Original Article

The Effectiveness of Conventional Trabeculectomy in Controlling Intraocular Pressure in Our Population

Ghazala Tabassum, Imran Ghayoor, Riaz Ahmed

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See end of article for authors affiliations

Correspondence to:
Ghazala Tabassum
House # 106 Block-H,
Phase – II Defence View
Karachi

Purpose: To evaluate the effectiveness of conventional trabeculectomy in controlling intraocular pressure in patients with POAG in our population.

Material and Methods: This case control study was carried out in department of ophthalmology, Liaquat National Hospital Karachi from 21st March 2005 to 20th March 2006. 50 patients included in this study were diagnosed case of POAG, who underwent conventional trabeculectomy. Mean follow up was one year. Outcome measures were intraocular pressure and visual acuity.

Results: The study included 50 patients with POAG who undergone conventional trabeculectomy. Age range of patients was 41 – 74 with the mean 56.8 years. Visual acuity showed no statistically significant difference between pre and post-operative periods. Pre-op intra ocular pressure was 20 – 55 mmHg and it was reduced to a mean of 5-22 mmHg post operatively. The mean decline in IOP after surgery was 15.78 mmHg. Perimetry and C/D ratio showed no significant change after surgery.

Conclusion: Results show that in most of the cases visual acuity is maintained and IOP is controlled in the short term period of one year. So conventional trabeculectomy can be effective in controlling IOP in our population.

Glaucoma is the second leading cause of blindness worldwide[1]. Three quarters of people with glaucoma have the open-angle variant, of whom 10% are bilaterally blind[2]. Although it is generally a bilateral disease, its severity may be asymmetrical in two eyes. It has an adult onset, open and normal appearing angles on gonioscopy with the evidence of glaucomatous optic nerve damage. This optic nerve damage may take the form of changes in the appearance of the optic disc or nerve fiber layer or the presence of abnormality in visual fields.[3] Several factors have been implicated as risk factors in the development of glaucomatous optic nerve damage such as elevated intraocular pressure (IOP), myopia and changes in the appearance of the optic nerve, family history of glaucoma, age, black race, diabetes mellitus and cardiovascular diseases.[4]

Treatment modalities of Glaucoma consist of topical and systemic medication, laser treatment[5] and conventional surgical procedures[6]. Traditionally maximum tolerated medical therapy has been used before laser trabeculoplasty or conventional surgery.

Trabeculectomy lowers IOP by the creation of a new channel (guarded fistula) for aqueous outflow between the anterior chamber and subtenon space. Performed early this filtering surgery gives excellent IOP control with minimal complications[7]. We conducted this study to document the effectiveness of conventional trabeculectomy in controlling IOP in our population.

MATERIAL AND METHODS

This study was carried out in the department of ophthalmology of Liaquat National Hospital from 21st March 05 to 20th March 06. After informed consent, 50

patients (28 male and 22 female) were selected in the study. The age range of patients was 41 – 74 with the mean 56.86. Inclusion criteria were patients with POAG undergoing conventional trabeculectomy. Exclusion criteria were patients having secondary glaucoma, primary / secondary angle closure glaucoma and history of prior surgery. Complete biodata and detailed history were taken from all subjects about his / her eye illness as well as systemic illnesses. Detailed ophthalmic examination including visual acuity with and without pinhole, objective and subjective refraction, papillary examination, color vision; adnexa, anterior and posterior segment examination by Slitlamp, anterior chamber angle was assessed with goniolens. Intraocular pressure was measured with Goldmann application tonometer. 30–2 visual field analysis was performed with computerized (Humphry) perimeter.

After confirming as a case of POAG, patients were kept on list for trabeculectomy. Patients who had IOP more then 40 mmHg were given pre op 20% mannitol 200 ml I/V in 20 minutes.

Patients were kept on regular follow up for one year. Follow up consists of six visits postoperatively, done at 1st day, on 1st week 1st, 3rd, 6th and 12th months At each visit, refraction, visual acuity best corrected visual activity, IOP, anterior chamber depth and pupil reaction and bleb appearance. C/D ratio with +90D lens was analyzed. Massage was done to reform the bleb where needed. Visual fields analysis was performed with computerized perimetry (Humphery) in 6th and 12th post operative months.

Statistical package for social science (SPSS) 10.0 version was used to analyze data. Relevant descriptive frequency and percentage was computed for qualitative variables like sex, visual acuity, IOP. Mean and standard deviation was computed for qualitative variables like age and IOP. Chi square test was used to see the association of pre and postoperative visual acuity and t-test was used to see mean ± standard deviation of pre and postoperative IOP.

