Saudi Journal of Ophthalmology (2014) 28, 253–256

Original article

Surgical outcomes of 23-gauge vitrectomy for the management of lens fragments dropped into the vitreous cavity during cataract surgery

Kyung Min Koh, MD; Hyoung Seok Kim, MD; Han Joo Cho, MD; Young Ju Lew, MD, PhD; Moon Jung Choi, MD; Jung Il Han, MD, PhD; Sung Won Cho, MD, PhD; Chul Gu Kim, MD; Tae Gon Lee, MD; Jong Woo Kim, MD, PhD; Su Jin Yoo, MD *

Abstract

Purpose: To assess the clinical features and surgical outcomes of 23-Gauge (G) vitrectomy for lens fragments dropped into the vitreous during cataract surgery.
Methods: A retrospective, non-comparative, interventional case series at a single medical center. The medical records of 45 eyes from 45 consecutive patients who were referred to our hospital for surgical retrieval of phacoemulsification dropped lens fragments and who underwent 23-G vitrectomy were retrospectively reviewed. Data pertaining to patient demographics, pre- and post-operative Snellen visual acuity, and postoperative complications were recorded. Factors associated with dropped lens fragments were also examined.
Results: Mean patient age was 68.18 ± 11.47 years. The preoperative and postoperative mean logarithm of minimum angle of resolution (logMAR) visual acuity was 1.91 ± 0.59 (Snellen equivalent 0.06 ± 0.15) and 0.42 ± 0.51 (Snellen equivalent 0.54 ± 0.31), respectively. Forty-two eyes (93.3%) had dislocated lens fragments <50% of the total lens size. Two eyes (4.4%) had a large and hard lens nucleus, which necessitated the use of a 20-G fragmatome to efficiently and completely remove the lens material. At the final examination, 30 eyes (66.6%) had a visual acuity better than 20/40. Post-vitrectomy complications included elevated IOP for at least 3 months (n = 5 eyes, 11.1%), intraocular lens dislocation (n = 2 eyes, 4.4%), and cystoid macular edema (n = 1 eye, 2.2%). No cases of postoperative endophthalmitis or retinal detachment were observed.
Conclusions: A 23-G vitrectomy is safe and efficient for the surgical management of dropped lens fragments following cataract surgery.

Keywords: Complication, Dropped lens, Lensectomy, Phacoemulsification, 23 Gauge vitrectomy

http://dx.doi.org/10.1016/j.sjopt.2014.01.001

Introduction

Dislocation and dropping of lens fragments into the vitreous during phacoemulsification is a serious complication during cataract surgery that occurs in 0.1–1.5% of all cases.[1] In clear-corneal incision cataract extraction, the rate of posteriorly dislocated crystalline lens ranges from 0.3% to 1.1%.[2] Intravitreal retained lens fragments, with an incidence rate between 0.1% and 1.6%, are a rare but potentially serious complication of cataract surgery, which can result in poor

Received 30 August 2013; received in revised form 9 November 2013; accepted 26 January 2014; available online 3 February 2014.

Department of Ophthalmology, Kim's Eye Hospital, Myung-Gok Eye Research Institute, Konyang University College of Medicine, Seoul, Republic of Korea

* Corresponding author. Address: Department of Ophthalmology, Kim's Eye Hospital, Konyang University College of Medicine Youngdeungpo 4th 156, Youngdeungpo gu, Seoul 150-034, Republic of Korea. Tel.: +82 1577 2639; fax: +82 2 2677 9214.
e-mail address: yousujin@kimeye.com (S.J. Yoo).

Peer review under responsibility of Saudi Ophthalmological Society, King Saud University

Production and hosting by Elsevier

Access this article online:
www.saudiophthaljournal.com
www.sciencedirect.com

visual acuity (VA) and other serious ocular complications.[3] Posterior-capsule rupture during phacoemulsification is the most frequent cause.[4] Three port 20-gauge (G) pars plana vitrectomy (PPV) has been the gold standard for vitreoretinal surgery since 1974, and standard 20-G PPV is an established surgical technique for retained lens fragments.[5,6] Compared with traditional 20-G vitrectomy, 23-G PPV permits decreased operative and healing times, faster visual recovery, and reduced postoperative inflammation associated with conjunctival and scleral sutures.[7] Additionally, diminished conjunctival scarring may result in a higher success rate for a patient's future surgical procedures.

Over the past decade, transconjunctival sutureless vitrectomy has been introduced and has dramatically reduced postoperative patient discomfort. In 2005, Eckardt[8] promoted the 23-G transconjunctival system, in an effort to combine the benefits of the 25-G and 20-G instrumentation. This report reviews the safety and efficacy of the 23-G PPV for lens fragment retrieval from the vitreous cavity following cataract surgery.

