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- Should be typed in English and on one side of A4 (290x210cm) size white paper, using Times New Roman font, size 12, with single space
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Text

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Acknowledgements

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Can we start anti VEGF as an antifbrotic agent in the Glaucoma Filtration surgery!

M N Islam[1]

Welcome to this edition of JBGS. This edition containsthe usual range of topics that illustrate the breadth and depth of some interesting topics in Glaucoma. This is what we were aiming for when starting this journal and wehope this is how you have found it. In this current issue of the journal-papers range from superb, erudite clinical reviews such as 'Comparative study of intraocular pressure (IOP) by contact and non–contact technique by M B Shahid, M S Ahmad, S A Wadud, M A Rahman, S A Shahid, Use of topical brimonidine to prevent intraocular pressure elevations following Nd: YAG-laser posterior capsulotomy by M S I Prodhan, I R Choudhury; Collagen implantation in trabeculectomy- is it the better option? By S M Noman; Central retinal artery occlusion causing neovascular glaucoma due to carotid occlusive disease-a case report by S Begum, S N Hassan, Z S Shahid, T Hossian; Brinzolamide-Brimonidine (FCs) tds is a good alternative to PGAs (Travaprost) for IOP control in PGAs sensitive patients- a comparative study by U Kawsar, S Rahman, Z Shahid, M R Shaheen; Anterior segment biometric changes after cataract surgery in primary angle closure suspect (pacs) patients, measured with anterior segment OCT by R Mannan, S Adhikary, S M Hossain.

Regarding Trabeculectomy augmented with collagen matrix (Ologen) described by SM Noman has been well practiced by many surgeons. In my last 15 years experience Ologen is useful when MMC can not be used specially in pregnant women, very younger age. In my comparative case series MMC vs Ologen the IOP reduction was significantly lower in the MMC group while complications was lower in the Ologen group.

Recently Subconj injection of anti VEGF (Vascular Endothelial Growth Factor) Bivacizumab (Avastine) 1.25 mg in 0.05 ml is being used by many surgeons. Along with pre operative sub conj MMC this post operative avastine increases antifibriotic activity and ultimately increases the success rate. In my case study (In press for publication) of 100 patients, group A, 50 patients of trabeculectomy with pre op sub conj MMC + post op Avastinevs 50 patients of trabeculectomy with pre op sub conjMMC only showed 18% better results in the group A. Complications was compareable. No unusual complications found in the avastine group. I believe preoperative use of low dose MMC and post operativeAvastine can be more practiced to see its long term results.

One area of publication not represented in the current edition of the journal is a correspondence section. It is something we would always wish to encourage. Letters are a sign of aliving, vibrant journal that readers actively want to get involved with.

Correspondence can be of various types. Some letters add their own viewpoint toarticles published – sometimes in agreement and sometimes putting an alternative pointof view. In either case, we would always give the original author a right of reply. Acorrespondent may point out an error in a paper and we would publish this in the nextisuue of JBGS. The corpus of medical knowledge is a precious thing andjournals must seek to publish as high quality information as possible. As scientific'truth' is not fixed but changes over time, this change needs to be quickly reflected

in journals. It is the dynamism of a journal– its desire and ability to rapidly publishalternative views – that is the best way to protect and enhance medical knowledge. Ultimately, it is of course the readers who, by their own expertise, are the trueguardians of this knowledge. We hope you will continue to enjoy the JBGS

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Pattern of Glaucoma in A Referral Hospital in Dhaka, Bangladesh

Z Hasan[1], B K Sarker[2], S J Kabir[3], S Abdullahi[4]

Abstract

Background: The aim of this study was to analyze the pattern of glaucoma in the largest and oldest speciality eye hospital (Ispahani Islamia Eye Institute and Hospital) in Bangladesh.

Methods and material: We retrospectively reviewed the clinical records of all patients attending our glaucoma department of Ispahani Islamia Eye Institute and Hospital in period of July 2016 to June 2017. Medical records of patients with any type of glaucoma were identified from the database established for the 23406 patients and reviewed for this study. Diagnosis of glaucoma was established based on typical clinical findings, examinations like goniscopy and investigations like visual field assessment. Glaucoma was defined as the presence of either glaucomatous optic disc damage and/or glaucomatous visual field defect. Sustained intraocular eye pressure above 21 mmHg in the absence of optic disc damage and visual field changes was defined as ocular hypertension (OHT).

Results: Over the year spanning July 2016 to June 2017, 282712 patients were seen in total by Ispahani Islamia Eye Institute and Hospital. Of these, a total of 23406 patients (8%) being seen by the Glaucoma department and there were 63.3% females.

Primary angle closure glaucoma (PACG) constitutes 43.1% (10,095) of all glaucoma patients, a statistic surprising as POAG is more common in neighbouring India. This merits further research into the genetic roots of this disease in a Bangladeshi population. Primary open angle glaucoma constitutes 25.5% (5966),juvenile open angle glaucoma (JOAG) 1.4% (335), normal tension glaucoma (NTG) 2.4% (549), pseudo-exfoliation 0.3% (69) and congenital glaucoma 1.06% (248). The remainder are secondary glaucomas (26.2%), with an associated secondary cause. These numbers are just the tip of the iceberg of the true situation in the community as many patients remained undiagnosed at community level.

Conclusion: With this paper, we seek to demonstrate the magnitude of disease in our country from the perspective of the Glaucoma departments of a tertiary referral center.

Chronic PACG is the most common form of glaucoma in population with severe visual impairment. Early screening of PACG probably contributed to the improvement of visual prognosis of these patients. A large number of the patients had unilateral blindness at the time of presentation, emphasising the need for a tool to screen those at potential risk. We are looking to raise the awareness of the ophthalmological community in Bangladesh as a whole, so that there can be a hope for these patients in the near future.

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[1]Dr. Zafrul Hasan
[2]Dr. Bipul Kumer Sarker
[3]Dr. Syed Jahangir Kabir
[4]Dr. Sadiq Abdullahi

Introduction

Glaucoma is a progressive optic neuropathy characterised by characteristic optic nerve head damage associated with characteristic visual field defect of which raised intraocular is a risk factor. It is the commonest cause of irreversible blindness in the world and the second commonest cause of blindness world-wide after cataract.[1,2] The global prevalence of glaucoma for population aged 40 to 80 years is 3.54%. The prevalence of primary open angle glaucoma (POAG) is highest in Africa and the prevalence of primary angle closure glaucoma (PACG) is highest in Asia. In 2013, the number of people (aged 40 to 80 years) with glaucoma worldwide was estimated to be 64.3 million, projected to increase to 76.0 million in 2020 and 111.8 million in 2040.[1] In Asian populations, PACG is the main cause of morbidity from glaucoma. PACG blinds 10-times more people than POAG does, and the worldwide incidence of PACG is growing while PACG represents only 10–15% of all glaucomas in the black and white populations, it accounts for a significant percentage of glaucomas that occur in Asian populations.[3] In a population based study in Dhaka among people aged 40 years and older, the prevalence of definite glaucoma was 2.1% (95% confidence interval: 1.5 to 2.9; 39 people). The prevalence of definite and probable glaucoma was 3.1% (95% CI: 2.4 to 4.0; 58 people) in subjects of the same age. Primary open angle glaucoma was the most common form of glaucoma, accounting for 75% of the total.[4] This is all study and since then there are no additional study on prevalence of glaucoma in Bangladesh

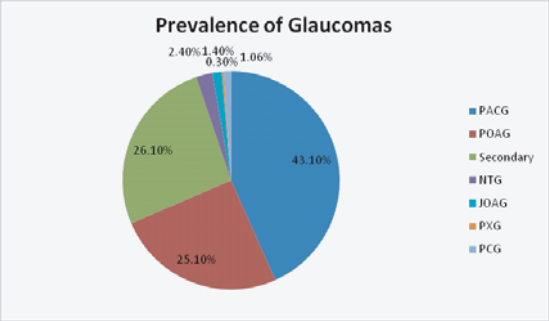
The aim of our study is to report the pattern of glaucoma presentation in glaucoma department of a tertiary referral hospital, the largest in Bangladesh.

Materials and Methods

This is a retrospective study conducted at glaucoma department of Islamia Ispahani Eye Institute and Hospital, the largest eye hospital in Bangladesh. The study adhered to the tenet of Helsinki declaration and was approved by the human research and ethical committee of the hospital. The medical records of all patients attending clinic departments from July 2016 to June 2017 were retrieved from the data base of the medical record department of the hospital. Socio-demographic as well as clinical data were extracted from the patients folder. Such information as age, gender, family history, presence or absence of systemic disease and diagnosis were recorded. Patients with incomplete records were excluded from the study. Diagnosis of glaucoma was made based on international council of ophthalmology (ICO) guidelines. All the patients had comprehensive including visual acuity assessment with best correction; anterior segment slit lamp biomicroscopic examination as well as stereoscopic examination of the fundus with 78D volk lenses. Gonioscopy was performed on all patients and angle was graded according to Shaffer's grading system and intraocular pressure was measured by Goldman applanation tonometer. Visual field assessment was carried out using Swedish Interactive Thresholding Algorithms (SITA) 24-2/10-2 programme. Patients with clear media had coloured fundal photograph and those suspected to have primary open glaucoma or normal tension glaucoma had central corneal thickness (CCT) measured.

Results

Over the year spanning July 2016 to June 2017, 282712 patients were seen in total by Ispahani Islamia Eye Institute and Hospital. Of these, a total of 23406 patients (8%) were seen in the Glaucoma department and 63.3% were females. The mean age at presentation was 52.5±12.5.Primary angle closure glaucoma (PACG) constitutes 43.1% (10,095) of all glaucoma patients, followed by primary open angle glaucoma(POAG) 25.5% (5966).Others are juvenile open angle glaucoma (JOAG) 1.4% (335), normal tension glaucoma (NTG) 2.4 (549), pseudo-exfoliation 0.3% (69) and congenital glaucoma 1.06% (248). The remainder are secondary glaucomas (26.2%) mainly steroid induced glaucoma, neovascular glaucoma, post traumatic and iridocorneal endothelial (ICE) syndrome.



Discussion

Our study has shown that primary angle closure glaucoma is the commonest type of glaucomas among the patients presented during the study period. Our hospital being the largest referral centre in the country shows that the findings might approximate the true population prevalence; this is further supported by findings from previous studies that found PACG to be commoner among Asians.[5,6,7] However, a population-based study in Dhaka division conducted in 2006 found the primary open angle glaucoma to be the commonest type of glaucoma in contradiction to our study.[8] The difference could be due to the fact that their study is a population- based study conducted by a general ophthalmologist with high possibility that gonioscopy was not performed on all the studied population and where performed the gonioscopic skill of the investigator was not mentioned in the paper. Other types of glaucoma such as secondary glaucoma and primary open glaucoma were the second commonest among our patients. There is a an established an association between primary open angle glaucoma and old age.[9,10] Therefore, the increasing life expectancy in Bangladesh could explain the high proportion of POAG among the studied population. Majority of the glaucoma patients were female (68%).[11,12,10]

Conclusion

Primary angle closure glaucoma is the commonest type of glaucoma in our hospital and females were more affected with glaucoma. There is a need for properly conducted study on the true prevalence of different types of glaucoma to enable development of glaucoma services.

