

A COMPARATIVE STUDY BETWEEN SINGLE SITE AND TWO DIFFERENT SITES PHACOTRABECULECTOMYJitendra Kumar¹, V. K. Misuriya², Mohd Sunny³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: **AIM:** To evaluate and compare efficacy and outcome after single site phacotrabeculectomy and two sites phacotrabeculectomy in cases of coexisting open angle, angle closure and lens induced glaucoma and cataract. **MATERIALS AND METHODS:** This study was randomized, prospective, interventional and comparative clinical trial. The present study of combined cataract extraction with trabeculectomy was done in tertiary centre. In the present study of combined cataract extraction with trabeculectomy 28 eyes were operated upon and follow-up was done between 2 months to 14.5 months. **RESULT:** There is early restoration of good vision in 75% of cases. A good tension control is achieved. Tension can be controlled in 85.7% eyes with surgery, while overall tension control with post-operative medical therapy can be achieved in 92.85% eyes. The average reduction of intra-ocular pressure after this reduction of intra-ocular pressure after this procedure is more than 50% and it is highly significant statistically ($P < 0.001$). **CONCLUSION:** The combined operation of trabeculectomy and cataract extraction by phacoemulsification give results comparable to those obtained for separate procedures in terms of intraocular pressure control restoration of vision. The advantages of combined procedure outweigh the small increase in the risks of surgery.

KEYWORDS: Glaucoma, phacoemulsification, trabeculectomy.

INTRODUCTION: Glaucoma and cataract frequently coexist in the geriatric population. The various associations between them have long been recognized. There has been an increase in their coexistence, because of a number of factors, the earlier diagnosis of glaucoma, efficacy of medical therapy of glaucoma leading to long periods of control and retention of good vision until cataract develops and progresses. The possible role of miotic drugs such as phospholine iodide in glaucoma causing production or aggravation of cataract formation. In some instances, it may be difficult to decide if the visual loss is due to cataract or glaucoma or both.

Similarly, surgical therapy of glaucoma may result in the rapidly increasing ventricular opacification, especially if prolonged hypotony occurs, there is delayed formation of persistence of shallow anterior chamber or when the lens is directly traumatized. Cataract extraction seldom relieves a coexisting glaucoma, even it may make medical control of glaucoma more difficult and it definitively makes subsequent surgical therapy more hazardous. Also, a cataract extraction performed after the establishment of a successful filtering bleb often results in the loss of the functioning fistula and uncontrolled glaucoma. According to Witmer nearly all the eyes with these combined disorders needed medical treatment for the glaucoma, three to six months after a standard cataract extraction.⁽²⁾

In the patients with both severely visually handicapping lens opacities and medically uncontrolled glaucoma, the problems is difficult and the choice is controversial. Some clinicians

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would surgically attack glaucoma first reasoning that the damage from glaucoma is irreversible, whereas the visual deficits from cataract can be managed later; other remove cataract first in the hope that intra-ocular pressure control will be easier later.

One answer to the dilemma lies in the combined glaucoma – cataract operation, though not universally accepted as a valid alternative. This has been favored by many surgeons because of various advantages (Sorsby, 1967), such as:

One surgical and psychological trauma to the patients, short stay at hospital so reduction of cost, avoidance of malignant glaucoma, avoidance of the second state operation in high risk patients, avoidance of prolonged medications and early restoration of vision. Last but not the least the eye is exposed only once to the hazards of surgery such as iritis, corneal disease, infection, hyphema and others.

The disadvantage is that it carries the higher risk of complications. However the changes of complications depend upon the preoperative preparations and the surgical technique. Moreover, the judicious use of the hypertensive drugs such as: carbonic anhydrase inhibitors, glycerol, hypertonic solution as mannitol, retrobulbar anaesthesia with massage.

The combined procedures with various types of filtering operation have been attempted for many years with varying degree of success. After the introduction of Cairns trabeculectomy in 1968, with the advantage of guarded filtering wound, several authors in recent past have tried trabeculectomy in combination with cataract extraction. Results were encouraging, yet it is not a universally accepted combined procedure. So this procedure of cataract extraction with trabeculectomy was performed in the present study for its further evaluation.

MATERIALS AND METHODS:

THE MATERIALS: The present study was carried out in the department of Ophthalmology, M.L.B. Medical College, Hospital, Jhansi between January 2012 to August 2013. The patients selected have marked visual deficit because of advantaged lenticular opacities and raised intra-ocular tension. The patients suffering from chronic narrow angle, chronic open angle and lens induced glaucoma were taken up for the study.

The patients were of either sex and the age ranged from 50 to 75years. Number of the eyes underwent this surgery was twenty eight. In no patients both the eyes were operated. The minimum follow-up period was two months. The surgery was done by the consultant surgeons of the department.

