

## Research Article

# Surgical outcome of single site phacotrabeculectomy in management of concurrent glaucoma and cataract

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## ABSTRACT

**Background:** The aim of our study is to evaluate the efficacy and safety of combined procedure of single site phacoemulsification and trabeculectomy in terms of improvement of visual acuity and intraocular pressure control.

**Methods:** Prospective, noncomparative, consecutive, interventional study of 74 eyes (64 patients) of single site phacotrabeculectomy in cases of primary open angle glaucoma with significant operable cataract from April 2014 to March 2015. Out of 64 patients 30 were male and 34 were female with age ranged 48 to 80 (mean 64.5) years. Ten patient required bilateral surgery. The controlled mean preoperative IOP was 20 mmHg ranged (12- 36 mmHg). Postoperative best corrected visual acuity, intraocular pressure and fundus examination were done one day, one week, one month, three months and one year following surgery. Perimetry was done at third and twelve months.

**Results:** Mean postoperative intraocular pressure after 12 months of follow up was 12 mmHg (range 08 to 20 mmHg) and overall improvement in visual acuity achieved in 90.54% (67) of eyes. Visual acuity of 6/12 and better was achieved in 62.16% (46) eyes. IOP was controlled without any treatment in 83.78% (62) eyes, and rest 16.22% (12) eyes needed antiglaucoma drugs to control IOP. Hyphema and uveitis were common complications noted.

**Conclusions:** Combined phacotrabeculectomy is safe and effective method in restoring vision and lowering intraocular pressure. It helps in early visual rehabilitation and convenient, economical method to manage concurrent glaucoma and cataract.

**Key Words:** Phacotrabeculectomy, Intraocular pressure, Bleb, Combined, Single-site

## INTRODUCTION

Cataract and glaucoma commonly coexist, especially among the elderly population.<sup>1</sup> The goal of treatment in coexisting glaucoma with cataract is to achieve an adequate long-term intraocular pressure (IOP) control, and to avoid IOP spikes in postoperative period which are deleterious to the health of the optic nerve head, at the same time to achieve optimal visual rehabilitation to improve the quality of life of the patient.<sup>2</sup> The other

things to be remembered are minimal surgical trauma and risk, and ensuring that the procedure is cost effective. Whether cataract surgery and trabeculectomy by two separate procedures or combined cataract extraction with trabeculectomy is to be performed depends on several important factors. These factors include a careful assessment of the risk-benefit ratio associated with each surgical procedure, patient's preferences and their visual needs, severity of glaucoma, cost-benefit analysis, as well as the experience and skill of the surgeon. Combined

phacoemulsification with trabeculectomy is the best surgical approach in concurrent glaucoma and cataract patients.<sup>3</sup> Recently there has been a widespread shift to use combined phacotrabeculectomy as a treatment of choice for concurrent cataract and glaucoma.<sup>4</sup> Combined phacotrabeculectomy is as safe and effective in controlling IOP as trabeculectomy alone.<sup>5</sup> But combined procedure has been associated with more postoperative complications compared to phacoemulsification alone.<sup>6</sup> Phacotrabeculectomy can be done through single site, where both phacoemulsification and trabeculectomy performed from the same site with insertion of a rigid PMMA IOL or a foldable IOL. The second option is through two site surgery, by performing a temporal phacoemulsification and a superior trabeculectomy.

The aim of our study is to evaluate the efficacy and safety of combined procedure of single site phacoemulsification and trabeculectomy in terms of improvement of visual acuity and intraocular pressure control.

