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Secondary Intraocular Lens Implantation with Flanged Intrascleral Fixation in an Aphakia Patient

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Abstract

Cataracts are a leading cause of blindness globally, with surgery being the most effective treatment. While phacoemulsification is the standard procedure in developed nations, cases involving inadequate capsular support, such as aphakia, present unique challenges. The flanged intrascleral fixation technique has emerged as a promising solution, offering enhanced stability and reduced complications compared to traditional methods like scleral-sutured intraocular lenses (IOLs). This case report explores the implementation of this innovative technique in an elderly patient with aphakia.A 78-year-old woman with blurred vision and aphakia in her left eye was referred for IOL implantation. Following previous cataract surgery without lens implantation, she required a stable and durable solution. Using the flanged intrascleral fixation method, a 3 mm sclerocorneal tunnel was created, and a 5.0 polypropylene suture was inserted through the IOL fixation hole. The flange procedure stabilized the lens, ensuring precise positioning. The surgery was completed with minimal bleeding, and postoperative care included antibiotics and pressure-reducing agents. Follow-up confirmed successful IOL placement with no complications, highlighting the technique's efficacy. The flanged haptic technique represents a significant advancement in cataract surgery, particularly for patients with aphakia and insufficient capsular support. By simplifying the procedure and minimizing risks such as dislocation and inflammation, it offers improved surgical outcomes. Continued research into this method holds promise for enhancing patient care and advancing ophthalmological practices.

Keywords: cataract, intraocular lens implantation, flanged intrascleral fixation

BACKGROUND

The World Health Organization defines blindness as visual acuity of less than 3/60 in the best corrected eye.(1) Globally, about 94 million people are blind or visually impaired, with cataracts being the leading cause of blindness in the world.(2–4) At least 50% of all blindness is attributed to cataracts, with 90% of these cases occurring in developing countries.(5) In 2010, the prevalence of cataracts in the United States was 17.1%, while according to the results of the Riskesdas 2013 survey, the prevalence of cataracts in Indonesia was 1.4%, with respondents of all ages.(4)

Cataract is a condition of cloudiness in the lens, which can result from hydration of the lens, denaturation of lens proteins, or a combination of both.(6,7) Cataracts commonly occur in older age, it can also occur due to congenital abnormalities or as a complication of chronic eye diseases. (2,3,6,7) There are four surgical methods for cataract surgery in Indonesia, which are phacoemulsification, small incision cataract surgery (SICS), extracapsular cataract extraction (ECCE), and intracapsular cataract extraction (ICCE).(5)

Cataract surgery is widely considered as one of the most prevalent and efficient surgical interventions across all medical domains. While aging stands out as the primary cause, various other factors are recognized to contribute to cataract development.(8) Phacoemulsification stands as the preferred method for cataract surgery in developed nations, while manual small incision cataract surgery is commonly employed in developing regions. Typically, surgical outcomes are favorable, and complications like endophthalmitis can often be averted or effectively managed.(8,9)

However, in special populations,

inadequate capsular support remains a challenge, with intrascleral fixation techniques an alternative measure compared to traditional methods such as IOLs sutured to the sclera.(10) The flanged haptic technique, a subset of intrascleral fixation, demonstrates enhanced postoperative stability and reduced complication risks, thus highlighting its potential as an innovative advancement in cataract surgery.(11,12) We hereby present a case involving a 78-year-old woman who presented with aphakia, wherein the flanged haptic technique was applied.

CASE REPORT

A 78-year-old female patient referred from Permata Hati Hospital came to the ophthalmology clinic at Bangli General Hospital with the main complaint of blurred vision in both eyes. The patient had previously undergone cataract surgery on the left eye in the previous month, but an intraocular lens (IOL) had not been implanted. The patient has a history of hypertension for the past 4 years and is being treated with Tobramycin with Dexamethasone eye drops 6 drops per day in the left eye, methylprednisolone 8 mg three times a day, paracetamol 500 mg three times a day, and candesartan 8 mg once daily.

Physical examination within normal limits. Ophthalmological examination showed visual acuity of 2/60 in the right eye and hand motion in the left eye. The laboratory assessment and thorax x-ray were excellent. The patient was further diagnosed with left eye aphakia and scheduled for IOL implantation surgery using the Flanged Intrascleral Fixation technique three days later.