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Anterior segment biometric changes after cataract surgery in primary angle closure suspect (pacs) patients, measured with anterior segment oct:

R Mannan[1], S Adhikary[2], S M Hossain[3]

Abstract

To observe the anterior segment biometric changes after cataract surgery in primary angle closure suspect (PACS) patients.

Introduction

Currently, the primary angle-closure glaucoma (PACG) classification is primary angle-closure suspects, primary angle-closure and primary angle-closure glaucoma. Primary angle-closure suspects are those having greater than 180° to 270° of iridotrabecular contact. In addition to the same degree of iridotrabecular contact, PACG cases would have elevated IOP, glaucomatous optic neuropathy and visual field loss.

Phacoemulsification and intraocular lens (IOL) implantation might decrease IOP to some extent in eyes with angle closure suspect by widening the anterior chamber angle.[11,12] As well as it can introduce significant change in anterior segment biometric parameters of the eye, such as:- anterior chamber depth, volume and angle width etc.

Phacoemulsification in PACS eyes poses few challenges also, such as : shallow AC, large lenticular mass etc. These conditions may result in complications such as corneal edema and posterior capsule rupture.[8,13]

Limited studies have evaluated the effect of phacoemulsification in eyes with PACS.[8] In this prospective study, we tried to find out the effect of phacoemulsification on PACS eyes in terms of anterior segment biometric changes as well as its effect on IOP.

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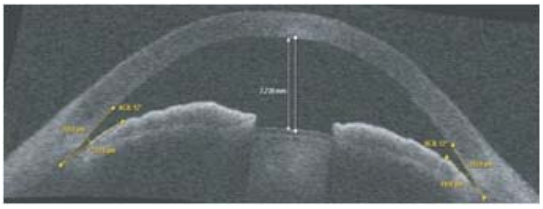
Method

This prospective study was performed from February 2017 to September 2017 at the Glaucoma Clinic, National Institute of Ophthalmology and Hospital, Dhaka. The study was approved by the Ethical Committee at National Institute of Ophthalmology and Hospital. All patients provided informed written consent in accordance with the Declaration of Helsinki.

The study sample : comprised of 24 consecutive PACS patients.

Inclusion criteria : diagnosis of PACS based on gonioscopy, i.e.posterior trabecular meshwork not visible in at least three quarters .No glaucomatous optic disc excavation or visual field defects, visually significant cataracts prior to enrollment.

Exclusion criteria : consisted of a history of an acute attack of primary angle closure and neovascular, inflammatory, or other secondary types of angle closure glaucoma.



Preoperative Assessment

Preoperatively, all participants underwent a comprehensive ophthalmologic evaluation including slit lamp biomicroscopy, dilated fundus examination with a 78 diopter lens, best corrected visual acuity (BCVA) measurement, IOP (mmHg) measured with a calibrated Goldmann applanation tonometer, gonioscopy, and 24-2 Humphrey visual fields (Carl Zeiss Meditec AG, Jena, Germany).

Preoperative values of AC depth, AC volume and Angle of anterior chamber were measured in all cases using Anterior Segment OCT (SL-OCT, Heidelberg Engineering,Germany).

The anterior chamber angle was graded as: 4, a wide open angle with visible ciliary body band; 3, an angle with visible scleral spur; 2, an angle with visible anterior trabecular meshwork; 1, an angle in which only the Schwalbe line is visible; and; 0, an angle with no visible angle structure. Angle grading were recorded.

Surgical Procedure and Postoperative Assessment

All operations were performed under topical anesthesia by a single surgeon. Phacoemulsification was performed through a 2.8-mm temporal clear cornea incision and foldable intraocular lens was implanted within the capsular bag.

Postoperatively, a topical corticosteroid and antibiotic were administered for one week. The topical steroid was tapered weekly over an additional 3 weeks.

Postoperative assessment included slit lamp examination, determination of BCVA, IOP measurement, gonioscopy. Postoperative values were measured at the 1 and 6 month visits. AC depth, AC volume and Angle of anterior chamber was measured at month 1 in all cases using Anterior Segment OCT.

Postoperative AC depth, AC volume and Angle of anterior chamber and IOP were the primary outcome measures.

Statistical Analysis

SPSS software version 13.0 (IBM Corp., New York, NY, USA) was used for statistical analysis. P values of 0.05 or less were labelled as statistically significant. Pre- and postoperative values were compared with paired t-test. Univariate regression analysis was performed to find correlation between IOP and other variables.

Results

Twenty four eyes of 24 PACS patients including 13 female and 11 male subjects were included in this study.

Mean age: Mean age of the study patients was 64.2±9.2 (range: 55-75) years .

BCVA : improved significantly from 6/24 to 6/18 preoperatively; to 6/12 to 6/9 at month 1 (P<0.001); 6/9 to 6/6 at month 6 (P<0.001) postoperatively.

Average anterior chamber angle width: increased significantly from grade 1 to 2 preoperatively to grade 2 to 3 post-operatively (P<0.001).

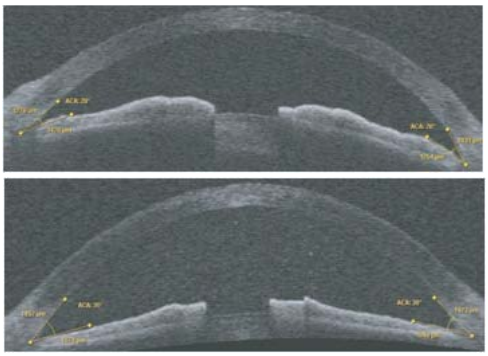


Fig: 1 Postoperative anterior chamber angle width change observed in AS OCT.

Average anterior chamber volume: There was a significant increase in anterior chamber volume postoperatively in study patients after phacoemulcification.

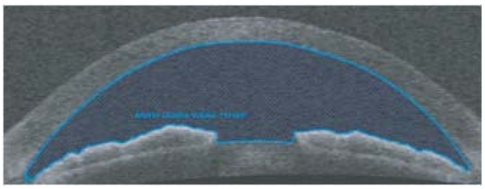


Fig : 2 anterior chamber volume measured with AS OCT.

Anterior Chamber depth (AC depth):

There was a statisticaly significant increase in anterior chamber depth postoperatively in study patients after phacoemulcification.

The anterior chamber depth increased from 2.08±0.16 mm (preoperatively to 2.46±0.40 mm postoperatively (P<0.001).

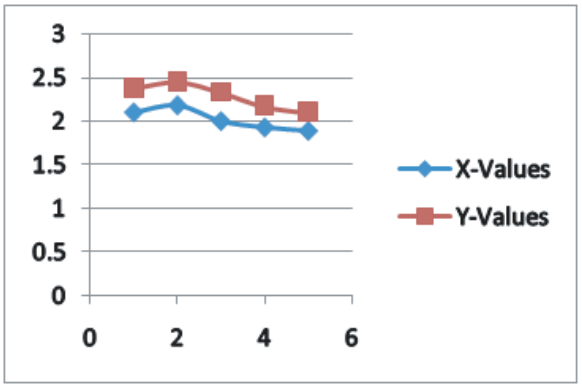


diagram : 1 Represents the mean pre & post operative anterior chamber depth (the X-values represent the preoperative AC depth and Y-values represent the average post operative AC depths)

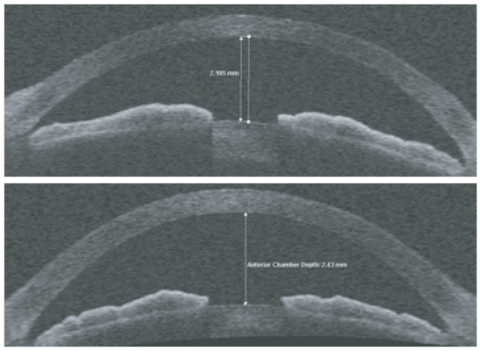


Fig : 3 Change in anterior chamber depth (pre and postoperative AC depth.)

IOP changes : There was significant decrease in IOP from 16.11±5.92 (range: 11-22) mmHg at baseline to 14.24±4.60 (range: 10-20) mmHg 06 months after surgery (P<0.01).

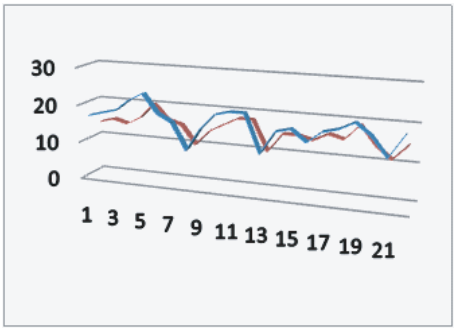


diagram : 2 Describes the mean pre and postoperative IOP at each visit (blue line &red line : represents the preoperative & average postoperative IOP respectively in study patients after cataract surgery).

The magnitude of IOP reduction was correlated with preoperative IOP(P<0.001)

There was significant correlation between IOP reduction and changes in preoperative AC depth after cataract surgery(P=0.01).

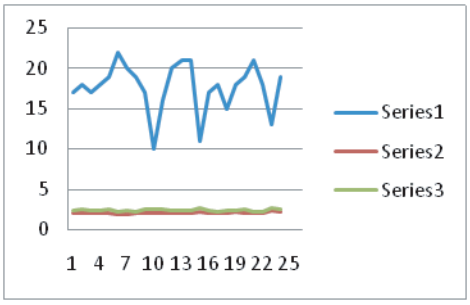


diagram : 3 preoperative IOP and changes in AC depth. The magnitude of IOP reduction was significantly correlated with preoperative IOP (P<0.001) (series 1: denotes preoperative IOP; series 2&3 : represents the preoperative & average postoperative AC depth respectively in study patients)

There was no noticable correlation between IOP changes and sex or age of the study subjects

There was no incidence of : posterior capsule rupture(PCT), nuclear drop or vitreous loss in any of the study patients. Three patients developed corneal edema which resolved within the first 2 weeks postoperatively. Three of the patients had anterior chamber reaction which was treated by increasing the corticosteroid drops .

