOL reimplantation in 8 eyes (57%) and aphakia in 6 eyes (43%). Intraoperative complications of IOL explantation surgery are dependent on implantation-explantation period.

Conclusion: IOL explantation surgery is demanding procedure associated with careful preoperative planning and potential perioperative risks. Although associated with a high incidence of complications, IOL explantation with reimplantation can significantly improve visual acuity.

Keywords: intraocular lens explantation, intraocular lens reimplantation, cataract surgery

Volume 4 Issue 5 - 2016

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Received: August 11, 2016 | **Published:** August 22, 2016

Abbreviations: IOL, intraocular lens; PCO, posterior capsular opacification; UGH, uveitis-glaucoma-hyphema; UCVA, uncorrected visual acuity; BCVA, best corrected visual acuity; VA, visual acuity; PEX, pseudo exfoliative syndrome; PC, posterior chamber; D, Diopter

Introduction

Changes in intraocular lens (IOL) design and performance from first lenses to present are the reason for continuous progress in cataract surgery. There are rare but important clinical cases when IOL can be the cause of eye pathology and complications that indicate IOL explantation with or without IOL replacement. Removing an IOL can be indicated at the time of primary IOL implantation or months or years later as a postoperative secondary procedure. Most common indications for primary intraoperative explantation are incorrect IOL type or power, damaged IOL, such as a fractured haptic or damage to ocular tissues during insertion of the IOL.[1] Postoperative secondary indications are undesirable optical aberrations and glare, damaged IOL, incorrect IOL power, malposition of the IOL, corneal decompensation and bullous keratopathy, posterior capsular opacification (PCO), iritis/uveitis-glaucoma-hyphema (UGH) syndrome and chronic cystoid macular edema.[2,3] The aim of our study was to evaluate indications and efficacy of the intraocular lens explantation procedure.

Patients and methods

Our study was retrospective study that included all IOL explantation procedures that were performed at Department of Ophthalmology, Clinical Hospital Center Rijeka, Croatia in period from March 2010 to March 2013. The study included a review of medical records for 14 eyes from 14 patients treated with IOL explantation surgery with or without new IOL reimplantation. A detailed preoperative and postoperative ophthalmic examination was performed, which included uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), biomicroscopic and fundus examination. Intraocular pressure (IOP) was measured with applanation tonometry. We analyzed intraoperative and postoperative complications related to the IOL exchange and their incidences.[4]

All IOL explantation surgeries were managed by experienced surgeon through a limbal incision. Technique of IOL removal was dependant on the type of the IOL, location of the IOL and perioperative complications. Topical anesthesia with 2% lidocaine gel was used in all cases. Two side-ports were made in clear cornea and main incision was made at the temporal side. The ophthalmic viscoelastic device was introduced into the anterior chamber. For separation of possible peripheral adhesions between IOL and ocular tissues a 23

gauge needle with a bent tip and viscoelastic device were used. IOL was separated from adjacent ocular tissue by visco-dissection and rotated to confirm that the IOL is free of peripheral adhesions. With the IOL positioned in the anterior chamber, removal of IOL was performed by two techniques. First technique is IOL explantation through a stigmatically neutral 3-4mm small incision by IOL cutting or refolding. IOL can be cut into incision-size pieces with special scissors in anterior chamber and then removed. In second technique, a method known as 'Pac Man' was performed, where three-piece IOL is removed by cutting with scissors about 2/3 through the IOL optic and rotating the IOL through the incision.[5,6] In second technique IOL is explanted "flat", unfolded through extended incision to 5-6mm.

When the IOL was adherent to the capsular bag or chamber angle tissues, one or both haptics were cut peripherally and left in primary position in order to prevent zonular dehiscence. Anterior vitrectomy was performed when vitreous loss was determined. New foldable IOLs were implanted into the capsular bag when capsular integrity was maintained. When the IOL was explanted along with the lens capsule or in case of zonular dehiscence, a new foldable IOL was fixated to the sclera or IOL was implanted in anterior chamber. In the end, viscoelastic device was removed by irrigation and aspiration and the incision was closed with interrupted 10-0 nylon sutures. After surgery, patients received corticosteroid/antibiotic eye drops four times a day per 1 month.

IOL power was calculated before initial cataract surgery using the keratometric values and axial length. The SRK/T formula was used to calculate IOL power. During postoperative follow-up, visual acuity (VA), intraocular pressure (IOP), biomicroscopic and fundus status were monitored. Postoperative best corrected visual acuity (BCVA) results were obtained 1.5 month after operation. The mean postoperative BCVA was compared with the recorded BCVA before IOL explantation surgery.

Results

The subjects included in our study were 9 men (64%) and 5 women (36%). The initial cataract surgery procedure was a phacoemulsification surgery in 9 eyes (64%) and an extracapsular cataract extraction in 5 eyes (36%). The time interval between initial IOL implantation and the IOL explantation was from 2 days to 60 months, mean period between operations was 14 months. Preoperative location of the IOL with indication for explantation was anterior chamber in 2 eyes (14%) and posterior chamber in 12 eyes (86%).