## METHODS

Seventy four eyes of 64 patients, 30 male and 34 female patients (10 with bilateral cases) were studied. Age ranged 48-80 (mean 64.5) years; all the surgeries were performed by single surgeon in cases of primary open angle glaucoma with significant operable cataract from April 2014 to march 2015. The patients with visually significant cataract with open angle glaucoma plus either of the following characteristics like controlled IOP (21 mm Hg or below) on 2 or more drugs, intolerant, Poor compliance or allergy to drugs, uncontrolled glaucoma IOP above 21 mmHg with maximum acceptable medication, progressing glaucomatous visual field defects despite medication and patients not willing to continue anti-glaucoma drugs following cataract surgery were included in study. Patients with additional ocular pathology like iritis or corneal endothelial dystrophy or previously operated for glaucoma patients and other variety of glaucoma like angle closure or secondary glaucoma cases were excluded from study. All patients were operated under peribulbar block after taking proper informed consent. The following technique was adopted for the single-site phacotrabeculectomy, a fornix-based conjunctival flap was lifted and the sclera was treated with light surface cautery. A triangular 4 mm vertically and 3.5 mm horizontally a 3/4<sup>th</sup> partial depth incision to sclera at the limbus was given and sclera flap was created with a 15 number blade which was extend 1mm into the clear cornea. A paracentesis was made into the clear cornea with a side port knife. The 2.75 mm keratome was used to enter the anterior chamber at the corneal side of the scleral tunnel through which the phacoemulsification by routine stop and chop procedure was performed. Following implantation of the foldable IOL, a 1.5 mm × 3.00 mm deep block of sclera tissue was excised. Peripheral iridectomy was performed and thorough evacuation of viscoelastics was ensured. The external scleral incision was secured with 10-0 nylon suture, 3 in

number one at apex and two at base of triangle on both sides. The conjunctiva was re-apposed at the limbus using a 10-0 vicryl suture at both ends. Balanced salt solution was injected via the paracentesis, anterior chamber formed and patency of passage checked by good elevated bleb at the end. Inferior fornix sub conjunctival injection of dexamethasone and gentamycin was given. Postoperatively combination of prednisolone acetate and moxifloxacin was given topically to all the patients at 3 hourly intervals in first week and then tapered off over next 3 to 6 weeks and cyclopentolate eye drop daily for one week. Patients were reviewed regularly over 12 month's period at one day, one week, one month, three months, and six and twelve months postoperatively and at each visit their visual acuity, IOP (by applanation tonometry), fundus checked and postoperative complications were recorded. Pre and postoperatively gonioscopy and field charting is done at 3 month and one year follow-up and results were analyzed.

## RESULTS

Total 74 eyes (64 patients) were included in study. Thirty were (46.88%) males and 34 (53.12%) females; between age group of 48 to 80 years (mean 64.5). Age distribution seen among different age group were, between 41 to 50 years only 3 patients (4.68%). Between 51 to 60 years were 15 patients (23.45%), similarly between 61 to 70 years there were 21 patients (32.81%). Maximum number of patients belongs to age group above 70 years, 25 patients (39.06%). Preoperative visual acuity ranged between count fingers to 6/24. Preoperatively range of controlled IOP on medications was 12 mmHg to 36 mmHg (mean 20 mmHg). Number of medications required to control IOP were tabulated in (Table 1), 20 eyes (27.03%) needed 4 local antiglaucoma drops.

**Table 1: Preoperative use of antiglaucoma drugs (n=74).**

Number of drugs	Number of eyes	Percentage
1	4	5.40%
2	21	28.38%
3	27	36.49%
4	20	27.03%
Systemic	2	2.70%

**Table 2: Comparative evaluation of sequential changes in post-operative intraocular pressure.**

Duration	IOP (mmHg)
One day	04-22
One week	08-21
One month	08-26
Three months	10-24
Six months	12-18
Twelve months	08-20

Mean postoperative intraocular pressure after 12 months of follow up was 12 mmHg (range 08 to 20 mmHg) and overall improvement in visual acuity achieved in 67 (90.54%) of eyes and poor visual acuity in 7 (9.46%) is attributed to glaucomatous optic atrophy. In 83.78% (62) eyes showed ‘surgical successes’, with postoperative IOP  $\leq$ 21 mmHg, postoperative IOP at least 30% lower than preoperative IOP, no medication and no reoperation, and rest 16.22% (12) eyes showed ‘comparative surgical successes’, with postoperative IOP  $\leq$ 21 mmHg with one IOP lowering drug, postoperative IOP at least 30% lower than preoperative IOP and no reoperation. In our series resurgery or needling is not required to control IOP. Sequential changes noted in every visit are tabulated in Table 2.

Visual acuity of 6/12 and better was achieved in 62.16% of eyes (Table 3).

**Table 3: Best corrected visual acuity (n=74).**

Visual acuity	No of eyes	Percentage
6/12 or better	46	62.16%
6/36-6/18	17	22.98%
Less than 6/36	11	14.86%

Early and late complications in our series was recorded (Table 4), hyphema and uveitis were common complications noted.