Discussion

Cataract surgery in PACS has provided us an opportunity to address two pathologies with one intervention: restoring vision and eliminating a narrow angle.[14]

In this study, a significant reduction in IOP was observed after phacoemulsification in PACS eyes. Although there are conflicting reports on postoperative IOP changes after cataract surgery in eyes with primary open angle glaucoma, ranging from a decrease of 0.8 mmHg to an increase of 6.6 mmHg.[4,9]

There is paucity of studies on the efficacy and safety of cataract surgery in PACS eyes.[8,10,11] In most of these studies, the results of PACG and POAG patients were not analyzed separately

Cataract surgery is widely accepted to be beneficial in patients with PACG. A decrease of 6 to 12 mmHg in IOP has been previously reported in this group of patients.[11,12] Hayashi et al[15] reported that 40.0% of PACG patients did not require glaucoma medications after cataract surgery.

In our study, although the angle opened and AC depth increased, we could not differentiate which factor was more significant in decreasing IOP. However, release of appositional closure due to intumescent cataract with shallow anterior chambers may be related to the significant reduction in IOP observed following cataract surgery in cases with higher preoperative IOP.

Few evidences showed that the magnitude of IOP reduction following cataract surgery is positively correlated with the level of preoperative IOP.[12,17-19] In this study, mean IOP reduction in patients with preoperative pressure >21 mmHg was 11 mmHg (from 22.6 mmHg preoperatively to 10.5 mmHg postoperatively).

As found in previous studies on PACS patients, we have also observed an increase in AC depth after phacoemulcification. A greater postoperative decrease in IOP was associated with shallower preoperative AC depth.[19,20] There is greater widening of the drainage angle in eyes with shallower AC depth.[20] A larger lens may play a predominant role in causing IOP elevation in these eyes. Collectively, these observations may explain There is positive correlation between shallow preoperative AC depth and lower postoperative IOPs.

Although cataract surgery in eyes with PACS is a bit challenging, no serious complication such as posterior capsular rupture, corneal decompensation or wound burn has occurred in this study. Few minor complications were noted namely as: temporary corneal edema (6.5%), and anterior chamber reaction (6.5%). But they were treated without any significant vision related adversity.

Limitations of the study: The study has few limitations. Such as: the results may not be randomized to racial groups other than Bangladeshi subjects. If the follow up period as well as number of study subjects were increased the outcome could be studied more effectively. Use of imaging techniques such as ultrasound biomicroscopy (UBM) or newer versions of anterior segment OCT could be done to evaluate the biometric values of the anterior segment more efficiently.

Conclusion

In this study, we have noticed a significant increase in anterior chamber depth and widening of anterior chamber angle width as well as reduction in IOP after phacoemulsification in PACS eyes.

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Original Article

Comparative study of intraocular pressure (IOP) by contact and non–contact technique

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Abstract

Background: Intraocular pressure (IOP) is one of the most important parameters in the diagnosis and treatment of glaucoma.[1] Glaucoma has been established as the second leading cause of blindness. The treatment of glaucoma focuses mainly on lowering intraocular pressure (IOP). The target IOP is often set to a level 20% to 30% of IOP reduction, and consequent large IOP reduction beyond 30% or even 40% in cases of advanced glaucoma.[2] The different methods of tonometery are: Goldman Applanation tonometery, Noncontact (airpuff) tonometery, Perkins tonometery, Tonopentonometery, Transpalpebraltonometery.

Objective : To determine the frequency of accuracy of intraocular pressure (IOP) measured by non-contact (airpuff) tonometer compared with Goldmann applanation tonometer.

Methods : This was a non-interventional, cross sectional study con-ducted at a tertiary care centre of Dhaka, Bangladesh. consecutive subjects attending the BSMMU eye OPD were included in the study. IOP was measured by non-contact (airpuff) tonometer and a slit lamp mounted GAT in all the subjects. The study samples were selected by convenience sampling who presented for check-up in the Eye Department of community ophthalmology, BangaBandhu Sheikh Mujib Medical University, Dhaka. Bangladesh.

Results : A total of 120 eyes in 60 patients were studied. The mean age of the patients was 41.60 year. study population consisted of 24 (40 %) men and 36 (60 %) women. The mean intraocular pressure was 13.52 &13.72 mmHg for GAT, and 16.64 & 17.44 mmHg for Airpuff respectively. The range of measurements by GAT was from 10 to 23 mmHg and by Airpuff was 12to 28mmHg. The difference between IOP measured by two instruments were statistically significant (p=0.000).

Conclusion: Airpuff tonometer is quick, a non-contact method to measure intraocular pressure and is useful for screening purposes and postoperative case but the measurements should be confirmed with Goldmann applanation tonometer for accurate labelling of intraocular pressure.

Keywords: Glaucoma, Intraocular pressure, Goldmann applanation tonometry, Non-contact airpuff tonometer

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Introduction

Intraocular pressure (IOP) is one of the most important parameters in the diagnosis and treatment of glaucoma.[1] Glaucoma has been established as the second leading cause of blindness.[3] The treatment of glaucoma focuses mainly on lowering intraocular pressure (IOP). The target IOP is often set to a level 20% to 30% of IOP reduction, and consequent large IOP reduction beyond 30% or even 40% in cases of advanced glaucoma.[2] The different methods of tonometery are: Goldman Applanation tonometery, Noncontact (airpuff) tonometery, Perkins tonometery, Tonopentonometery, Transpalpebraltonometery.

Goldmann Applanation Tonometer is the method of choice in the ophthalmological clinical settings. Based on Imbert-Fick principle, the Goldmann tonometer assesses the intraocular pressure by measuring the force necessary to applanate a fixed area of cornea.[3] Airpuff tonometry is based on the principle of Applanation, the central part of cornea is flattened by a jet of air to measure the level of IOP.[5] The main advantages of non-contact tonometers are that they are non-invasive and thus comfortable for the patient with a minimal risk of infection. The performance of non-contact tonometery and the interpretation of results are easier than with Goldmann tonometery.

The reliability and stability of IOP measurements is very important. Normal IOP is important to maintain the shape of the eye and normal visual function. Long-term high IOP can cause irreversible damage to the retinal ganglion`cells and postganglionic nerve

fibres. Studies have shown that for every 1 mmHg reduction in IOP, visual field damage can be reduced by 10%.

Pooled data from large epidemiologic studies indicate that the mean IOP is approximately 16 mmHg; however, these pooled data have a non-Gaussian distribution with a skew toward higher pressures, especially in individuals over the age of 40. The value 22 mmHg has been used in the past to both separate normal and abnormal pressures and define which patients required ocular hypotensive therapy. This division was based largely on the erroneous assumptions that glaucomatous damage is caused exclusively by pressures that are higher than normal and that normal pressures do not cause damage.

Methods

This was a non-interventional, comparative cross sectional study conducted Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. Consecutive subjects attending the BSMMU community ophthalmology OPD were included in the study. IOP was measured by non-contact (airpuff) tonometer and a slit lamp mounted GAT in all the subjects. The study samples were selected by convenience sampling who presented for check-up in the Eye Department of community ophthalmology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. Inclusion criteria includes, best corrected visual acuity (BCVA) at least 6/6, refractive error within ±2D spherical and within ±2D of astigmatism.[15] the subjects with normal fundus on +90D examination. Exclusion criteria includes, refractive error >±2D, any active eye disease --- uveitis, corneal disease, infection, discharge, etc, any condition that did not allow taking measurements. Both the procedures were explained to the subjects and an informed consent was taken according to the Declaration of Helsinki. All the measurements were taken from 9 AM to 10 AM to avoid the effect of diurnal fluctuations on IOP. Measurement by Airpuff tonometer this was done first in each patient followed by Goldman applanation tonometry. It was done before applanation tonometry because touching the cornea by applanation prism might have effect on non-contact (airpuff) tonometer readings.[16-22] The subjects were made to sit on a chair and IOP was mea-sured by non-contact (air puff) tonometer. The average of three measurements was taken for analysis. Measurement by GAT: the applanation tonometry was done by a slit lamp mounted applanation tonometer on Haag-Streit R-900 device (Haag-Streit, Koeniz, Switzerland). The subjects were seated comfortably on the slit lamp after explaining the procedure. Proparacaine (0.5%) eye drops were instilled as an anaesthetic agent followed by application of sterilized strip of Flourescein (1%) in the inferior fornix of the eye.[2,3,23] The applanation prism tip was cleaned by alcolhol to avoid transmission of infection.[23] The time difference of at least 15 min was kept between the two measurements. The readings were taken by properly calibrated GAT. The standard clinical methods, recommendations and guidelines of the manufacturers were followed for appropriate readings.[23] Three different readings for the designated eye were and the average was calculated which was used for statistical analysis.

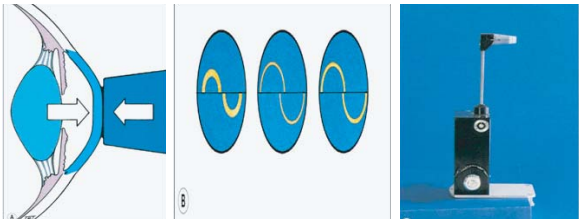

Fig: 1 Goldman Applanation tonometry

Fig:2 Non Contact Air puff Tonometer 200(NIPPON)

The data were entered in Microsoft excel spread sheet. Statistical analysis was done with SPSS 16 software (Chicago,IL, USA). The mean IOP measured by each instruments were compared. Student's t-test was performed to compare the mean

IOP obtained with two methods. was used to explore correlation between the two methods of IOP measurements. A p-value of <0.05 was taken as significant.

Results

A total of 120 eyes in 60 patients were studied. The mean age of the patients was 41.60 year. study population consisted of 24 (40 %) men and 36(60 %) women. The mean intraocular pressure was 13.52 &13.72 mmHg for GAT, and 16.64 & 17.44 mmHg for Air puff respectively. The range of measurements by GAT was from 10 to 23 mmHg and by Air puff was 12to 28mmHg. The difference between IOP measured by two instruments were statistically significant (p=0.000).

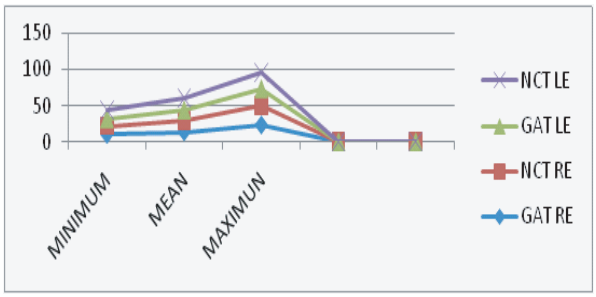

Fig : 3 IOP trend

In our study a total of 120 eyes in 60 patients were studied. The mean age of the patients was 41.60 year. study population consisted of 24 (40 %) men and 36 (60 %) women(Table-01,02, Figure-03).

