Visual Outcomes Following Manual Small Incision Cataract Surgery for Phacomorphic Glaucoma

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Abstract

Aims: To evaluate intraocular pressure (IOP) control, visual prognosis and complications following manual small incision cataract surgery among eyes with phacomorphic glaucoma.

Material and Methods: This prospective, non-randomized interventional consecutive case series included 10 eyes of 10 patients with phacomorphic glaucoma who presented to Kasr El-Aini Hospital between March 2010 and April 2011. All patients underwent slit-lamp bio-microscopy, applanation tonometry and gonioscopy of the other eye to rule out angle closure. Small incision cataract surgery with intraocular lens implantation was performed in all affected eyes. Complete ophthalmic examination was done at each follow-up visit.

Results: A total of 10 eyes with phacomorphic glaucoma were included in this study. The preoperative mean IOP was 38.2 ± 12.3 mmHg and mean IOP at last follow-up was 14.7 ± 2.4 mmHg. There was a statistically significant difference between IOP at presentation and IOP at last follow-up (p < 0.001). No significant intraoperative complications were noted. The final postoperative best corrected visual acuity was 20/40 or better in all patients.

Conclusion: Manual small incision cataract surgery is safe and effective in controlling IOP and achieving good functional visual acuity with minimal complications in the management of phacomorphic glaucoma in developing countries.

Key Words: Intraocular pressure – Manual small incision cataract surgery – Phacomorphic glaucoma.

Introduction

GLAUCOMA is an eye disorder in which the optic nerve suffers damage, permanently impacting vision in the affected eye(s) and progressing to complete blindness if untreated. It is often, but not always, associated with increased pressure of the fluid in the eye (aqueous humour). The term ‘ocular hypertension’ is used for cases having constantly raised intraocular pressure (IOP) without any associated optic nerve damage [1].

Glaucoma is the third leading cause of blindness worldwide. Glaucoma affects 1 in 200 people aged fifty and younger, and 1 in 10 over the age of eighty. If the condition is detected early enough it is possible to arrest the development or slow the progression with medical and surgical means [2].

Phacomorphic glaucoma is type of angle closure glaucoma in which it occurs as a complication of mature large sized cataractous lens. It occurs equally in men and women. Generally, phacomorphic glaucoma is observed in older patients with senile cataracts, but it can occur in younger patients after a traumatic cataract or a rapidly developing intumescent cataract [3].

With age, the size of cataractous lens will increase in size in both the antero-posterior level and equatorial level. The lens lies behind the iris and there is a space between the iris and the lens in which the aqueous will follow naturally from the posterior chamber to the anterior chamber through the pupil. As the size of the cataract increase, this space will gradually get smaller and aqueous outflow resistance will occur, leading to increase in intraocular pressure. Sometimes, this cataract will push on the iris leading to complete close of this space with sudden increase in intraocular pressure. This type of angle closure glaucoma is called pupillary block and it is an acute condition and can cause severe damage to the ocular structures if not treated as soon as possible [4].

The patient with phacomorphic glaucoma will come with severe eye pain and headache with nausea and vomiting and on ocular examination there will be corneal edema due to high intraocular pressure which can reach 50 mmHg or even more. Also the anterior chamber will be shallow because the iris is pushed anteriorly by the large sized cataract [3].
Treatment of this condition should be done by cataract surgery extraction but before this surgery, the intraocular pressure should be decreased by antiglaucoma medications. Which can be either eye drops, oral medications or sometimes with laser iridectomy. Once the intraocular pressure is reduced, a cataract surgery should be done to extract the cataract and replace it with an artificial intraocular lens.

Cataract surgery in phacomorphic glaucoma poses several challenges: The high intraocular pressure (IOP) increases the risk of expulsive hemorrhage, positive pressure and there is often zonular dialysis which makes surgery technically more difficult. Manual small incision cataract surgery (MSICS) is popular in developing countries as it is inexpensive compared to instrumental phacoemulsification and allows high-volume cataract surgery without compromising quality of medical care. Our study aimed to evaluate the visual prognosis, IOP control and complications following MSICS in the management of patients with phacomorphic glaucoma.

Material and Methods

This prospective, non-randomized interventional consecutive cases series included 10 eyes of 10 patients with phacomorphic glaucoma who presented to Kasr El-Aini Hospital between March 2010 and April 2011. Phacomorphic glaucomas were diagnosed by subjective complaints of acute pain and redness associated with objective signs such as presence of corneal edema, shallow anterior chamber, an intumescent cataractous lens and IOP above 21mmHg. The preoperative assessment included slit-lamp examination, applanation tonometry, gonioscopy of other eye to rule out angle closure and B-scan ultrasonography to exclude posterior segment pathology. All patients were treated with topical beta blockers, antibiotic steroid drops, oral acetazolamide and oral glycerol. If the IOP was more than 45mmHg, intravenous mannitol was given.