THE METHOD: The following pattern was adopted for almost all the patients.

Systemic: Recording of pulse and blood pressure.

Local: The local examination was done under bright illumination with the help of uniocular corneal loupe (10x) and + 13 dioptre condensing lens. The slit lamp examination was done whenever required particularly to examine transparency of cornea, aqueous flare, keratic precipitates, extent of lenticular opacities and pigmentary dispersion over lens, to elicit papillary reaction/perception of light in doubtful cases.

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Tonometry: It was performed by Schiotz's tonometer with standard technique. Almost in all the cases one particular Schiotz's tonometer was used pre-operatively, post-operatively and in follow-up period.

Funduscopy: Both distant direct and direct ophthalmoscopy were done by Hiene's ophthalmoscope. The type and the extent of lenticular opacities were assessed.

Gonioscopy: It was done by Goldman's three mirror gonioscope.

Visual Acuity: This was recorded in term of Snellen's test types, finger-counting, hand-movement, perception of light and projection of rays depending on the individual's visual status

RESULTS: The present study of combined cataract extraction with trabeculectomy was carried out in department of Ophthalmology, M.L.B. Medical College, Hospital, Jhansi, between January 2012 to August 2013. Twenty eight eyes underwent this combined surgery. The review of observations and result lead to following concluding points:

1. Coexisting condition of glaucoma and cataract is essentially a problem of geriatric population.
2. The control of intra-ocular pressure is significantly ($P < 0.01$) better in females.
3. A good tension control is achieved. Tension can be controlled in 85.7% eyes with surgery, while overall tension control with post-operative medical therapy can be achieved in 92.85% eyes. The average reduction of intra-ocular pressure after this procedure is more than 50% and it is highly significant statistically ($P < 0.001$).
4. A filtering bleb is essential for the maintenance of filtration. In this combined surgery, a diffuse well-guarded filtering bleb is formed which is the basis of better tension control. Its presence in surgically controlled eyes are highly significant statistically ($P < 0.001$).
5. There is early restoration of good vision in 75% of cases.
6. The only significant complication is hyphaema. Like other complication such as striate keratitis, iritis and hypotony; is also usually transient. Moreover all these complications do not interfere much with the final outcome of surgery.
7. Other complications such as shallow anterior chamber, choroidal detachment, wound leakage and persistent hypotony are insignificant. Overall complications in combined procedure are not significantly more than the two separate operations.
8. This combined procedure should be done under magnification for its precision.
9. The combined operation of trabeculectomy and cataract extraction by phacoemulsification give results comparable to those obtained for separate procedures. The advantages of combined procedure outweigh the small increase in the risks of surgery.
10. It is a safe, effective and valid alternative for patients with cataract and either open, closed or lens induced glaucoma.
11. Patients need periodic follow-up examination to establish its long lasting results.

DISCUSSION: A single procedure which accomplishes two purposes is much more desirable than two separate operations. Theoretically, the combined cataract extraction phacoemulsification with glaucoma operation would seem to be the ideal approach to the patients with co-existing glaucoma

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and cataract. It has got obvious advantages. So the choice of which combined operation to perform, may be made from both practical and theoretical consideration.

Trabeculectomy has been shown to be a safe and effective operation in both open and closed angle glaucoma (Ridgway et al., 1972 and Watson, 1975)⁽⁴⁾ and to lesser extent in secondary glaucoma Wilson⁽⁵⁾ Moreover, trabeculectomy has the advantage of guarded filtering wound, so better glaucoma control can be attained; and there is possible avoidance of many shallow or flay anterior chamber post-operatively. So trabeculectomy and cataract extraction simultaneously were done in the present study for its further evaluation.

In the present study of combined cataract extraction with trabeculectomy 28 eyes were operated upon and follow-up was done. The age of the patients ranged from 45 to 75 years, mean age was 62.85 years.

As the major disadvantage considered with combined cataract extraction and glaucoma operation is, increased risk of complication, this part will be discussed first followed by tension control and visual improvement.

TENSION CONTROL: The control of tension or intra-ocular pressure (≤ 21 mm. of Hg.) was achieved, without additional medical therapy, in 24 (85.7%) eyes. The success rates for eyes not receiving post-surgical treatment in a series of similar combined operations varied from 80% to 95% Hilsdorf,⁽⁶⁾ Bregest,⁽⁷⁾ Jerndal & Lundstrom,⁽⁸⁾ Manzoor et al.,⁽⁹⁾ Edwards,⁽¹⁰⁾ and Wechsler & Robinson,⁽¹¹⁾ Our results are favourably comparable with these studies.

On the whole, the tension with medical therapy was controlled in all the 6 (100%) eyes of pen angle glaucoma 3(75%) out of 4 chronic angle closure glaucoma; and 17(94.4%) out of 18 eyes with lens induced glaucoma.