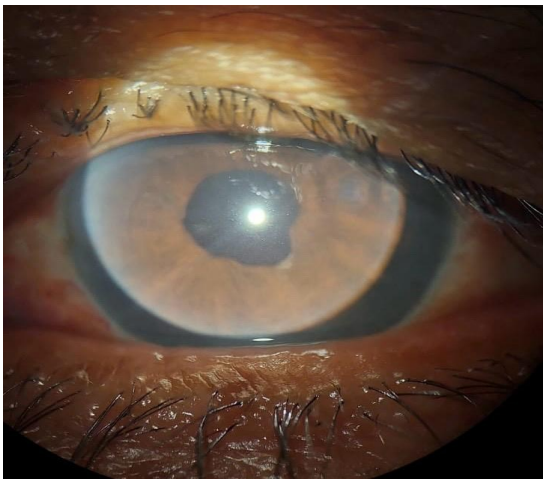

Figure 1. Image of the pre-operative examination before IOL implantation.

The patient was prepared for general anesthesia. Subsequently, the operative field was disinfected and dressed. Conjunctival peritomy was performed, followed by the creation of a 3 mm sclerocorneal tunnel. Then, an anterior chamber maintainer was inserted to balance the outflow, followed by the creation of a side port. The sclera was punctured with a g27 needle, then a 5.0 polypropylene suture was inserted into the needle and sclera, with the suture positioned through the IOL fixation hole. The flange procedure was then performed by making a small incision to insert a bovie, which could then anchor in place to stabilize the lens position during surgery. The IOL was inserted, directed centrally, and fixed with a bovie on the sclera**.** The surgeon successfully performed IOL implantation using the flanged technique. Subsequently, the patient was given carbachol to increase fluid outflow and reduce intraocular pressure. The patient was also

given intracameral Moxifloxacin antibiotic before wound closure and wound care using an eyepatch.

The surgery went smoothly with less than 1 cc of bleeding. After the operation, the patient was allowed to go home but was asked to return for a follow-up appointment one week after the surgery to monitor the repositioning of IOL. The patient experienced no significant adverse event post discharge reportedly and was given medication upon discharge.

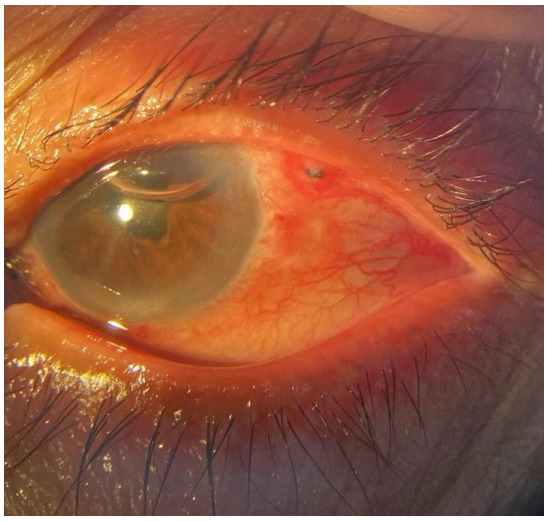

Figure 2. Image of the post-operative after IOL implantation.

CLINICAL QUESTION

From the case report provided, the formulated clinical query was: "What is flanged intrascleral fixation in lens implantation and the implementation of this procedure on an aphakia patient?"

PICO Question:

- Patient: Adult individuals diagnosed with cataract and aphakia
- Intervention/Concept: Flanged intrascleral fixation in lens implantation
- Context: Cataract surgery

Inclusion criteria encompass case reports, case-control studies, cohort studies, reviews, and clinical trials.

METHODS

The literature review was carried out by searching for the keywords "flanged intrascleral fixation" and "cataract" across multiple electronic databases including Google Scholar, PubMed, and through manual searches of e-books. The search strategy involved using a combination of keywords and Medical Subject Headings (MeSH) terms, employing a Boolean search method to efficiently combine and analyze the terms. Inclusion criteria involved adult patients diagnosed with cataract requiring lens implantation. Articles written in languages other than English were excluded.