Preoperatively intravenous mannitol 20% (1-2g/kg body weight) was given in all patients. Surgeries were performed under general anesthesia. After superior fornix-based conjunctival flap, a partial thickness 6.0-6.5mm scleral incision was made 2mm behind the limbus and a scleral tunnel was extended 1mm into clear cornea. An additional paracentesis was made at the 10 o’clock position. The anterior chamber was filled with an air bubble and 0.1ml of 0.06% trypan blue was injected under the air bubble. After several seconds, viscoelastic was used to displace the air bubble. The anterior chamber was entered with a 3.2mm keratome. Anterior chamber was deepened with viscoelastic and continuous curvilinear capsulorhexis (CCC) was made in the anterior capsule using a bent 26G needle cystitome. A Sinskey hook was used to hook out one pole of the nucleus outside the capsular bag and the rest of the nucleus was rotated out anticlockwise or clockwise into the anterior chamber. The nucleus was extracted out of the eye using an irrigating vectis. After aspiration of the remaining cortex, a 6-mm optic polymethyl methacrylate posterior chamber intraocular lens was implanted into the capsular bag. The viscoelastic material was aspirated and the wound was closed with two interrupted 10/0 suture and the paracentesis was hydrated with balanced salt solution. The conjunctival flap was opposed using a forceps fitted to bipolar diathermy. Subconjuctival injection of garamicin and dexamethasone was given.

Postoperatively, patients were treated with topical antibiotics and steroids for the next six to eight weeks. Statistical analyses were performed using SPSS version 16.0 and Student t-tests used to compare means, with p-value 0.05 considered statistically significant.

Results

A total of 10 patients of mean age 64±3.2 years with phacomorphic glaucoma in 10 eyes were analyzed during the study period of one year. Posterior chamber intraocular lens (PCIOL) implantation was done by small incision cataract surgery to all patients. On the first postoperative day, there was corneal edema in 8 patients and only one patient had severe iritis. And this was resolved with topical medications within few days after the surgery.

The preoperative mean IOP was 38.2±12.3 mmHg and mean IOP at last follow-up was 14.7±2.4mmHg (range, 7-20) without the use of antiglaucoma medications. There was a statistically significant difference between IOP at presentation and IOP at last follow-up (p<0.001). At the last follow-up visit, the BCVA was 20/40 or better in most of the patients.

Discussion

Phacomorphic glaucoma is a common occurrence in developing countries. High quality high volume surgery is the preferred method of delivery to tackle the large backlog of cataract blindness. Extra-capsular cataract extraction (ECCE) requires a large incision in a globe with very high IOP,
which increases the risk of sight-threatening complications [5].

MSICS with trypan blue staining of anterior capsule has an advantage over ECCE and phacoemulsification. It has been shown that MSICS gives better uncorrected vision compared to ECCE due to higher postoperative astigmatism in ECCE [9].

Ruit et al., reported that both phacoemulsification and MSICS achieved excellent visual outcomes with low complication rates. MSICS may be the more appropriate surgical procedure for the treatment of advanced cataracts in the developing world [10,11]. Venkatesh et al., have reported MSICS to be safe and effective for management of phacolytic glaucoma [12].

Phacoemulsification is difficult in phacomorphic glaucoma because there is an increased risk shallow chamber, iris prolapse, peripheral capsulorrhesis tears; the risk endothelial cell loss is greater because of the close proximity of the phaco tip during nucleus emulsification and the reduced endothelial reserve in these patients. In contrast, MSICS does not require expensive equipment like phacoemulsification and the anterior chamber is more stable due to the shelving scleral wound along with minimal surgical-related complications [13].

In the present study the IOP on the final visit was less than 20mmHg in all patients without the use of anti-glaucoma medications, with a mean IOP of $14.7 \pm 2.4 \text{mmHg}$. There was a statistically significant difference between IOP at presentation and IOP at last follow-up (Student $t$-test $p<0.0001$). This result is similar to IOP control of other studies on ECCE performed for phacomorphic glaucoma. All patients had good visual outcome with BCVA of 20/40 or better in the last follow-up visit postoperatively. These visual outcome results are comparable with other studies of ECCE performed in phacomorphic glaucoma [14-16].

MSICS is popular in developing countries as it is inexpensive, has a shorter learning curve compared to phacoemulsification and allows high-volume cataract surgery without compromising quality of medical care. In developing countries phacomorphic glaucoma is not an uncommon presentation in the population [17].

In MSICS, the prolapse of nucleus into the anterior chamber and its delivery through the tunnel involve manipulations very close to the iris and the cornea. The surgeon has to be extra careful with these structures, as postoperative inflammation and corneal edema can be all too common [18].

MSICS could be safe and effective in controlling IOP and attaining good functional visual recovery in the management of phacomorphic glaucoma with minimal complications in the developing world [18].

References