VISUAL RESULTS: In our study all the aspects of result in different type of glaucoma are not discussed because of marked difference in number of lens induced,⁽¹⁸⁾ open angle⁽⁶⁾ and angle closure glaucoma.⁽⁴⁾ On the whole, the intra-ocular pressure control and visual improvement in our study are rewarding at the expense of slight increase in the rate of complications and it is felt that patients need long term follow-up to establish the final outcome of this combined procedures. Twenty eight eyes were operated upon and were followed up. The follow-up of the patients varied in between 2 months to 14.5 months. The average follow-up being 5.9months, that is about 177 days.

TYPE OF GLAUCOMA AND TYPE OF SURGICAL PROCEDURE: The various types of glaucoma in 20 eyes are shown in table No. 2. The diagnosis of different types of glaucoma was based on the examination of slit lamps and gonioscopy. The further differentiation between lens induced glaucoma and angle closure glaucoma was made on the basis of history, the angle status and anterior chamber of the other eye.

Type	No. of eyes	Percentage
Operated with same port (Lens induced)	18	64.3
operated with two different port (Primary open angle)	6	21.4
operated with two different port (Primary narrow angle)	4	14.3
Total	28	100.0

Table 1: Surgical procedure and pre-operative diagnosis as related to the type of glaucoma

