

# Analysis of Primary Surgery and Medical Treatment in the Management of Primary Open Angle Glaucoma

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## Abstract

**Background:** To evaluate and compare the efficacy of medical and surgical treatment for management of primary open angle glaucoma (POAG).

**Methods:** Study included a total of 32 patients with 60 eyes, who were divided into two groups. 31 eyes were included in group A and were given medical treatment. 29 eyes were included in group B and were managed with primary surgery (Trabeculectomy).

**Results:** The IOP was controlled in group A with one drug in 62.5% (n=10), with two drugs in 25% (n=4) and with three drugs in 6.25% (n=1). The IOP of group B patients was controlled by surgery alone in 81.25% (n=13) and with surgery and drugs in 18.75% (n=3). P values were found to be constantly less than 0.001.

**Conclusion:** Primary surgery i.e. trabeculectomy is a superior modality of treatment for POAG as compared to medical therapy as it is cost-effective, IOP control is uniform and compliance is not a problem.

**Keywords:** Primary open angle glaucoma. Trabeculectomy. Intraocular pressure (IOP). Anti-glaucoma medications.

## Introduction

Primary open angle glaucoma (POAG) is a slowly progressive, usually bilateral disease with an insidious onset. It is generally asymptomatic until it has caused a significant loss of visual field, although some patients may become aware of early defects by chance.<sup>1</sup>

POAG is the most common form of glaucoma all over the world<sup>2,3</sup>. It accounts for 60-70% of all glaucoma cases. The prevalence in the population above the age of 40 Yrs is 0.5 to 1%<sup>4</sup>. Glaucoma is considered to be the fourth largest cause of blindness nationwide and is responsible for an estimated 82, 677

cases.<sup>5,6</sup> POAG has a hereditary component.<sup>7,8</sup> In addition, glaucoma has strong association with diabetes mellitus and is also a powerful risk factor for cataract, increasing the risk of cataract four folds in a population as a whole.<sup>9</sup>

Elevated intraocular pressure is one of the major risk factors in causing damage to the optic nerve head.<sup>10</sup> Persons who are most likely to develop POAG than the average person are called POAG suspects. They have positive family history, optic disc changes, and /or elevated IOP with or without field changes.<sup>11</sup> When the patient has elevated IOP, optic disc cupping and visual field loss, there is no controversy that PAOG should be treated. The other indications for treatment include the appearance of scotomas, progressive cupping without detectable visual field loss and a vascular occlusion associated with increased IOP.<sup>12,13</sup>

The purpose of treatment of POAG is to preserve visual function by controlling IOP and thereby preventing or retarding further optic nerve damage. Regular and careful follow up is also important to ensure that any progression is detected early. Topical beta-blockers, parasympathomimetics (pilocarpine) are routinely used in our set-up. Newer topical agents e.g. dorzolamide (CAI), brimonidine (alpha-2 agonist) & latanoprost, bimatoprost and travoprost (prostaglandin analogues) along with topical combination therapies are expensive and not available to most of the patients reporting in Eye outpatient department. So use of these medicines is confined to selected cases. Among various surgical options, trabeculectomy (with or without antimetabolite as an adjunct) is the treatment of choice. Argon laser trabeculoplasty is also used if the laser facility is available.

## Patients and Methods

This study was carried out in the Department of Ophthalmology, POF Hospital Wah Cantt. from April 14 2007 to December 14 2007. Sixty eyes of thirty-two patients were recruited in this study.

For this study the diagnosis of POAG was based on intraocular (IOP) exceeding 21 mm of Hg, open angle of anterior chamber on gonioscopy, visual field defects and progressively increasing cupping of the optic disc. The patients included belonged to both the sexes. These patients included the serving and retired POF employees, their families and patients from allied departments.

All patients who had undergone previous ocular surgery, trauma or had any other associated ocular pathology requiring long-term use of topical medications were excluded from the study. The patients were divided into two groups, *Group A and B*. It was a double-blind, randomized study with every alternate patient selected for primary surgery. These patients were evaluated thoroughly by a detailed history and thorough clinical examination including slit lamp biomicroscopy, gonioscopy and direct ophthalmoscopy. IOP was measured with Goldmann applanation tonometer. Visual acuity for both near and distant vision was also checked. Humphery visual field analyzer was used for the evaluation of the visual fields and informed written consent was taken in all the cases.

*Group A patients* (n 16, eyes 31) were given medical treatment with Timolol 0.5% topically and the patients were evaluated for visual acuity, IOP and evaluation of cup-disc ratio on day 1, day 3 and day 7. If after 7 days of treatment with Timolol 0.5%, IOP remained above 21, mm Hg Pilocarpine was also added to the drug regimen and thereafter patients were evaluated weekly for 4 weeks. If after two weeks of combined treatment with 0.5% Timolol and 2% Pilocarpine, the IOP still remained above 21 mm Hg, a third agent i.e. Prostaglandin Analogue (0.005% Latanoprost ) was added to the treatment regimen. These patients were followed for another two weeks. If the IOP still remained above 21 mm Hg, these patients were excluded from the study and were treated surgically. Patient compliance with therapy was also checked. The patients were asked whether they had used the drug on the morning of the visit to the hospital and how often they missed their prescribed dose *Group B*

*patients* (n 16, eyes 29) were managed with primary surgery (Trabeculectomy). These patients were also evaluated on day 1, 3 and 7, and thereafter weekly for 4 weeks and monthly for 6 months.