Methods

The medical records of consecutive patients who underwent PPV for retained lens material (surgeons: HSK, HJC, YJY, MJC, JIH, SWC, CGK, and SJY) between June 2008 and June 2012 were reviewed. All surgeries were performed at Kim's Eye Hospital retina center. The study protocol was reviewed and approved by the Human Investigation Committee of institution and was done in compliance with the Health Insurance Portability and Accountability Act regulations. The conduct of this study adhered to the tenets of the Declaration of Helsinki.

We included all patients who underwent 23-G vitrectomy for retained crystalline lens material in the vitreous cavity and who had a minimum postoperative follow-up period of 2 months. Records were excluded from analysis if inflammatory or ocular surface disease with severe conjunctival scarring was present, or if the patient had a history of vitreoretinal or glaucoma surgery in the operative eye. Cases that required more than 2 sclerotomy sites, or those that were converted to a 20-G procedure, were also excluded.

Pre-, intra-, and postoperative medical record data were retrospectively collected. Demographic information and initial and final examination details, including visual acuity, noncontact tonometry (Tonometer TX-10, Canon, Utsunomiya-shi, Japan) intraocular pressure (IOP) measurements, PPV surgery details, and postoperative complications were noted. Hypotony was defined as an IOP of $\leqslant$5 mmHg, and elevated IOP was defined as an IOP of $\geqslant$21 mmHg. Indications for surgery included retained nuclear material or cortex, with or without marked intraocular inflammation, and/or uncontrolled IOP. Preoperative patient characteristics are summarized in Table 1. Best-corrected Snellen visual acuity measurements were converted into logarithm of the minimum angle of resolution (logMAR) units.

All surgical procedures were performed using a 3-port transconjunctival microcannula-based 23-gauge PPV system (Accurus® 800 CS, Alcon Manufacturing, Ltd., Irvine, CA). Microcannulas were inserted transconjunctivally, with the help of an insertion trocar, 3.0 mm posterior to the limbus in the inferotemporal, superotemporal, and superonasal quadrants. A 23-G microvitreoretinal (MVR) blade was inserted tangentially, approximately 30° parallel to the limbus. The infusion cannula was placed in the inferotemporal quadrant, and plugs were used to temporarily close the other entry sites. A high speed vitrectomy probe (ACCURUS® 8065; Alcon Manufacturing, Ltd., Irvine, CA) with a cutting rate of 1500–2500 cuts/min and a vacuum level of 300–500 mmHg was used during PPV. The balanced salt solution bottle height was set at 50 cm. Retained lens material was removed with a 500 mmHg vacuum and a 1500 cuts/min linear cutting rate, which was decreased as aspiration was increased. A bimanual technique was used to push the nucleus into the port of the vitrectomy cutter with the endoilluminator probe. In cases where hard lens material was unable to be removed with the vitrectomy probe, 1 sclerotomy site was enlarged to accommodate a 20-G MVR blade and the fragmatome hand piece (ACCURUS®). Through this sclerotomy, intravitreal phacoemulsification with a 20-G titanium fragmatome (ACCURUS®) was performed to remove the hard nucleus fragments in the mid-vitreous with a vacuum level of 100–150 mmHg. Microcannulas were slightly withdrawn from the eye at the end of the operation. A gentle massage to the 23-G sclerotomy site was performed with a muscle hook to achieve a proper seal. In all cases of aphakia, an intraocular lens (IOL) was implanted. If the anterior capsulorhexis was intact, IOL sulcus insertion was performed. If the anterior capsulorhexis was not intact, IOL scleral fixation was performed. In eyes that received an intraocular lens implantation corneal stromal wound hydration was performed at the end of surgery to ensure water tight secure wounds. If the fragmatome was used, the 20-G sclerotomy created in the superotemporal quadrant was closed with 7–0 vicryl sutures.

Patients were monitored postoperative at day 1, week 1, month 1, month 3, and then every 3 months. Because most patients did not attend all clinical appointments, data were evaluated at the day 1 appointment and the final postoperative visit. All patients were examined on postoperative day 1, and at various times, depending on each patient's recovery, but for at least 2 months following surgery. Patients were monitored for complications including wound leakage, intraocular hemorrhage, retinal tears or detachments, hypotony, glaucoma, choroidal detachment, endophthalmitis, and cystoid macular edema. Statistical analysis was performed using SPSS statistical software (SPSS for Windows, Version 20.0; SPSS Inc, Chicago, IL). A P value of < 0.05 was defined as statistically significant.

Table 1. Demographic characteristics of patients (n = 45).

Mean age (year, mean ± SD)	68.18 ± 11.47
Sex (male/female)	17/28
Lesion (OD/OS)	28/17
HTN	13/45 (28.9%)
DM	2/45 (4.4%)
DM and HTN	11/45 (24.4%)

Results

A total of 140 eyes (140 consecutive patients) had dislocated lens material, and were managed at our institution, between June 2008 and June 2012. Of these, 95 eyes underwent 20-G transconjunctival sutureless vitrectomy