Table – I : Results of IOP in GAT and airpuff with mean and number of patient

	N	Mean	Std. Deviation
patient age	50	41.6000	14.44483
GAT in right eye	50	13.5200	3.23400
GAT in left eye	50	13.7200	3.11048
Air Puff inRight eye	50	16.6400	3.73489
Air puff in left eye	50	17.4400	3.44140

The mean intraocular pressure was 13.52 & 13.72 mmHg for GAT and 16.64 & 17.44 mmHg for Air puff respectively (Table-04, 05 Figure–04). The range of measurements by GAT was from 10 to 23 mmHg and by Air puff was 12 to 28 mmHg. The difference between IOP measured by two instruments were statistically significant (p=0.000) (Table 05).

Discussion

Non Contact Air Puff Tonometer are usually commonly used in day-to-day ophthalmic clinic practice. Its accuracy is very good even in edematous or irregular corneas, less dependent on corneal thickness, can be used in upright or supine positions, no need of Fluoresce. It does not require slit lamp and topical anaesthesia. Disadvantages of Pneumatonometer is expensive. GAT has two disadvantages. First, the instrument probe must come into direct contact with the cornea, which can increase the risk of infection. Second, use of the GAT requires a topical anaesthetic and some patients, especially children, are unwilling or unable to tolerate drug instillation.

Table – II

Results of IOP in GAT and airpuff with mean and number of patient with P value and CI

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig.(2 -tailed)	Mean Difference	Lower	Upper
GAT in left eye	31.190	49	.000	13.72000	12.8360	14.6040
Air puff in left eye	35.834	49	.000	17.44000	16.4620	18.4180

With these factors in mind, several non-contact tonometers have been developed to facilitate measurement of IOP during vision screening. Severalcomparative studies have demonstrated the reliability and accuracy of IOP measurements obtained with non-contact tonometers and their correlation with measurements obtained with the GAT in subjects with and without glaucoma. Babalola OE et al, the accuracy of two non-contact tonometers, including the Reichert AT550, Goldmann applanation tonometer and a Perkins tonometer was tested in a young normal population. The results showed a high level of agreement between the AT550 and Goldmann applanation tonometer.[6] Masood Alam Shah et al in their study, concluded that intraocular pressure readings obtained by AT550 are comparable clinically with those obtained by the Goldmann applanation tonometer in a population having intraocular pressure within the normal range. In their study the difference between IOP measured by two instruments were statistically significant (p=0.03).In the study by Salim et al a close level of agreement in the normal range of IOPs was observed, with an increased variation as the magnitude of measurements increased. Our data also highlighted that there were 86.4% of eyeshaving IOP variations within ±3 mmHg. Study done by Moseley et al. showed that 71% of the patients had IOP variation within ±3m Hg. Babalola etal. found that 79% of patients were within ±3 mmHg. The mean of the paired difference in IOP was lesser in IOP less than 18 than above that. These differences in IOP were more common at the higher IOP ranges than the IOP in lower teens. This indicated that in most of the patients the Keeler's Pulsair NCT measured IOP correctly if it was within normal range but one has to become cognisant if measured IOP is 18 mmHg or above with Pulsair NCT. They concluded that NCT is a fair tool for screening purposes in community practices as can be easily used by residents and health care personals. The reliability of the instrument decreases if IOP is in the range of higherteens. In this study we also observed IOP variations within ±3 mmHg and difference were also statistically significant (p=0.000)

Conclusions

Compared to non-contact air-puff tonometer, the Goldmann applanation tonometeris a reliable and consistent technique for measurement of intraocular pressure. Airpuff tonometer is quick, a non-contact method to measure intraocular pressure and is useful for screening purposes and postoperative case.

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Collagen implantation in trabeculectomy- is it the better option?

S M Noman[1]

Abstract :

Background : To present the result of our study that compares the out-comes of trabeculectomy with collagen implant versus conventional trabeculectomy for uncontrolled intraocular pressure (IOP).

Methods : 60 eyes of 60 patients were randomly selected for trabeculectomy either with Ologen implant (study group) or without implant (control group). Preoperative history taking & examinations were done. Data included age, gender, glaucoma type, IOP and number of postoperative glaucoma medications were collected. Post operative IOP, number of post operative glaucoma medications & post operative complications were recorded. Each patient was followed up for at least 6 months.

Result : No significant differences were observed between the groups like preoperative IOP and number of pre operative anti glaucoma medications. Post operative IOP in both groups were significantly lower than preoperative level at all follow up. The number of glaucoma medications were reduced from a preoperative mean of 3.5 ± 0.5 to a 6-month postoperative mean of 0.2 ± 0.5 ($P < 0.001$) in the study group and from 3.5 ± 0.7 to 0.4 ±.1 ($P < 0.001$) in the control group. Collagen group had statistically significant less complications were observed in this study.

Conclusion : Trabeculectomy with Ologen does not show any significant advantages over the trabeculectomy alone in terms of Intraocular pressure but immediate post operative complications are less with Ologen implantation, that indicates Ologens safety profile. Large sample size & prolong follow up are needed to confirm the safety & long term out come of trabeculectomy with OloGen.

Key Words : Trabeculectomy, Ologen, Glaucoma, Bleb, Intraocular pressure

Introduction

Cairns 1968 introduced trabeculectomy for the treatment of glaucoma. Trabeculectomy bleb can be failed by wound healing & frosis resulting obstruction of drainage fistula. Failure can be prevented by inhibition of fibrosis. Fibroblast growth beneath the conjunctiva (between 3rd -5th post operative day) plays an important role in bleb failure.[1] Adjunctive antimetabolites like 5- fluoro- uracil (5-FU) and mitomycin-C may enhance the success rate by preventing fibrosis.[2]

Antimetabolites increases the risk of post operative wound leak, hypotony & endophthalmitis[1-3] Studies in animal models show, the uses biodegredable collagen matrix implant beneath the conjunction helps in controlling wound healing process & maintain space for drainage without post operative complications those are common with antimetabolites use.[4] The background of this study is to compare outcomes of trabeculectomy with ologen implant with the trabeculectomy without implant.

Materials & Method

This is a prospective randomized clinical trial that was done in the glaucoma department of Chittagong Eye Infirmary and Training Complex, Bangladesh. Randomizely patients are divided into trabeculectomy (control group) and trabeculectomy & collagen (study group) 6x1 mm biodegradable, porous collagen matrix (atelocollagen plus glycosaminoglycans) were used for the implant.

Fig-1 : A Piece of Collagen

CEITC hospital review board approved the study following Helsinki declaration Informed consent was taken after detail explanation about the implant and operation. Explanation was done to Muslim people as Ologen is not halal origin.

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Two Patients refused due to religious binding. No patient lost for follow up. Young age group (<18 yrs), neovasular glaucoma, history of previous surgery or laser, & absolute complicated glaucoma were excluded form the study. Preoperative following data were collected age, gender, diagnosis, level of intraocular pressure (day before surgery), number of medications. All patients were under went single future trabeculectomy. Post operative IOP, bleb condition & number of glaucoma medications, were also recorded in each follow up. IOP measurement was done with Goldmann applanation tonometer.

Success was defined with some criteria : (1) complete success when IOP of 21mmHg or less with out antiglaucoma mediations & (2) qualified success when IOP of 21 mmHg with the use of antiglaucoma medication. Hyptony was defined as an IOP <6mmHg. Flat anterior chamber can be defined as peripheral iridocorneal touch with central at least I corneal thickness depth.

Surgical Technique :

Surgeries were done by single surgeon (SMN). After peribulbar anesthesia & proper drapping, fornix based incision was given around 12'O Clock. Triangular, superficial scleral flap (4x4mm) was produced facing apex towards 12 O' clock position. 2x1 mm deep sclerectomy & a peripheral iridectomy was performed thereafter. Scleral flap was closed with a single suture (10/O nylon). Ologen was placed over the apex of the triangular flap beneath the conjunctiva after making the operation area dry. Conjunctiva was closed like a wing with 2 sutures by 10/O nylon. Post operatively all patients were treated with Atropin 1%, 3 times daily for 2 weeks, Moxifloxacin 4 times daily for 1 week & Prednisoln acetate eye drop 6 times daily for 3 weeks then tapered gradually.

Statistical analysis was done with windows SPSS. Pre operative & demographic data & IOP comparison were analyzed with students T test. Surgical failure success & complications were analyzed with the c^2 test. With long rank test, Kaplan-Meier survival analysis for surgical success were calculated.

P values < 0.05 were taken as statistically significant.

Fig-2 : Collagen Implantation under Conjunctiva

Results : 60 eyes were enrolled in the study & randomly divided into two groups of Trabeculectomy wth or without ologen implant.

Table-1 describes demographic & diagnostic data before operation. There were no significant differences between the groups in terms of age, gender, eye laterality, diagnosis, pre operative IOP and number of topical & systemic anti glaucoma medications.

8 patients from the study group and 9 patients from control group needed systemic carbonic anhydrase inhibitors.

Operations were uncomplicated in both groups.

Table-1 :

	Study group	Control group	P-value
No. of eyes	30	30	
Age (years)			
Mean (±SD)	61.3 (±18.5)	70.9 (±12.9)	0.188
Range	20–80	32–86	
Median	65	74.5	
Gender			
Male	17 (55%)	18 (60%)	
Female	13 (45%)	12 (40%)	0.759
Eye laterality			
Right	12 (40%)	17 (55%)	
Left	18 (60%)	13 (45%)	0.17
Diagnosis			
POAG	15 (50%)	15 (50%)	
PXG	6 (20%)	6 (20%)	
PACG	3 (10%)	6 (20%)	
IG	6 (20%)	3 (10%)	0.838
Preoperative IOP (mmHg)			
Mean (±SD)	27.5 (±4.3)	34 (±10.6)	0.289
Range	20–35	21–51	

No. of preoperative medications			
Mean (±SD)	3 (±0.5)	3.5 (±0.7)	0.613
Range	2–4	1–4	
Time of preoperative medications (months)			
Mean (±SD)	45.15 (±37.34)	43.35 (±35.96)	0.180

**SD, standard deviation; IOP, intraocular pressure; POAG, primary open-angle glaucoma; PXG, pseudoexfoliative glaucoma; PACG, primary angle closure glaucoma; IG, inflammatory glaucoma.

Mean IOPs for both groups are listed in Table-2 No difference is observed in IOP measurement 6 month after operation between two groups. Post operative IOP levels in both groups is significantly lower than preoperative one. (P<0.05) None of the eyes in the study group developed high IOP>21mmHg post operatively where 2 eyes of control group developed so at the six month visit.

Post operatively in control group mean number of antiglaucoma medications was dropped from (3.5 ± 0.7) to (0.4 ± 0.1) (P < 0.001). Where in the study group from (3.5 ± 0.5) to (0.2 ± 0.5) (P < 0.001). There is no significant difference in their reduction between & groups.