## Results

The age of the patients ranged from 36 years to 78 years, with a peak incidence in the 5<sup>th</sup> decade of life (Table 1). The number of patients decreased after the age of 60 years. Out of 32 patients, 24 were males and 8 were females, giving a male to female ratio of 3:1. Patients treated with primary surgery (Trabeculectomy) had satisfactory stabilization of IOP, showing complete success in 81.25% and qualified success in 18.75%, where 0.5% Timolol was required. No complication occurred after surgery. As IOP was frequently and regularly recorded and an attempt was made to keep it within the safe limits, disc or visual field deterioration was not seen during the follow-up period. The p-values using one tail T test comparing two groups i.e. Group A & B was highly significant statistically (p<0.001) which shows that these results could not have occurred by chance alone.

**Table 1: Age Distribution**

Age (yrs)	Number of Patients	%
Below 40	3	9.3
40-50	7	21.8
51-60	12	37.5
61-70	6	18.7
71-80	4	12.5

In *Group A* 62.5% patients required only one drug for control of IOP (Table 2).

**Table 2: Drugs in Group A**

IOP controlled with	Number of patients	%
One Drug	10	62.5
Two Drugs	4	25
Three Drugs	1	6.25
Uncontrolled	1	6.25
<b>TOTAL</b>	<b>16</b>	<b>100</b>

6 patients had intraocular pressure more than 21 mm Hg after 7 days of initiation of therapy with

Timolol 0.5%. Therefore Pilocarpine was also added to their therapy. The compliance of the patients to the medical therapy was not 100%. Only 13 patients had complied with the therapy and they never missed a single dose. Some patients developed side effects of topical medications. 1 patient developed eczema of the lids, probably due to beta-blockers. Another patient had cough and shortness of breath, which got aggravated after starting Timolol. Another patient developed vertigo.

Side effects of pilocarpine included headache and ocular pain (2 patients each). One patient each experienced mild heaviness of head, nausea, running nose and sore throat.

After using Latanoprost, one patient suffered from severe irritation and redness of eyes. Two patients were lost in the follow-up one month and three months after initiation of treatment.

In Group B, two patients had ECCE previously in one eye and one had retinal detachment surgery in one eye previously. Therefore 29 eyes were available to undergo primary surgery. After surgery, three patients required additional measures to control their IOP with Timolol. (Table 3). Two patients were lost to follow up. No complications were seen after surgery.

**Table 3: Management of Group B**

IOP controlled with	Number of patients	%
Surgery alone	13	81.25
Surgery & drugs	3	18.75
Uncontrolled	NIL	
TOTAL	16	100

## Discussion

Primary open angle glaucoma is the most common form of glaucoma and constitutes 35% of all glaucomas<sup>14</sup>. Primary open angle glaucoma is one of the common causes of blindness<sup>15</sup>. Elevated IOP is the major risk factor for damage to optic nerve head fibers<sup>16,17</sup>. Therefore the goal of any therapy should be to provide the maximum benefit to the largest proportion of patients with the least toxicity.

In our study we compared the results of medical therapy vs. surgical treatment for POAG. We found a male predominance for POAG (males 75% and females 25%). It was probably due to a predominantly higher male representation amongst

patients in POF Hospital.

The incidence of POAG was found to increase with age with a peak in the 5<sup>th</sup> decade i.e. 37.5%. The lesser number of cases after the 7<sup>th</sup> decade is probably due to the decreasing survival in that age. This fact is comparable to figures by Hoskins and Kass.<sup>18</sup>

In the present study, compliance with medication on the day of consulting the doctor was 75%. It was fractionally better than the overall compliance of less than 75%. This is in accordance with observations made by Kass et al<sup>18</sup>. It means that IOP reading on the day of examination may be misleading and is not truly indicative of patient's IOP status in the few weeks prior to examination.

Timolol has to be avoided in patients with cardiac or pulmonary problems. Timolol is not safe in all the cases but the physicians due to its beneficial effects on visual fields favour it more. Similarly pilocarpine eye drops are intolerable in a small percentage of patients, though mild side effects e.g. headache, pain in the eyes, nausea occur in significant number of cases. Various side effects of systemic carbonic anhydrase inhibitors make these agents an unpleasant choice for long-term management of POAG). In our study, similar side effects were seen in group-A patients using one or a combination of different agents. Out of a total of 16 patients, a single drug could manage only 10 patients (62.5%). However in these patients few problems were faced. In a few cases the frequency of medication had to be increased. Some patients suffered side effects and still others had poor compliance.

A significant proportion had more fluctuation in IOP before they were satisfactorily controlled with two (25%) and three (6.25%) drugs respectively. In this study we found complete success in patients treated with primary surgery alone (81.25%) and qualified success in remaining patients with addition of 0.5% Timolol (18.75%). No complication occurred after surgery.

As IOP was frequently and regularly recorded and an attempt was made to keep it within the safe limits, disc or visual field deterioration was not seen during the follow-up period.

The p-values of individual groups i.e. medically controlled and surgically controlled groups are highly significant (p<0.001) statistically which shows that these results could not have occurred by chance alone. These results are consistent with those of Lichter et al.<sup>19</sup> However, a larger study sample is recommended for more reliable results.

## Conclusions

Primary surgery i.e. trabeculectomy is a superior modality of treatment for POAG as compared to medical therapy, where more than one agent is frequently needed to stabilize IOP and frequent monitoring of IOP is required. In addition, medical therapy is associated with problems like non-compliance and side effects, which leads to difficulty in stabilizing the IOP.

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