Indications for explantation in our study were: subluxation or dislocation of the implant in 6 eyes (43%), corneal decompensation in 4 eyes (29%), IOL damage in 3 eyes (21%) and incorrect IOL power with refractive surprise in 1 eye (7%). Most common indication for IOL removal with anterior chamber location of the IOL was corneal decompensation. For posterior chamber IOL, main indication for removal was IOL subluxation; 50% of the eyes had pseudoexfoliative syndrome (PEX) with probable spontaneous loss of zonular support.

Intraoperative treatment after IOL explantation was new IOL reimplantation in 8 eyes (57%) and aphakia in 6 eyes (43%). IOL was reimplanted in posterior chamber (PC): in the bag in 4 eyes (50%), sulcus fixation in 1 eye (12.5%) and in anterior chamber in 3 eyes (21%). We compared preoperative best corrected visual acuity (BCVA) with postoperative best corrected visual acuity. Postoperative BCVA were obtained during follow-up visit, at least 1.5 month after surgery. Our data also showed improved postoperative BCVA after IOL explantation with reimplantation in 6 eyes (43%), mean postoperative BCVA after IOL exchange was 0.58 according to Snellen charts and mean preoperative BCVA before IOL exchange was 0.43 according to Snellen charts. In 2 eyes, postoperative BCVA was equal to preoperative BCVA, with mean BCVA value 0.6 according to Snellen charts. In 3 eyes postoperative BCVA was worse than preoperative BCVA, with mean postoperative BCVA 0.016 to hand movement.

Discussion

Clinical reports regarding the indications and need for IOL explantation is rare. In past few years, there are an increasing number of explanted multifocal IOLs in foreign studies but in correlation to the fact that more of these lenses are being implanted. Our results can be compared to foreign studies, as Neuhann et al.[3] 2012 year study in which indications for IOL removal were subluxation/dislocation of the implant in 55.2% of cases, optical problems/incorrect IOL power (21%), calcification of hydrophilic acrylic IOL (7.6%), corneal decompensation associated with an anterior chamber lens (4.8%), and single cases with varying problems. As known from previous studies, IOL removal without implantation is very rare.[7] Although our study involved a small number of patients and requires larger studies to accurately determine the most meaningful steps to perform IOL explantation, our results can be compared with results from previous articles.

In our study, corneal decompensation with or without recurrent uveitis was main reason for postoperative aphakia in 5 eyes (36%) of 6 aphakic eyes (43%). Intraoperative complications of IOL explantation surgery are dependent on implantation-explantation period because of possible adhesions between the capsule or chamber angle and the optic or the haptics of IOLs. In case of peripheral anterior synechiae, "fibrotic cocoons," around the haptics in the angle, haptic amputation with scissors is an option; the haptics can be either left in their primary position because forced traction may result in iridodialysis and hyphema.[1,6] Most common intraoperative complications are partial zonular dehiscence, total zonular dehiscence and posterior capsule rupture, in 4.3–50% of eyes during surgery.[8–11] The intraoperative complications recorded in our study were anterior vitrectomy, performed in 5 eyes (36%), zonular dehiscence in 1 eye (7%), 1 profuse iris bleeding (7%), peripheral adhesions between IOL and anterior chamber angle with need for haptic amputation and retained haptics in 1 eye (7%). There were no complications caused by retained haptics, as is familiar from similar reports.[12]

Postoperative visual acuity results are dependent on the preoperative complications and indications for IOL explantation. Most common reason for postoperative negative results was corneal decompensation. IOL explantation was indicated in eyes of 4 patients who primary underwent traumatic cataract surgery and indication for explantation was corneal decompensation with recurrent uveitis in 3 eyes and total zonular dehiscence in 1 eye. In our only case of IOL surprise, as potentially preventable error, the posterior chamber IOL implanted after cataract surgery had 13.48 diopter (D) powers with postoperative refraction -9.00 Dsph - 1.50 Dcyl ax 90 with 1.0 visual acuity according to Snellen chart. IOL explantation with exchange with 22.0 D lens was performed 8 months following primary surgery with postoperative BCVA 1.0 according to Snellen chart.

Citation: Babić MB, Merlak M. Intraocular lens explantation: 3-year retrospective analysis. *Adv Ophthalmol Vis Syst.* 2016;4(5):147–149.
DOI: 10.15406/aovs.2016.04.00129

Conclusion

IOL explantation surgery is demanding procedure associated with careful preoperative planning and dependent on indications for explantation and potential perioperative risks. Although associated with a high incidence of complications, IOL explantation with reimplantation significantly improves visual acuity. The clinical outcomes after an intraocular lens explantation have also improved markedly with the advent of modern foldable intraocular lenses.

Acknowledgments

None.

Conflicts of interest

The authors declare there are no conflicts of interest.

Funding

None.

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