Table-2 :

	Study group	**Control group**	**P-value**
Preoperative	27.5 (±4.3)	34 (±10.6)	0.269
Range	20–35	21–51	
Postoperative visits			
6 months	16 (±4)	15.5 (±3)	0.950
Range	11–21	10–21	

Fig-3 shows Kaplan-Meier survival analysis for both groups using complete success definition. No statistical differences observed between survival curves.

At the 6 month 27 (90%) eyes in both groups showed complete success. All eyes in the study grops 100% & 29 (97%) of 30 eyes in the control group showed qualified success. (P > 0.66)

No statistical significance difference was observed in post operative patients in terms of post operative complication (Table-3).

In the first post operative day 2 eyes in the control group & 2 eyes in the study group developed hypotony those were improved within one month.

Two eyes in the control group & two eyes in the study group developed flat anterior chamber without positive Seidel test those were resolved spontaneously after giving patching for two days. One Patient from the control group & 1 patient from the study group developed encapsulated bleb. No patient developed cataract in the study group where as 1 patient developed cataract in the control group at the end of the 5th month. No patient develop endophthalmitis in either groups.

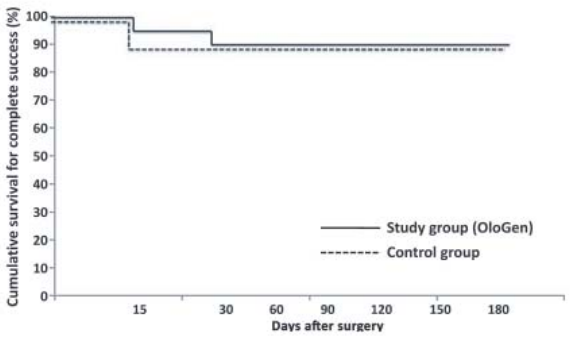

Fig-3

Table-3

	Study group (%)	Control group (%)	P-value
Hypotony	2 (5)	2 (5)	1
Flat anterior chamber	2 (10)	2 (5)	0.548
Hyphaemas	4 (5)	3 (15)	0.179
Encapsulated bleb	1 (10)	1 (25)	0.211
Cataract	0	1	0.311

Discussion

Penetrating glaucoma surgical procedures allow a powerful reduction of IOP. The pressure reducing effect of penetrating surgery is probably still higher than that of non peneterating strategies, particularly in the long run.[5, 6, 7]

Trabeculectomy is the most standard procedure in penetrating anti glaucoma surgery was introduced by Cairns in 1968.[8]

The method was developed further over subsequent decades to address various problems. In 1990, MMC was applied as an anti metabolite during trabeculectomy.[9] Various studies demonstrated significant enhancement of success rates and post operative IOP through intra operative use of MMC[10] This is associated with an increase in adverse effect such as cataract formation, avascular blebs, thinning of the conjunctiva, subsequent blebitis and

endophthalmities.[11-13]

The current focus is on the development of less toxic agents & implants to inhibit cicatrisation without adverse effects.

One approach in the development of biodegradable implants to serve as a place holder and prevent conjunctiva and scleral adhesion.

A few different biodegradable implants are due to be tested in animal models. With a poly (L-lactide-co-epsilon-caprolactone) film, designed to work as an adhesion barrier in filtration surgery, a significantly lower postoperative IOP was found in relation to control eyes and no signficant difference to outcome in MMC-treated eyes was detected.[14] A solid hyaluronic acid-carboxymethyl cellulose film significantly inhibited sub conjunctival scar formation and prevented adhesions of conjunctiva and sclera.[15] The use of seprafilm (sodium hyaluronate and carboxymethylcellulose) reduced postoperative conjunctivo-sclera adhesion. A porous collagen-glycosaminoglycan matrix (ologen implant) was tested in animal models. This implant was designed to prevent collapse of the subconjunctival space, for example, the conjunctivo-sclera adhesion. It led to a randomsed collagen deposition and microcyst formation after penetrating glaucomato surgery in contrast to the negative control and decreased early postoperative scarring[16,17]. Moreover, the ologen implant will also be adjuvant in repairing postoperative bleb leaks[17]. In human subjects, the ologen implant was tested non augmentation in deep sclerectomy. This study revealed that deep sclerectomy with ologen implantation is an effective and well-tolerated method for reduction of IOP.[18] A further pilot study revealed non-significant differences in postoperative IOP after trabeculectomy with ologen and sole trabeculectomy.[19] In summary of the previous studies, the use of the ologen implant promises comparable IOP reduction after trabeculectomy and a lower risk profile in comparison with the use of anti-metabolites, for example, MMC and 5-fluorouracil, although the use of ologen implant does not seem to offer a significant advantage compared with trabeculectomy alone in a pilot study.[19]

Recent studies in animal models reported that, the use of a bio-engineered biodegradable, porous collagen implant offers the potential for a new method of providing controlled resistance seteveen the anterior chamber and the subconjunctional space in the early post operative period, as well as maintaining long term IOP control by avoiding loosely structured filtering bleb.[4] According to the manufacturer, the Ologen implant used in our study may normalize sub conjunctival wound healing and maintain good filtration & biodegrade within 30-90days.

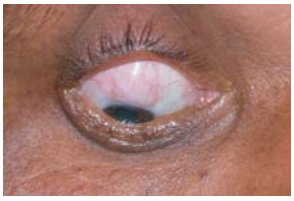

Fig-4

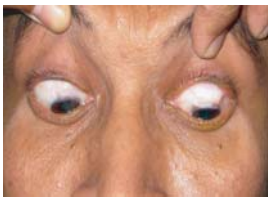

Fig-5

Fig-6

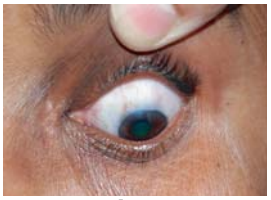

Fig-7

(Fig 4-7 : Some Implanted Collagen in filtration surgery)

Our study reveals that trabeculectomy with implanation of an ologen implant is a safe method for penetrating anti-glaucomatous surgery. We did not detect any ologen-specific side effects, such as translocation of the implant or erosion of the conjunctiva. No allergy was detected and corkscrew vessel scores were comparable in the two interventional groups.

In the early post operative period, excessive aqueous filtration could cause low IOP. Severe hypotony could result in severe complications such as choroidal detachment, gradual bleb failure, cataract & corneal edema & can be associated with maculopathy and loss of visual acuity.[19]

In our study, there was no vision threatening complications were observed except temporary hypotony & shallow anterior chamber (same number of patients in both groups) those were improved with conservative management gradually.

Post operative IOP levels were significantly lower than pre operative levels with both groups at 6 months after operation.

The mean number of antiglaucoma medications used

in both groups was significantly reduced after surgery, there was no significant difference between the two groups in terms of either the mean post operative IOP with the mean number of antiglaucoma medications used. This result is very much similar with the study of Papaconstantinou et al.[19] There were non statistically significant differences between the two groups in terms of post operative complications. That is very similar with other study.[19]

Papconstantenour et al[19] experienced one case of endopthalkmitis with 2 cases of positive Seidel test in the study group. In our study we did not face such complications in either groups.

One patient from the control group developed cataract at the end of 5th month after filtration surgery. He underwent cataract surgery with implantation. Still bleb Morophology & IOP are normal limit in that patient.

Four eyes from the control groups & 2 eyes from the study groups developed hyphema at immediate post operative period (1st to 3rd).

This is probably due to leaking of blood from the scleral flap angle to the anterior chamber. In the study group probably it is less due to relative tight sealing due to pressure of the ologen.

Even though there were no statistically significant differences between the two groups in terms of post operative complications, there may be clinical significance in the fact that 4 eyes from the control group developed hyphaema & one eye developed cataract which needed cataract surgery.

Ologen did not show any allergy to anybody in our study. But biodegradation is slower than the mentioned period of 60-90 days. Even in all eyes of the ologen group the implant degraded partially even at the end of 6 month after filtration surgery.

In conclusion of their study we can say that, trabeculectmy with ologen implantation have not significant advantage over trabeculactomy only. Additionally there were no statistically significant differences between the two groups in terms of complications.

Large sample sizes, prolong follow up are needed to confirm those outcomes with safely as well as efficacy of ologen in filtration surgery.

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Brinzolamide-Brimonidine (FCs) tds is a good alternative to PGAs (Travaprost) for IOP control in PGAs sensitive patients- a comparative study

U Kawsar[1], S Rahman[2], Z Shahid[3], M R Shaheen[4]

Abstract

Purpose : To evaluate the safety and efficacy of adding brinzolamide 1%/ Brimonidine 0.2% fixed combination (BBFC) to a prostaglandin analog Travoprost 0.004% (PGA).

Methods : Prospective study of patients with open-angle glaucoma or ocular hypertension with higher intraocular pressure (IOP) from normal range. Safety assessments included adverse events, visual acuity, and slit-lamp examinations.Total (n = 27) with Open Angle Glaucoma treated with Brinzolamide-Brimonidine (FCs) three times daily or Travoprost once daily for 12 weeks. 25 patients completed the study, Efficacy analyses included,13 patients for Brinzolamide-Brimonidine (FCs) and12 patients for Travoprost with a monitored baseline score of intra-ocular pressure. Adverse reactions were monitored at each study visit.

Results : IOP was decreased at week 12 (17.8±4.1mmHg) compared with baseline (29.1± 3.0mmHg); IOP at week 6 was 18.2±3.3mmHg at Brinzolamide-Brimonidine (FCs) group, and at Travoprost group IOP was decreased at (16.3 ±3.0mmHg) compared with baseline (28.1± 3.4mmHg) at week 12, at week 12, almost all patients who completed the study, achieved IOP 18mmHg. Patient-reported symptoms (e.g., pain and redness) were mostly unchanged from baseline. About fifteen adverse events (AEs) were reported; the most frequently reported AE was Headache, blurred vision and discomfort, almost all adverse events are seen at travoprost group.

Brinzolamide/brimonidine is the first available fixed-combination that does not contain timolol, and may be particularly suited to patients with comorbidities that restrict treatment with â-adrenergic receptor antagonists. And this is generally a well-tolerated anti-glaucoma combination product for glaucoma patients.

Conclusion : Patients had less discomfort with brinzolamide /brimonidine than with travoprostgroup, both treatments were generally effective for the treatment of open-angle glaucoma or ocular hypertension (Decreasing the rate of IOP is almost same in both group), When glaucoma patients complain of various adverse events with Travoprost administration, switching to brinzolamide/brimonidine fixed combination is an acceptable treatment option.