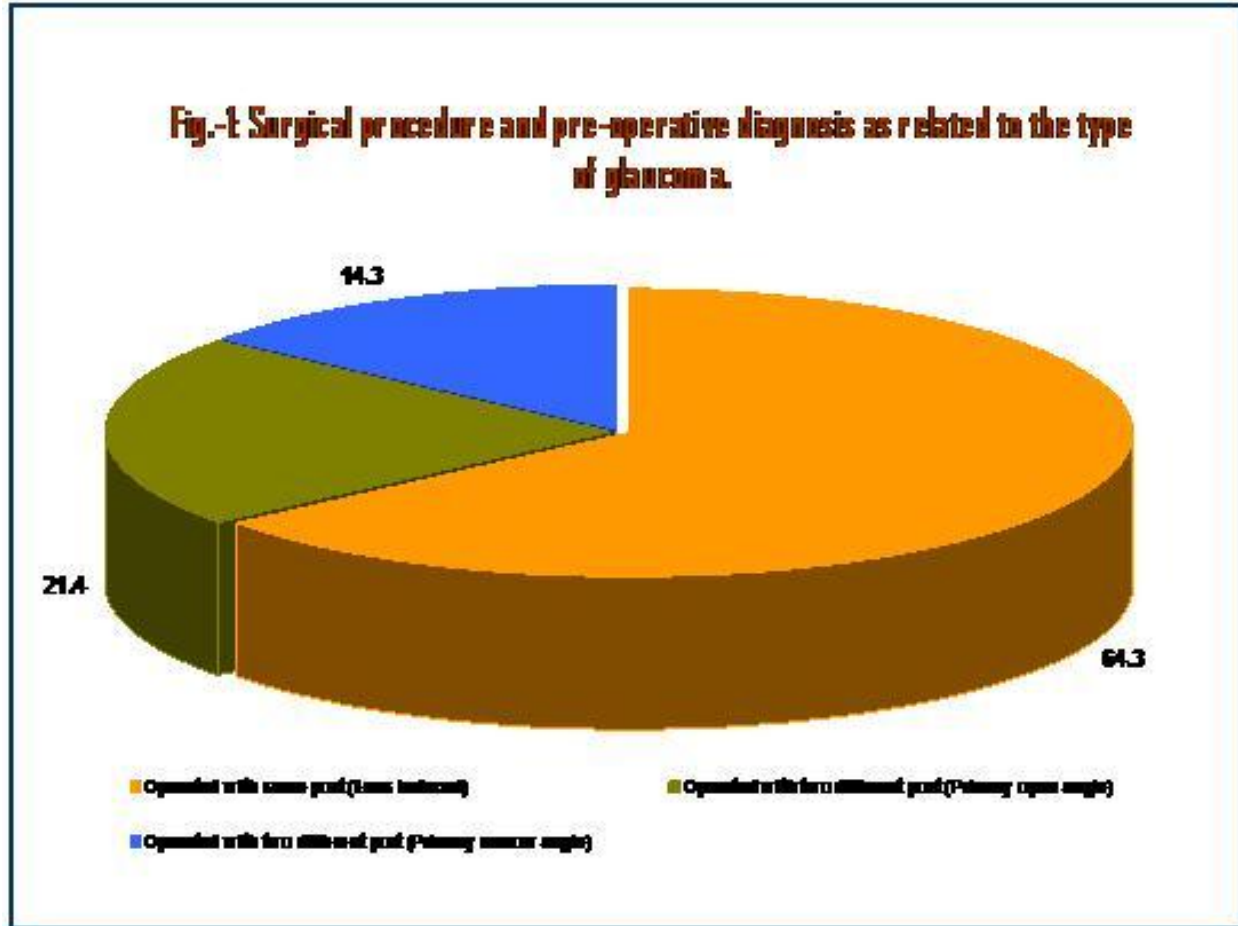


Figure 1

Parameter	No. of eyes		t-value	P
	Surgical controlled	Surgically uncontrolled		
Age > 60	13/24	2/4	0.555	> 0.5
Sex: Male	9/24	3/4	2.94	< 0.01
Female	15/24	1/4	2.80	< 0.01
Filtering bleb	20/24	1/4	5.57	< 0.001
Visible cleft genioscopically	19/21	2/4	5.26	< 0.001
Pre-op. control of tension	20/24	2/4	3.59	< 0.01

Table 2: Tested parameters statistically

STATISTICAL ANALYSIS: t-test of significance was applied for various parameters in 2 groups of surgically controlled and surgically uncontrolled patients in respect of intra-ocular pressure. As already observed 24 patients had controlled intraocular tension surgically while tension was uncontrolled in 4 patients.

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There were 14 patients above the age of 60 years, out of these 13 eyes had controlled while 2 eyes had uncontrolled tension. The t-value is 0.555, $P > 0.5$.

Out of 12 male patients, 9 (75.0%) had controlled tension while 3 (25.0%) eyes were uncontrolled t-value = 2.94, $P < 0.01$.

The number of female patients were 16. Out of these, 15 (93.7%) were controlled while 1 (6.3%) eye was uncontrolled. $T = 2.80$, $P < 0.01$.

Filtering bleb was present in 20 out of 24 controlled eyes, while in 1 eye of uncontrolled ones. $t = 5.57$, $P < 0.001$.

Visible cleft gonioscopically was seen in 19 out of 21 controlled eyes (other 3 could not be examined) while in 2 uncontrolled eyes, $t = 5.26$, $P < 0.001$.

Pre-operative control of tension by medications was observed in 20 out of 24 controlled eyes while in 2 out of 4 uncontrolled eyes. $T = 3.59$, $P < 0.01$.

VISUAL ACUITY: Glaucoma and cataract frequently coexist though the history of cataract goes back some 4000 years and probably further, cataract as a disease of lens in which the opacity is due to derangement of the intra-ocular fluid. He used to treat it surgically by couching, while the term glaucoma was used to describe blindness coming on in advancing year associated with a glazed appearance of pupil in the Hippocratic Aphorisms. Originally both diseases were considered in the lens, only at a later date it was differentiated.

A series of 106 cases in which they combined the cataract extract with trephining with scleral flap (Elliot-Fronimopoulos). In 95 cases tension was compensated without topical therapy (90% success)⁽¹³⁾ Kuroda and Takatsuki (1978)⁽¹⁴⁾ combined with trabeculectomy in 34 eyes with various glaucomas. Follow-up was 6 months. 90% had normal pressure, improvement of vision occurred in 50% in spite of removal of cataractous lens; because of advanced glaucomatous optic atrophy? Combined the cataract extraction with trabeculectomy in 37 eyes of various types of glaucoma, the average follow-up duration was 23.7 months.

The average pre-operative intra-ocular pressure was 23.5 mm, while 16.2 mm. of Hg after operation. Visual acuity improved in 64.9% cases and without improvement in others. 59.5% did not require any medications while in all 35 eyes (94.6%) were controlled post-operatively. No greater incidence of complications in combined procedures from that that expected cataract extraction alone except flat chamber and hyphema in 4 eyes each.⁽¹⁵⁾

Combined with trabeculectomy with 91% success in 70 cases. Spaeth (1980) combined extraction of lens with trabeculectomy, partial punch sclerectomy, iridenchleisis and cyclodialysis, but did not find a single combination suitable for all type of cases. He mentioned for specific indication for each case. Edwards⁽¹⁰⁾ extracted 59 cataracts with trabeculectomy, the follow-up varying between 6 months to 2 years.¹⁶ Reported trabeculectomy with cataract extraction in 20 cases (7 chronic simple glaucoma, 3 exfoliative and 10 lens induced).

In 19 (95%) eyes the tension was controlled between 10 to 24 mm. of Hg. Only one needs medical therapy. Visual acuity increased in 17 eyes. The only complications was hyphema.⁽¹⁶⁾ Extracted 94 cataract with trabeculectomy (59 open angle while 35 capsular glaucoma). Follow-up was 1 to 9 years, average being 3.4 years. 61 (65%) eyes had tension below 21mms, without medications. 31 eyes required additional medical therapy while 2 needed further surgical intervention.¹⁷

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