RESULTS

Total 50 patients (28 male and 22 female) were included in the study. The age range of patients was 41 – 74 with the mean 56.86 and standard deviation of 10.40. Table 1 shows the preoperative visual acuity and post operative best corrected visual acuity after 1 year. These results indicate that there is no statistically significant difference between pre and postoperative visual acuity. In most of the patient's visual acuity is maintained after 1 year of surgery. The chi square is1.174 and P value is 0.978.

Preoperative IOP was in the range of 20 – 55 mmHg, with the mean ± standard deviation of 32.70 ± 12.43. Out of 50 patients, 10 (20%) had IOP in the range of 10 – 21 mmHg; 16 (32%) had IOP in the range of 22-30 mmHg; 10 (20%) had IOP in the range of 31-40 mmHg; 10 (20%) had IOP in the range of 41 – 50 mmHg and 04 (08%) had IOP in the range of 51 – 55 mmHg. Postoperative IOP on 1st postoperative day was in the range of 3-22 mmHg with mean ± standard deviation of 11.20 ± 5.13. Out of 50 patients, 06 (12%) patients had IOP < 05 mmHg; 25 (50%) patients had IOP in the range of 8 – 10 mmHg; 10 (20%) had had IOP in the range of 11 – 16 mmHg; 09 (18%) patients had IOP in the range of 17 – 22 mmHg. Postoperatively in 4 (8%) patients bleb was flat and digital massage was done. These 4 patients were reviewed after 1 week. In 2 of these patients, IOP came to below 21 mmHg, while other 2 needed beta blockers to bring the IOP below 21mmHg. These results indicate that IOP is controlled in most of the patients that is statically significant. P value is < .0001.

Table 1: Pre and Post Operative Visual Acuity

VA	6/6	6/9	6/12	6/24	6/36	6/60	CF	Total
No. of Patients	3	15	10	12	5	3	2	50
(Pre-Operative)								
No. of Patients	2		9	14	6	4	3	50
(Post Operative)								

Chi Square = 1.174, P Value = .978
CF = Counting finger, **VF** = Visual Acuity

Table 2: Pre and Post operative Intra ocular pressure

	Range	Mean +/- Std. div	P value
Pre -op	20-55mmHg	32.7+/- 12.43	<.0001
Post -op (1st Day)	3-22 mmHg	11.20+/-5.13	
Pre -op	22-55mmHg	32.7+/-12.43	<.0001
Post -op (12th Month)	5-22 mmHg	15.78+/-3.71	

IOP= Intra Ocular Pressure

Range of IOP at the 1st postoperative month was 3-20 mmHg. Out of 50 patients, 2 (4%) patients had IOP < 5 mmHg; 18 (36%) patients had IOP in the range of 5 – 10 mm Hg; 20 (40%) patients had IOP in the range of 11 – 16 mmHg; 10 (20%) patients had IOP in the range of 16 – 20 mmHg.

Range of IOP in the 3rd postoperative month was 5-18 mmHg. Out of 50 patients, 5 (10%) patients had IOP in the range of 5 – 10 mmHg; 15 (30%) patients had IOP in the range of 11 – 12 mmHg; 25 (50%) patients had IOP in the range of 13 – 16 mmHg; 5 (10%) patients had IOP in the range of 16 – 18 mmHg.

Range of IOP in the 6th postoperative month was 5-20 mmHg. Out of 50 patients, 5 (10%) patients had IOP in the range of 5 – 10 mmHg; 15 (30%) patients had IOP in the range of 11 – 14 mmHg; 25 (50%) patients had IOP in the range of 15 – 18 mmHg; 5 (10%) patients had IOP > 18 mmHg.

The range of IOP in 12th postoperative month was 5-22 mmHg as shown in table 2 with mean and standard deviation of 15.78 ± 3.71. Out of 50 patients, 5 (10%) patients had IOP in the range of 5 – 10 mmHg; 25 (50%) patients had IOP in the range of 11 – 17 mmHg; 15 (30%) patients had IOP in the range of 18 – 20 mmHg and 5 (10%) patients had IOP in the range of 21 – 22 mmHg; out of last 5 patients, 2 stopped using beta blockers and 3 had cystic bleb. These results indicate that IOP is controlled in 45 patients out of 50, that is statically significant. P value is < 0.0001.