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Introduction

Glaucoma comprises a group of progressive, neurodegenerative disorders characterized by retinal ganglion cell death and nerve fiber layer atrophy and also a leading cause of irreversible blindness worldwide.The prevalence of glaucoma in Bangladesh is high. POAG (primary open angle glaucoma) is the most common form of glaucoma, although PACG (primary angle closure glaucoma) and secondary glaucoma were the most visually destructive forms of the disease in those affected. The pressure increases in the eye, because the passages that normally allow fluid within the eye to drain become blocked. As a result, Fluid collects in the eye, pressure on the optic nerve increases (an eye injury also can cause the pressure to raise), the nerve fibers in the optic nerve are damaged by this pressure

The amount and quality of information sent to the brain decreases, and a loss of vision occurs. Early detection and treatment of glaucoma can reduce the chances of damage to the eye and loss of sight. If left untreated, side vision (peripheral vision) and central vision will be destroyed and blindness may occur. A regular eye examination, including testing for glaucoma, is an important preventive eye care practice for people over the age of 35.

The ultimate goal of treating glaucoma is to reduce intraocular pressure (IOP). Reducing IOP to prevent or delay disease progression is the standard of care for ocular hypertension and glaucoma, and treatment with topical ocular hypotensive medication has been shown to slow the progression of visual field defects. Many patients require two or more glaucoma medications after the 1st year of treatment to maintain target IOP reductions. Fixed combinations of two ocular hypotensive medications have been shown

to effectively reduce IOP, simplify treatment regimens, and decrease cumulative exposure to preservatives and may increase treatment adherence compared with concomitant therapy with individual medications.

A combination of antiglaucoma medications is indicated if mono-therapy is not sufficient to achieve the predefined target pressure and/or in case of a progression of glaucomatous damage or conversion from ocular hypertension to glaucomatous optic neuropathy. Most recently many fixed combinations with two active compounds have become available for the medical treatment of glaucoma. Compared to non-fixed combinations, these drugs offer a much easier use for the patients. Fixed combinations have to be applied less frequently which may improve adherence. Furthermore, they most likely contain a lower amount of toxic preservatives compared to non-fixed combinations. And finally, fixed combinations may eliminate the risk of a "washout" of the first medication by using the second product of a non-fixed combination too soon after the first drop has been installed.

Topical prostaglandins (PGs), with their powerful ocular hypotensive effect (which is mainly the result of increasing uveoscleral outflow), are therefore another important treatment option for glaucoma. PGs/prostamides are approved as the first-line treatment for glaucoma in the European Glaucoma Society guidelines. The main reasons for this choice include their IOP-lowering efficacy, their lack of relevant systemic side effects, their requirement for only once-daily dosing, and their good overall tolerability profile.

While the IOP-lowering efficacy of any glaucoma therapy is critical, selection of a suitable topical ocular medication for glaucoma also depends on other factors that may influence patient adherence to therapy, such as drop comfort upon instillation and overall tolerability. Therefore, the objective of this crossover study was to assess ocular discomfort, efficacy upon instillation and patient preference for brinzolamide/brimonidine relative to a prostaglandin analogue Travoprost, in patients with open-angle glaucoma or ocular hypertension.

Methods

Study design:

This was a 12-week, prospective study. Total 27 patients are with open angle glaucoma treated with Brinzolamide-Brimonidine (FCs) three times daily or Travoprost once dailywere enrolled in this study. Two patients can't complete this survey study because they were from outside Dhaka City, and unable to communicate at 6 weeks routine visits. At screening (day 0), patients were assessed for study eligibility. Demographic information, medical histories, and information regarding contact lens wear (if applicable) were collected.

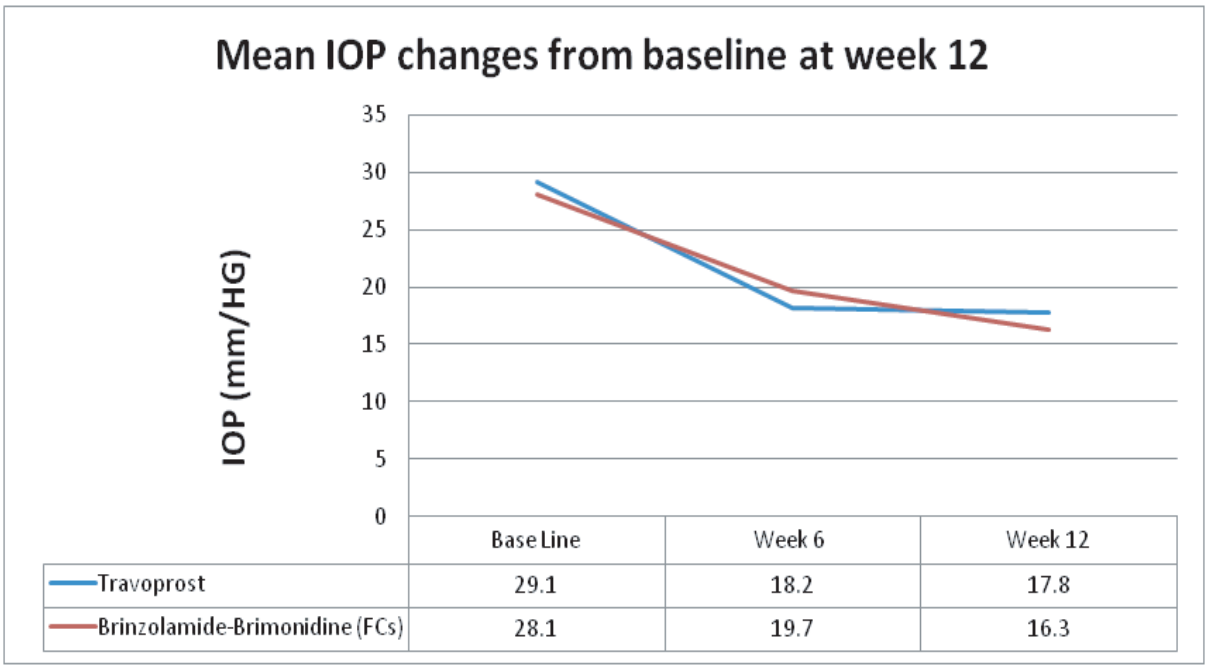
The primary efficacy outcome was the mean change in IOP from baseline, when patients were receiving Travoprost monotherapy, and receiving Brinzolamide-Brimonidine (FCs) to week 12, Other assessments included the mean change in IOP from baseline to week 6, percentage of patients reaching the target IOP of 18mmHg at week 12, and mean change in patient experience survey responses from baseline to week 12. IOP measurements were performed from baseline.

Safety was assessed by monitoring adverse event (AE) reports. Ocular signs and patients experience at weeks 6 and 12 were also assessed. Ocular signs were assessed in both eyes at each study visit by slit-lamp biomicroscopy of the eyelids, conjunctiva, cornea, iris, anterior chamber, and lens.

Patients Data

Category	Brinzolamide-Brimonidine (FCs)	Travoprost
Dosage Frequency	3 Times daily	Once Daily
Number of Patients	13 Patients (4 Female and 9 Male)	12 (1 Female and 11 Male)
Age Group	35-46 Years	
Iris color	All were Black	
Diagnosis	All patients were suffering at Primary open angle glaucoma	
Intraocular pressure, (mmHg)	29.1±3.0 mmHg (At Baseline)	28.1± 3.4mmHg(At Baseline)

**Treatment groups were based on the randomization assignment for day 1



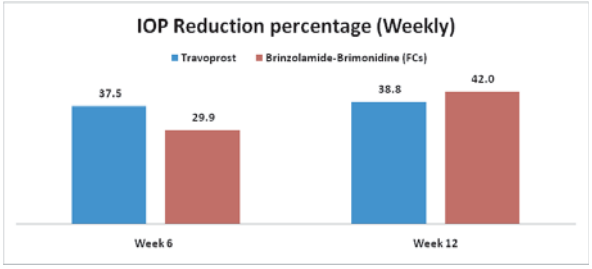
Mean IOP changes for Brinzolamide-Brimonidine (FCs) and travoprost 0.004% at week six and week 12.

The primary statistical objective of this study was to evaluate that the IOP-lowering efficacy and of observing adverse events of travoprost0.004% and Brinzolamide-Brimonidine (FCs).

Results

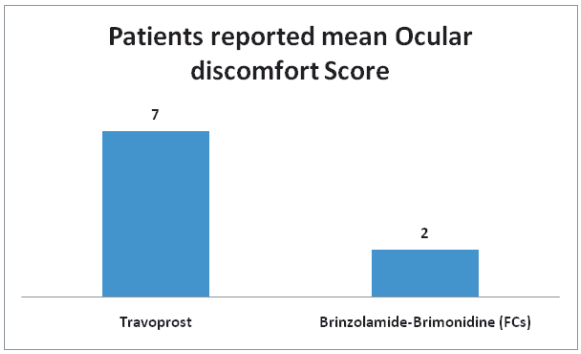
Patients in the per protocol data set, There were no statistically significant differences between treatment groups for mean age and also there were no statistically significant differences in mean IOP at baseline between treatment groups. The study results demonstrate that Brinzolamide-Brimonidine (FCs) three times daily and travoprost 0.004%, dosed once-dailymaintained IOP similarly throughout the day and provided significant IOP reductions.

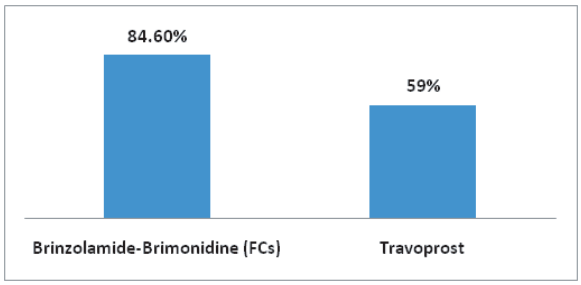
At Travoprost 0.004%, group 12 patients were enrolled (1 female and 11 male patients), Baseline IOP was 29.1±3.0 mmHg, and all patients achieved 18mmHg of IOP at the routine visit of week 12. Some patients of this group report some adverse events. And also atBrinzolamide-Brimonidine (FCs) group no patients had IOP greater then18mmHg after 12 weeks. At week six Travoprost shows almost 37.5% clinical success rate on the other hand at week 12 Brinzolamide-Brimonidine(FCs) group shows almost 42% clinical success rate. Total IOP reductions percentage is given at following graphs:-



IOP reduction percentage from baseline at weeks 6 and 12

A total of 15adverse events were reported by 11 patients in both groups, nearly all adverseevents were mild or moderate in severity. These reported adverse events resolved at the end of the study without using any further medications. Slit-lamp observations were done among all visits. At baseline, observations include eyelids, conjunctiva, cornea, iris, anterior chamber. Among all other adverse events Headache, Blurred vision and discomfort were reported frequently. Most of AEs were seen at Travoprost group.





