Cataract Surgery in Patients with Acute Primary Angle-Closure Glaucoma

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We investigated the results of cataract surgery in acute angle-closure glaucoma patients whose intraocular pressure (IOP) was not controlled with conventional treatment. We compared postoperative IOP and best corrected visual acuity (BCVA) with preoperative data in 10 eyes of 10 patients who had undergone cataract surgery for acute angle-closure glaucoma. Initial and preoperative mean IOP were 50.0 ± 6.4 mmHg and 34.9 ± 9.3 mmHg, respectively. Mean follow-up was 6.3 ± 5.9 months. Postoperative mean IOP was 12.0 ± 4.2 mmHg. All eyes were controlled at less than 21 mmHg and seven of them (70%) were controlled at less than 21 mmHg without medication. Postoperative BCVA was improved in 9 eyes. The complications were transient IOP elevation in 2 eyes and exudative membrane in 4. Cataract surgery may be effective to control IOP and improve visual acuity in patients with acute angle-closure glaucoma. However, follow up is necessary because of a high incidence of postoperative complications.

Key words: acute angle-closure glaucoma, cataract surgery, intraocular pressure (IOP), complications

INTRODUCTION

For managing acute angle-closure glaucoma, initially reducing the intraocular pressure (IOP) by antiglaucoma medications and then, the standard treatment is peripheral laser iridotomy performed to remove the relative pupillary block.1-6 However, angle-closure glaucoma in Asians shows more severe clinical findings and poorer response to laser iridotomy than that in Caucasians.3 Angle-closure glaucoma which is not controlled by medication and laser iridotomy needs surgery.6 However, the surgical option in medically uncontrolled acute angle-closure glaucoma is still controversial. The results of trabeculectomy in uncontrolled angle-closure glaucoma have been known to be poor and have a high incidence of complications.7 On the other hand, it is known that lens removal reduces IOP with fewer complications and good prognosis in visual acuity.8 However, these results of lens removal were implicated on chronic angle-closure glaucoma or uncontrolled IOP status.9-14 So we tried to evaluate the results of cataract surgery per-
formed emergently within a few days instead of the trabeculectomy in patients with angle-closure glaucoma under uncontrolled IOP status.

**METHODS**

We respectively reviewed 10 eyes of 10 patients who visited the Severance Hospital from March 2001 to October 2002, and underwent cataract surgery after diagnosis as acute angle-closure glaucoma with uncontrolled IOP status even with antiglaucoma medications and peripheral laser iridotomy. Mean age of the patients was 69.9 ± 6.6 years and they were all females (Table 1). Acute glaucoma attacks were on the right eye in 6 eyes and on the left in 4 eyes. We defined acute angle-closure glaucoma as the eye with IOP over 40 mmHg at initial visit, corneal edema with nonvisible gonioscopic examination, or angle-closure more than half of the angle on gonioscope, mid dilatation of pupil or more, and iris bombe. Cases with neovascular glaucoma in diabetic retinopathy or central retinal vein occlusion, uveitic glaucoma, and pupillary block with lens dislocation were excluded, as were those with disparity between both eyes in anterior chamber depth and gross cataractous changes. Phacoemulsification cataract surgery was performed in cases with IOP over 21 mmHg on Goldmann tonometry with continuous medication or peripheral laser iridotomy with maximal dosage of medication. The operations were performed by 2 of the authors (Kim and Hong). Four percent lidocaine was used in clear corneal incisional cases, and pinpoint anesthesia in superior sclera incisional cases. In all cases, the phacoemulsifier was used to remove the lens, and foldable intraocular lenses were used. We reviewed the clinical records of the patients to evaluate the personal history, IOP, best corrected vision before and after surgery, and complications.

**RESULTS**

Mean IOP was 50.0 ± 6.4 mmHg with 2.0 ± 1.5 anti-glaucoma medication at the first visit, and this was reduced before surgery to 34.9 ± 9.3 mmHg with 3.2 ± 0.4 anti-glaucoma medication (Table 1). Mean IOP of postoperative one day was 13.9 ± 10.3 mmHg. In 2 patients, IOP of postoperative one day was increased to 25 and 39 mmHg, so we used the ocular hypotensive medication temporarily (cases 7,8). At one week after surgery, IOP returned to within the normal range, and the medication was discontinued. However, IOP was re-elevated at 2 and 4 months after surgery in cases 7 and 8, respectively, and IOP was well controlled with anti-glaucoma medication. Mean IOP at postoperative one week was 10.1 ± 3.6 mmHg, slightly decreased from that at postoperative one day. Mean IOP of 1-2 month was 9.8 ± 3.2 mmHg, but at 3-6 months it was slightly increased to 15.3 ± 4.3 mmHg (Fig. 1). In case 4, IOP increased at 7 months after surgery, so we used 4 ocular hypotensive medications. Mean IOP at last visit at 6 months was 12.0 ± 4.2 mmHg under the usage of a mean number of 0.7 ± 4.2 medications. In all cases, IOP was controlled under 21

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<th>Table 1. Patient's characteristics</th>
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<td>Mean age (years)</td>
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IOP: intraocular pressure, No: number

**Fig. 1.** Mean intraocular pressure changes after phacoemulsification in patients with uncontrolled acute angle-closure glaucoma. Pre: preoperative, Post : Postoperative, 1d: 1 day, 1wk: 1 week, 1-2 m: 1-2 months, 3-6 m: 3-6 months.
mmHg, and in 7 eyes (70%) this was achieved without medication. Postoperative BCVA was improved in 9 eyes (90%), as compared to preoperative visual acuity. Complications developed in 4 eyes (40%), with postoperative exudative membrane in the anterior chamber being the most common surgical complication, and 2 of those were accompanied by temporarily increased IOP (Table 2). Exudative membranes were removed by YAG laser in two patients (cases 1 and 10) without any complications after laser treatment. Complications specific to cataract surgery itself, such as posterior capsular rupture, were absent in all cases.