**Table 4: Early post-operative complication (n=74).**

Complications	Number	Percentage
Striate keratitis	3	4.05%
Hyphema	5	6.67%
Shallow anterior chamber	4	5.40%
Anterior chamber reaction	7	9.45%
Hypotony	5	6.67%

The results of combined single site phacoemulsification and trabeculectomy are very encouraging with good success rate and minimal complications.

## DISCUSSION

Surgical options for coexisting cataract and glaucoma could be by various methods like only cataract surgery followed by postoperative antiglaucoma medication or combined phacotrabeculectomy from one site or two separate site procedure or finally it could be by two sequential surgeries of trabeculectomy and cataract separately. If IOP is fairly well controlled, the cataract operation can be undertaken first, later, if needed, a filtering procedure. The drawback for the trabeculectomy latter is postoperative pressure spikes, which can be devastating to the optic nerve.<sup>7</sup> On the other hand, if a filtering procedure is done first, cataract surgery in the presence of a functioning filtration bleb causes the bleb to fail in about 30% of cases.<sup>8</sup> Combined

phacoemulsification and trabeculectomy has several advantages and found to be effective in terms of IOP control to arrest glaucoma progression and at the same time better visual rehabilitation.<sup>9</sup> It is more economical to perform one operation rather than two and further, if phacoemulsification alone should not be sufficient there remains the stress of a second operation for an elderly.

Our results were comparable to other similar studies available in literature, Parihar et al in 30 cases reported 63.33% visual improvement (6/12 or better vision) and 86.7% eyes with IOP control with single site combined surgery.<sup>10</sup> Similarly perasalo et al in study of 243 cases of phacotreb reported 80% cases with visual improvement and 70% cases IOP control without drugs.<sup>11</sup> Our study confirms the safety and effectiveness of combined single site phacoemulsification with IOL implantation and trabeculectomy. One year after surgery, a statistically significant reduction of IOP was achieved ( $p < 0.001$ ), with this surgical technique, we observed good filtration bleb with very good postoperative IOP control. Moreover, we had a low incidence of postoperative complications like hyphema in 5 cases (6.67%) in our series in comparison to 11% of cases.<sup>12</sup> According to reports on combined surgery various complications noted and recommended to stabilize the chamber during the first postoperative hours by injection of low-weight sodium hyaluronate into the anterior chamber at the end of the surgery, in our series 2 patients required air injection for shallow anterior chamber and hypotony in early postoperative period.<sup>13,14</sup> We did not encounter any patient for bleb revision or repeat surgery due to raised IOP in our series. Moreover, for early postoperative bleb leaks we never had to use a bandage contact lens, as described by some authors.<sup>15,16</sup> In a comparative retrospective study, of 302 eyes (235 patients) with phacotrabeculectomy and IOL implantation with one incision, and 93 eyes (81 patients) of phacotrabeculectomy and IOL implantation with two incisions. Showed to be equally effective at reducing IOP by an average of 8.1 mm Hg and visual acuity improved for 57%, did not change for 27%, and deteriorated in 16%, in single site. While in two separate sites the visual acuity improved for 69%, did not change for 25%, and deteriorated in 6%.<sup>16</sup> In meta-analysis study of comparison of single site verses two site combined phacotrabeculectomy found both two-site and one-site procedure were well tolerated.<sup>17</sup> The overall effective lowering of intraocular pressure with good visual recovery through single site combined phacotrabeculectomy, with significant bleb formation in our series. We did not notice any undue induction of astigmatism in single site combined phacotrabeculectomy and patient achieve prompt and effective visual rehabilitation. Poor visual outcome in 7 (9.46%) was attributed to preexisting glaucomatous damage to the optic nerve head.

## CONCLUSION

Combined phacotrabeculectomy is safe and effective method in restoring vision and lowering intraocular pressure. It helps in early visual rehabilitation and convenient, economical method to manage concurrent glaucoma and cataract. One-site combined surgery is faster and easier to perform than two-site combined surgery as one-site technique does not require the surgeon to change position during the procedure. Less number of follow-up visits is needed. This surgical procedure can be a good alternative procedure in comparison to two sequential surgeries in patients with cataract and glaucoma.

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