Percentage of patients who preferred each medication on the basis of ocular tolerability

In the present study, ocular discomfort reported, was significantly lower after instillation of Brinzolamide-Brimonidine (FC) than after instillation of Travoprost. Maintaining IOP levels 18mmHg may decrease the risk of glaucoma progression. Travoprost and Brinzolamide-Brimonidine (FC) both group achieved this purpose.

These study results were limited due to a short-term exposure to each study drug. Long-term exposure to either drug may influence patient perceptions of comfort. At the end both Travoprost and Brinzolamide-Brimonidine (FC) were safe and well tolerated for the treatment of primary open angle glaucoma. But for the ocular comfort â-blocker free Brinzolamide-Brimonidine (FC) should be a preferred medication for glaucoma patients.

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Major adverse Events reported	Brinzolamide-Brimonidine (FCs) group patients reported	Travoprost group patients reported
Headache		01 (8.33%)
Blurred vision	01 (7.69%)	03 (25%)
Discomfort		03 (25%)
Dry eye	01 (7.69%)	01 (8.33%)
Conjunctival discomfort		01 (8.33%)
Ocular foreign body sensation		01 (8.33%)

**Calculated the percentage of patients who reported adverse events in both groups

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Original Article

Use of topical brimonidine to prevent intraocular pressure elevations following Nd: YAG-laser posterior capsulotomy

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Abstract

Objective: To study the effect of brimonidine on intraocular pressure (IOP) following Nd-YAG laser capsulotomy.

Materials and Methods: The study was observatinal and prospective in nature. The study was done in National institute of ophthalmology & hospital, Dhaka during the period of March/2015 to February /2017.

Results: Eighty percent of the subjects showed a decrease in IOP after instilling 0.2% brimonidine (1 hour pre capsulotomy). No such decrease was observed in control. After 1 and 4 hour post capsulotomy a statistically significant decrease in IOP ranging between 1–10 mmHg was found in 73.3% of the treatment group.

Conclusions: In the present study 0.2% brimonidine has been proven effective to counteract the increase in IOP following Nd-YAG laser capsulotomy.

Keywords: Brimonidine, intraocular pressure, Nd-YAG laser capsulotomy, posterior capsular opacification

Introduction

Major cause of blindness currently in worldwide is cataract which is reversible[2]. The entire cataract surgeries performed now a days is by extra capsular cataract extraction (SICS & PHACO).[3] Chances of posterior capsular opacification (PCO) remain high with manual SICS than PHACO; hence it is one of the most important complication of extra capsular cataract extraction. It leads to decrease in vision post-operatively to an extent that it diminishes more than pre-operative state[4]. Overall incidence of PCO is now rapidly decreasing due to PHACO surgery by expert hand. A noninvasive method of dealing with PCO is Nd-YAG laser capsulotomy. But Nd-YAG laser has its own problems like corneal haze, uveitis, hyphema, lens pits, and retinal detachment but the most consistent complication is the post-capsulotomy rise in intraocular pressure[5]. Rise in IOP is probably caused by clogging of the trabeculum with debris[7]. This is the maximum after 2–4 hours of procedure[6].

Drug brimonidine is usually used in the treatment of glaucoma as it lowers the IOP and reduces risk of progression and loss of vision. Mode of action is by α–2-adrenergic receptor agonist, thus resulting in lowering of IOP[7-9]. It has dual mechanism of action – firstly it decreases the aqueous humor formation and secondly it increases the uveoscleral outflow[9]. Brimonidine is proven safe and well-tolerated[7, 8, 10]. Artifical tear used in this study is a combination of poletthylene glycol and propylene glycol. It is used in dry eye syndrome. It has no documented effect on IOP. The present study documents the effect of brimonidine on the prevention of post-capsulotomy spike of IOP.

Material And Methods

The study was observational and prospective in nature. The study was done in National institute of ophthalmology & hospital, Dhaka during the period of March/2015 to February /2017. Ethical clearance was obtained to carry out this observational and prospective trial. Study subjects who consented to be a part of the study were selected and matched in terms of age and sex. The inclusion criteria in the study was non-glaucomatous subjects who presented with dimness of vision following PCO after SICS and PHACO, advised for Nd-YAG laser posterior capsulotomy at OPD. Exclusion criteria included subjects who were glaucomatous, high myopic, having corneal opacities and uveitis. Those subjects who had not consented were also excluded from the present study.

Total 120 subjects (120 eyes), as per the inclusion criteria, participated in the study. Purpose and procedures were explained and after obtaining written

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informed consent, they were allocated in two groups:

Group A: Subjects who were instilled with 0.2% brimonidine[7-9].

Group B: Treated with arttificial tear (combination of poletthylene glycol and propylene glycol).

The pre-capsulotomy assessment, sociodemographic profile, clinical history, and clinical ophthalmic examination of the subjects were recorded in a pretested proforma. Ophthalmic examination included:

1. Visual acuity by Snellen's chart and vision with pin hole
2. Subjective refraction
3. Slitlamp examination
4. Fundoscopy (direct and indirect)
5. IOP measurement by applanation tonometer

Base-line IOP was recorded by Goldmann Applanation tonometer. Before an hour of the capsulotomy, subjects from Group A were instilled with one drop of brimonidine 0.2% (trade name: Alphaten). However in the subjects belonging to Group B, one drop of arttificial tear (combination of poletthylene glycol 4 mg and propylene glycol 3 mg) (trade name: Systear) was instilled. Inraocular pressure was again recorded after 1 hour of instillation of drug (pre-laser post-drop IOP). YAG laser for PCO was done in both the groups under topical anesthesia. The power setting of the YAG machine for both the groups was between 2 to 3 mJ per pulse and the number of shots ranged from 2 to 4 per patient depending upon the thickness of PCO.

Immediately post-capsulotomy, 0.2% of brimonidine and arttificial tear were again instilled in subjects of Group A and Group B, respectively. IOP was recorded after 1 and 4 hours to document the effect of brimonidine in terms of change in IOP. Data were recorded and analyzed by the help of Epi 6.04.

Results

Majority of the subjects in both groups belonged to the age group of 41-60 years; this can be attributed to the higher incidence of cataract in this age group[2]. Out of total 120 subjects, who participated in the study, 52 (43.3%) were males and 68 (56.7%) were females.

Pre treatment (baseline) IOP was recorded one hour before the YAG laser capsulotomy and majority of subjects in both the groups had IOP between 10–19 mmHg. None of them had an IOP above 20 mmHg hence adhering to the inclusion criteria of being nonglaucomatous at the time of capsulotomy (Table 1)

Table-1 : Pretreatment (baseline) intraocular pressure

IOP (mmHg)	Group A No. of subjects (%)	Group B No. of subjects (%)	Total No. of subjects (%)
<10	04(6.66)	00	04(3.33)
10-15	28(46.67)	36(60)	64(53.33)
16-19	28(46.67)	24(40)	52(43.34)
20-25	00	00	00
>25	00	00	00
Total	60(100)	60(100)	120(100)

Post Brimonidine Pre Laser IOP i.e. IOP after one hour of instillation of Brimonidine in Group A revealed a fall in IOP prior to YAG laser capsulotomy (Table 2). A decrease in the IOP was noted in 24 subjects of Group A. However no such decrease in IOP was observed in Group-B.

Table 2 : IOP 1 hour post brimonidine (prelaser IOP)

Percentage fall in IOP	Group A No. of subjects (%)	Group B No. of subjects (%)
0-10	0	00
11-20	20(33.3)	00
21-30	20(33.3)	00
31-40	2(3.4)	00
>40	6(10)	00
No change in IOP	12(20)	60(100)
Total	60(100)	60(100)

Immediately post capsulotomy 0.2% of brimonidine and arttificial tear was again instilled in subjects of Group-A and Group-B respectively (Table 3).

Table 3 : Intraocular pressure changes after laser treatment

Intraocular pressure in mmHg	Group A - No. of subjects (%) After 1 hour	Group A - No. of subjects (%) After 4 hour	Group B - No. of subjects (%) After 1 hour	Group B - No. of subjects (%) After 4 hour
Rise in pressure				
1-5	2(3.3)	0	18(30)	12(20)
6-10	0	2(3.3)	10(16.6)	36(60)
>10	0	0	0	0
Fall in pressure				
1-5	30(50)	24(40)	0	0
6-10	15(25)	20(33.3)	0	0
>10	5(8.3)	8(13.3)	0	0
No change in IOP	8(13.3)	6(10)	32(53.3)	12(20)

Following observations were made:

Post capsulotomy after 1hour, out of 60 subjects in Group A, rise in IOP was seen in only 2(3.3%). However Group B 28(46.6%) subjects had raised IOP. This rise ranged from 0–10 mmHg. Among subjects of Group-A, 50% had a fall of 1-5 mmHg in IOP whereas no such fall was seen in subjects of Group-B. No change in IOP was seen in 8(13.3%) of subjects from Group A and 32 (53.3%) subjects of Group B. Observations in change of IOP after 1 hour of the intervention were found to be highly significant with a P value of 0.00002.

After 4 hour of YAG Laser capsulotomy IOP was raised in only 2(3.3%) out of 60 subjects in Group A. On the contrary in subjects of Group B, 48(80 %) subjects had raised IOP. This rise ranged from 1-5 mm in 12 subjects (20%) and 6–10 mmHg in 36 (60%) subjects. In Group A, the proportions of subject having a fall of IOP between 1-10 mm was 73.3% and 13.3% of subjects had a fall of more than 10 mm. However no such fall in IOP was seen in subjects from Group B. The observations after 4 hour of the intervention were found to be highly significant with a P value of 0.000023.

Discussion

Brimonidine has been tried to decrease the rise in IOP after YAG laser capsulotomy by several researchers.[12,13] In a study by Gartaganis et al., a significant mean percent reduction in IOP was found after 0.2% brimonidine instillation 1 hour pre capsulotomy and immediately post capsulotomy. However in the present study, when one drop of 0.2% brimonidine was instilled 1 hour pre-capsulotomy and immediately after Nd-YAG laser capsulotomy, IOP elevations were prevented. Yeom et al. had also documented similar observations where IOP decreased from the baseline in the group who were instilled with brimonidine. But in his study, decrease in IOP was significant after one and four postoperative hour ($P<0.00002$) and ($P<0.000023$) respectively, while the control group exhibited an increase in IOP. Present study also documents a decrease in IOP after 1 and 4 hour in Group A who were instilled with brimonidine. Thus present study provide substantial evidence in favor of brimonidine for prevention of acute rise in intraocular pressure after Nd: YAG laser posterior capsulotomy.

Conclusions

In the present study 0.2% brimonidine has been proven effective to counteract the increase in intraocular pressure following Nd-YAG laser capsulotomy.

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Iridocorneal Endothelial Syndrome – management is tough but never impossible- A case series study

S M Noman[1]

Abstract

Purpose : To document and describe clinical manifestations and management approaches to patients diagnosed with ICE syndrome presenting at the Glaucoma Department, Chittagong Eye Infirmary and Training Complex, Chittagong, Bangladesh.