**DISCUSSION**

Generally, acute angle-closure glaucoma develops when a relative obstruction of the iris renders it impossible for aqueous fluid to pass from the posterior chamber to the anterior chamber, thereby pushing the iris anteriorly, and closing the angle to increase IOP as it progresses. For treatment, peripheral iridotomy is performed by laser to reduce IOP by constructing a bypass to relieve the iris obstruction. However, peripheral laser iridotomy is not efficient in cases where there is anterior synechiae over 50-75% of the peripheral iris in acute glaucoma attack or closed angle due to the lens. If peripheral laser iridotomy may fail as the mode of treatment or IOP may not decrease enough for peripheral laser iridotomy to be performed, then surgical treatment should be considered. The first choice is trabeculotomy, but in cases with uncontrolled IOP, especially those with medication in the early phase, surgical results can be disappointing and a higher rate of complications occurs. Aung et al reported that after 22 months of follow-up, only 65% of cases were controlled with additive medication after trabeculotomy in uncontrolled acute angle-closure glaucoma patients, and that complications developed in 31% of cases. Cataract surgery in acute angle-closure glaucoma has more advantages. Angle-closure glaucoma with elevated IOP after laser iridotomy is related to the lens in some cases, and 15-60% of these patients need cataract surgery after trabeculotomy. It has been reported that if cataract surgery is performed with synechiolysis, the anterior synechiae of the iris can be removed if they had been developed within a year. But cataract surgery in uncontrolled angle-closure glaucoma has some difficulties such as poor intraoperative field of the anterior chamber due to corneal edema, difficult instrumental maneuver due to increased posterior chamber pressure and shallow anterior chamber, and a higher rate of posterior capsular rupture. In cases having severe corneal edema, it may be impossible to perform cataract surgery.

Acton et al reported that 94% of angle-closure patients require surgery.
glaucoma patients with medication remained in good IOP control after extracapsular cataract extraction. In that report, not all of the patients were cases of uncontrolled angle-closure glaucoma with failure of medication; five eyes were uncontrolled cases, whereas the other 4 eyes (80%) were well-controlled cases and 32% of patients had complications. A study about the comparison between trabeculectomy and extracapsular cataract extraction in angle-closure glaucoma reported that there was no significant difference of IOP and complication rate between the two groups, but that the prognosis of visual acuity was better in the cataract surgery group.12 Roberts et al13 reported the results of 3 cases of phacoemulsification in uncontrolled angle-closure glaucoma. It was reported that the result of synechialysis and phacoemulsification in angle-closure glaucoma patients was satisfactory in all 7 eyes.14 However, this report consisted of a chronic state of angle-closure glaucoma.14 Lee et al15 reported the effect of cataract extraction surgery on IOP, but their patients were not solely confirmed to the eyes with uncontrolled angle-closure glaucoma. In our study, IOP was well controlled with or without anti-glaucoma medication, and postoperative best corrected visual acuity (BCVA) was improved in 9 cases(90%), as compared to preoperative BCVA. In case 3, postoperative BCVA was not improved, probably due to severe optic nerve damage prior to surgery. Furthermore, improvement of postoperative BCVA was limited in cases 4, 6, and 7 due to severe optic nerve damage.

We need to investigate the ideal type of incision in cataract surgery for angle-closure glaucoma. In our study, we chose the temporal corneal incision except in 2 cases. It may have benefits in saving the conjunctiva for trabeculectomy, but in dense cataract cases, corneal burn and iris synechiae or prolapse may occur. In our 2 scleral incision cases, the surgeon preferred the scleral incision for minimizing the risk of posterior rupture in spite of damage to the conjunctiva for trabeculectomy. Because the surgeon thought that only cataract surgery was enough to control IOP, trabeculectomy was not combined with cataract surgery in these cases.

While this report is a retrospective case report consisting of a limited number of patients and a short follow-up period, it does provide the results of cataract surgery in uncontrolled angle-closure glaucoma, and this is an extension to the data of previously published Korean reports. Determining the type of surgical options in uncontrolled angle-closure glaucoma may remain controversial and depend not only on the anatomic conditions or the severity of disease, but also on the surgeon’s preference. The results of this study show that if cataract surgery is possible, then it is the preferable method for the control IOP in uncontrolled angle-closure glaucoma regardless of the status of cataractous changes. Since IOP increased slightly over time in some cases, a prospective study with longer follow-up period and a larger number of subjects is required to evaluate more precisely the effect.

REFERENCES


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