DISCUSSION

Cataract extraction is widely acknowledged as the most common surgical procedure across medical specialties, with approximately 20 million cases globally.(13,14) Presently, the standard practice involves phacoemulsification with intraocular lens placement within the capsular bag, yielding favorable anatomical and functional outcomes with minimal complications.(9,15) However, despite the universal adoption of this surgical technique, there are significant variations in the approaches to preoperative and postoperative care, diagnostic procedures, surgical environments, precautions, and follow-up protocols.(15) These differences stem from numerous factors, including institutional policies, national regulations, insurance prerequisites, payment arrangements, and individual surgeon preferences and routines.(15) Notably, special attention is warranted for elderly patients, particularly those afflicted with aphakia, to ensure tailored management strategies are employed.(9,10)

When dealing with inadequate capsular support, caution is necessary considering secondary intraocular lens (IOL) implantation.10,16 Several publications have reported success upon procedure involves intrascleral fixation of the IOL haptic using a double-needled method with a flanged design.(10–12) This technique, introduced by Yamane and colleagues, has shown promising results with minimal adverse events in adult patients.(12) The term "flanged IOL fixation" refers to the creation of a flange at the end of the haptic to

ensure secure fixation.(12) Here, we present a case of a 78-year-old woman presenting at the outpatient clinic with aphakia in her left eye, for whom an operation utilizing the flanged haptic technique was scheduled.

Several surgical options are available for addressing inadequate capsular support, including anterior chamber IOLs, iris-claw lenses, iris-sutured IOLs, and scleral-fixated posterior chamber IOLs, which may utilize sutureless techniques or involving sutures or glue.(10,12) Previous approaches involving scleral-sutured IOLs have raised concerns regarding potential long-term side effects associated with slow suture degradation and erosion.(17) Complications such as loosened or broken sutures can result in IOL malposition, reported in up to 24% of cases, and there is also a risk of inflammation and increased susceptibility to endophthalmitis if suture erosion occurs.(18,19) Among these options, the intrascleral IOL fixation technique has gained popularity due to several advantages over traditional transscleral suturing methods.(12)

Meanwhile, the flanged technique offers several advantages over other sutureless methods. This surgical approach involves fixing the haptics of the IOL firmly to the sclera via the conjunctiva, without the need for sutures or glue. Unlike alternative techniques, it does not require dissection of the conjunctiva or the creation of scleral flaps or pockets, rendering it technically less complex, less traumatic, and potentially swifter.(10,12,20) The utilization of 30 G needles for haptic externalization, as opposed to larger gauge needles (20–24 G) utilized in other methods, along with the incorporation of flanged haptic ends, enhances postoperative IOL stability and diminishes the risk of postoperative complications such as leakage, hypotony, and haptic exposure.(12)

Similarly, the transscleral IOL suture technique also boasts advantages over other methods, which may raise concerns regarding corneal endothelial cell loss, glaucoma, and peripheral anterior synechiae.(11,21) Nevertheless, the primary challenge of this procedure lies in the insertion of the IOL haptic into the needle. Before the initial surgery, it is imperative to ascertain that the IOL haptic can be successfully inserted into a 30-gauge needle and that the flange can be created via haptic cauterization.(12) In this case, no significant difficulties were found regarding the procedure and it was conducted successfully.

One of the paramount concerns in intraocular lens (IOL) fixation techniques is ensuring the stability of the IOL haptics. Instability can lead to complications such as vitreous hemorrhage and cystoid macular edema. The flanged technique stands out in this regard, as it offers an advantage by minimizing the risk of postoperative IOL dislocation. This enhanced stability contributes to better overall outcomes and reduces the likelihood of complications associated with IOL movement or mispositioning, as this study reported no postoperative IOL dislocation.(10,14) However, several publications have reported several complications of the technique, with early complications ranging from vitreous hemorrhage, hypotony, elevation of intraocular pressure (IOP), and corneal edema, while late complications include iris capture of IOL, cystoid macular edema, and IOP elevation.(11,12) Nevertheless, there were no notable side effects in this case, and the patient was in good health. This result highlights the potential of the flanged technique as an innovative advancement in cataract surgery, particularly for patients with aphakia.

CONCLUSION

The flanged haptic technique presents a promising advancement in cataract surgery, particularly for patients with aphakia and inadequate capsular support. This surgical approach offers advantages such as enhanced stability, reduced risk of complications, and simplified surgical procedures, while addressing several key challenges associated with traditional methods. Hereby, we reported the case of a 78-year-old woman presenting with aphakia in which the application of the flanged haptic technique yielded successful results. While

some complications have been reported in literature, the absence of adverse effects in this case underscores the potential of the flanged technique to improve outcomes and contribute to the evolution of cataract surgical practices. Continued research and refinement of this technique hold promise for further enhancing patient care and surgical outcomes in the field of ophthalmology.

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