Visual fields and C/D ratio showed no significant change after 1 year of surgery. Postoperative complications were Hypotony in 5 (10%) patients Flat anterior chamber in 6 (12%) patients due to bleb leak in 2 (4%) patients and excessive drainage in 4 (8%) patients. All of them were managed with topical cycloplegics, double patching and aggressive anti inflammation Hyphema occurred in 10 (20%) patients, lasted for 1 – 4 days and settled with conservative management.

In our study the mean IOP was 15.78 after 1 year of surgery. IOP controlled and visual acuity maintained in 45 out of 50 patients. So in our study 90% cases achieved target pressure after conventional trabeculectomy.

DISCUSSION

Glaucoma affects between 60 and 70 million people worldwide and is the leading cause of irreversible blindness.[8] The aim of glaucoma therapy is to preserve the visual function by achieving a "Target Pressure" in each patient. The so called Target Pressure goal should actually be a range with an upper IOP limit that is likely to reduce further damage to the optic nerve in a given patient. The target pressure range needs to be reassessed or changed as comparison of IOP fluctuations, optic nerve changes and / or visual field progression dictate. In points with advanced glaucoma or normal tension glaucoma, the need for especially low pressures should be recognized.[9]

We feel that the aim of trabeculectomy is a constant maintenance of reduced IOP in order to prevent further damage to visual function with the main goal to improve or at least preserve the patient's quality of life[10]. Studies of trabeculectomy as initial therapy for glaucoma, however suggest that there may be some advantages such as reduction of patient visits to the doctor and possibly better visual field preservation.[11] Surgery once had a bad reputation because of high complication rates both at the time of operation and later. The introduction of improved surgical instruments and suture material has led to various refinements of original operation[12]. Since the late 1960's the operation of choice in POAG has been Trabeculctomy" in which controlled fistula is created between the anterior chamber and the subconjunctival space utilizing a partial thickness scleral trap door guarding an internal sclerostomy.[13]

In Britain and much of Europe, filtration surgery is performed early in the course of the disease, without extensive use of medication.[14] Advocates of early surgery points to its high rate of success when performed early in the course of the disease.[15]

A long term multi center, prospective follow up study in Scotland, which compared early trabeculectomy and conventional medical therapy, showed better IOP control in the early surgery group, with less visual fields decay.[15]

In this study we have tried to find out whether the conventional trabeculectomy will work in our population or not. All the cases in our study were diagnosed case of POAG. We included the patients with the age ranging from 41 – 74 years. All the patients were Pakistani belonging to different localities and different postoperative behaviors. It was ensured that all patients were undergoing trabeculectomy by the same skilled surgery.

In the Moorfields Primary Treatment Study[16] the group of patients successfully treated by trabeculectomy achieved a mean IOP of 14.5 mmHg, compared with 18.5mmHg for the patients successfully treated with laser or medication. The significantly lower IOP_S in the surgical patients were maintained throughout the initial 5 years follow up period. There was a markedly high success rate of 98% (in terms of IOP control) in the surgical group at 5 years, compared with 80% in the medical group and only 60% in the laser patients. So our results are comparable to Moorefield's Primary Treatment Study.[7,16] The difference is that they also observed the result of laser and medication treatment.

Our results are also comparable to that Baber et al.[17] In their study, out of 46 eyes, the IOP was maintained at below 21 mmHg without medication in 42 eyes (91.3%). The difference is that his study includes all types of primary glaucoma.

In our study the mean IOP is around 15 mmHg after one year of surgery. IOP is controlled and visual acuity maintained in 45 out of 50 patients. So in our study 90% cases achieved success.

In a nutshell although convention a trabeculectomy is affective in controlling IOP in our population, the obvious down side of any short term, small study is its limitation, but it does present a trend, obviously in order to really prove whether conventional trabeculectomy will be working long term, it requires longer set of patient and a longer duration of study.

CONCLUSION

In our study the mean IOP is 15.78 after 1 year of surgery. IOP is controlled and visual acuity is maintained in 45 out of 50 patients. So in our study 90% cases achieved success after conventional trabeculectomy. Conventional trabeculectomy can be effective in controlling intraocular pressure in patients with primary open angle glaucoma in our population in the short term.

Author's Affiliation

Dr. Ghazala Tabassum
Liaquat National Hospital
Stadium Road, Postal Code74800
Karachi

Dr. Imran Ghayoor
Liaquat National Hospital
Stadium Road, Postal Code74800
Karachi

Dr. Riaz Ahmed
Liaquat National Hospital
Stadium Road, Postal Code74800
Karachi

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