Design : A hospital-based prospective observational case series review.

Participants : 25 patients who were diagnosed as ICE syndrome from November 2007 to October 2009.

Method : Patient particulars, history with main causes of hospital presentations were recorded. Ophthalmic examination details including tonometry, slit lamp examination, gonioscopy, indirect ophthalmoscopy, visual fluid examination and management given were documented. Similar relevant details were recorded for three follow up periods on all patients extending over a total period of 12 months.

Main outcome measure : Significant observations, pattern or associations within the cohort.

Results : 25 patients were included in the study. There were 15 female and 10 male patients. All 25 cases were unilateral. The mean age of the patients was 41 ± 15.27 years. Among them 15(60%) had pretreatment visual acuity between 6/9 – 6/18 and 10(40%) had 6/24 – 6/60). Improved visual acuity was observed one year after starting treatment. 21 patients (84%) presented with eccentric pupil (corectopia), 9 patients (36%) with peripheral anterior synechiae, 6 patients (32%) with iris atrophy, 6 patients (24%) with mild corneal oedema, 3 patients (12%) with ectropion uveae, 2 patients (8%) with polycoria and 11 patients (44%) presented with pigmentary changes over iris (like diffuse iris naevus). Mean IOP at presentation was 24.08 ± 14.3 mmHg and that of last follow-up was 17.38 ± 7.57 mmHg. IOP was controlled with 2 – 3 topical antiglaucoma medications in 8 patients (32%); with only observation in 5 patients (20%) and with surgical intervention in 12 patients (48%).

Conclusion : Although ICE syndrome is a refractory glaucoma, control of IOP and preservation of visual acuity were seen in 52% of cases which had conservative management with topical medications and observation. Patients not responding to medical management needed surgery for the control of intraocular pressure.

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Introduction

Iridocorneal endothelial (ICE) syndrome is typically a unilateral condition characterized by a corneal endothelial abnormality that is variably associated with corneal oedema, anterior chamber angle changes, alterations in the iris and secondary glaucoma. The disorder is usually diagnosed in early adulthood and is more common in females than in males. The spectrum of ICE syndrome is divided into Chandler's syndrome, essential (progressive) iris atrophy, and the Cogan–Reese (iris naevus) syndrome based primarily on the changes in the iris. Although clinically the distinction may be important, the three sub-types of ICE syndrome may more accurately be regarded as different manifestations of the same disease process. The subtypes of ICE syndrome are linked by the presence of an abnormal corneal endothelial cell layer. These cells have the capacity to migrate across the trabecular meshwork and onto the surface of the iris. Contracture of this layer results in

iris changes, peripheral anterior synechiae (PAS) and glaucoma. The glaucoma is presumed to be secondary to angle closure or a membrane covering the trabecular meshwork. The rate of glaucoma associated with ICE syndrome has been reported to range from 46% to 82%.[1-4] Previous studies have suggested that essential iris atrophy has a more refractory glaucoma than Chandler's syndrome.

The glaucoma associated with ICE syndrome often is difficult to treat.[1,4-5] Medical therapy is usually limited to aqueous suppressants and often becomes ineffective.[4] Laser trabeculoplasty is ineffective. The success rate of filtering surgery is also believed to be lower than with most other forms of glaucoma.[6-7] A few smaller studies on secondary glaucoma in ICE patients have looked at the outcomes since the introduction of antifibrotic agents and glaucoma drainage implant (GDI) surgery, but these studies

have had limited follow-up.[6-7]

The purpose of the current study is to describe clinical manifestations and management outcomes of patients who were diagnosed as ICE syndrome at the Glaucoma Department, Chittagong Eye Infirmary and Training Complex, Chittagong, Bangladesh.

Methods

This is a hospital-based combined non-concurrent and concurrent prospective cohort study of all cases presenting to the glaucoma clinic with a diagnosis of ICE syndrome. Cases were identified throughout a two-year period from November 1st 2007 to October 31st 2009. All patients were reviewed by a single consultant.

Details of history including the biographical details of patients (age, gender, address etc.) and clinical presentations were recorded. Ophthalmic examination was done and included visual acuity, intraocular pressure (IOP) by goldmann applanation tonometer, slitlamp examination, gonioscopy examination by Goldman 2 mirror goniolens, indirect ophthalmoscopic examination with 90D and 78D lens were done and documented as much as possible.

For previously diagnosed patients, their medical records were retrieved and relevant data were extracted and asked to come for follow-up as necessary. Newly diagnosed patients were duly processed and asked to return for future follow-up visits.

At least 3 follow-up data were recorded, 1 month after diagnosis of ICE syndrome, then 3 months and 6 months. On all visits ophthalmic exanimation was done by the same consultant.

Bleb clarity and AC depth were examined in each follow-up of all postoperative cases. After collection of data, they were then tabulated and analyzed. Outcomes of management were assessed mainly with regards to IOP control. Statistical analysis was done using SPSS v 13. T-test was done to determine probability value.

Results

A total number of 25 patients with ICE syndrome were encountered during the study period. All of the cases were unilaterally affected. Of these, 14 were newly diagnosed cases and 11 were previously diagnosed. The mean age of the patient was 41 ± 15.87 years (Table 1). Among them 15 (60%) were female and 10 (40%) were male patients (Figure 1). In all age group categories females were significantly more than males (Table 1).

Table 1 : Gender distribution of patients in the defined age categories (p < 0.4).

Age (years)	Male	Female	Total
15-29	2	4	6 (24%)
30-45	4	6	10 (40%)
> 45	4	5	9 (36%)
Total	10	15	25 (100%)

Mean age = 41 ± 15.87 years.

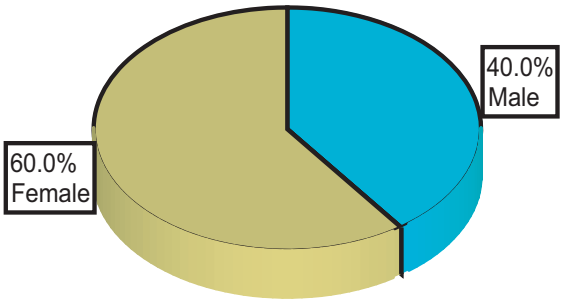

Figure 1: Gender distribution of patients.

21 patients (84%) presented with eccentric pupil (corectopia), 9 patients (36%) with peripheral anterior synechiae (PAS), 6 patients (32%) with iris atrophy, 6 patients (24%) with mild corneal edema, 3 patients (12%) with ectropion uveae, 2 patients (18%) with polycoria and 11 patients (44%) presented with pigmentary changes over iris like diffuse iris naevus (Table 2).

Table 2 : Distribution of syndrome features.

Features	N	Percentage (%)
Corectopia	21	84
Peripheral Anterior Synechaea	9	36
Iris atrophy	8	32
Corneal edema	6	24
Very Shallow AC	4	16
Ectropion uveae	3	12
Heterochromia	2	8
Cataract	2	8
Ploycoria	2	8
Guttata	1	4
Nystagmus	1	4
Corneal scar	1	4
Posterior Subcapsular Cataract	1	4

Pigment over lens	1	4
Pigmentary changes over iris:		
Diffuse iris naevus	6	24
Iris naevus	4	16
Pigment over iris	1	4

Among them 15(60%) had pretreatment visual acuity between (6/9 – 6/18) and 10(40%) had (6/24 – 6/60). Improvement in visual acuity was observed one year after initiating treatment (Table 3).

Table 3 : Pretreatment and post treatment visual acuity

VA	Pre-treatment N(%)	Post-treatment N(%)
6/6 – 6/18	15 (60)	20 (80)
6/24 – 6/60	10 (40)	5 (20)
Total	25 (100)	25 (100)

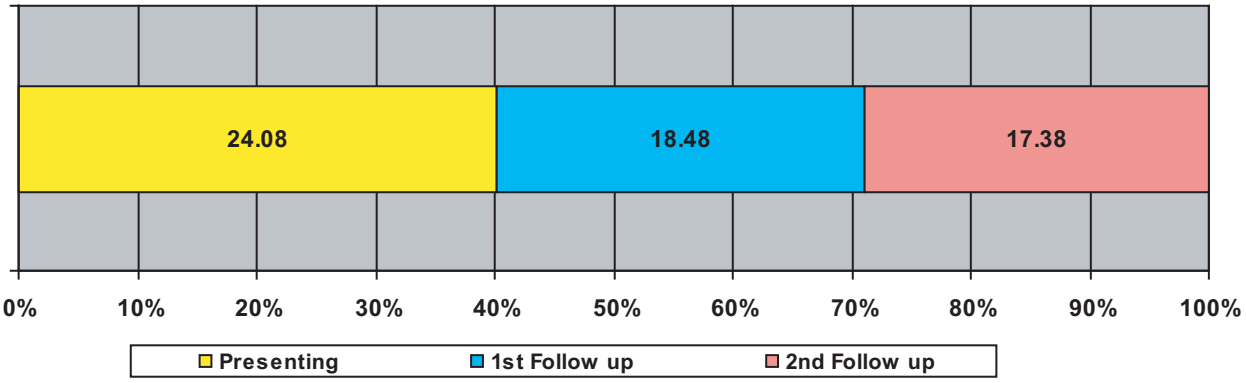

Figure 2 : IOP at different follow-up

15(60%) patients in the right eye and 10(40%) patients in the left eye were involved (Table 4).

Table 4 : Laterality of the disease.

Eye	N	Percentage
Right	15	60
Left	10	40
Total	25	100

At presentation 5 patients had a normal C:D ratio (0.2 – 0.5):1 with healthy neuroretinal rim and 20 patients presented with glaucomatous optic disc changes like increased C:D ratio (0.6 – 1), thinning or notching of the neuroretinal rim with corresponding visual field loss detected by HVF 24–2 and HVF 10–2 analysis (Table 5a and 5b).

Table 5a : Distribution of C:D ratio

Cup Disc Ratio	N	Percent
0.2:1	1	4
0.4:1	2	8
0.5:1	2	8
0.6:1	2	8
0.7:1	5	20
0.8:1	4	16
0.9:1	4	16
1:1	5	20
Total	25	100

Table 5b : Distribution of visual field defect

Cup Disc ratio	N	HVF	N
0.6:1	2	Superior arcuate scotoma	2
0.7:1	7	Inferior arcuate scotoma	2
		Superior arcuate scotoma	3
0.8:1	4	Double arcuate scotoma	4
0.9:1	4	Double arcuate scotoma	2
		Tubular field	2
0.10:1	5	Tubular field	5

Mean IOP at presentation was 24.08 ± 14.83 mmHg, at 1st follow-up was 18.48 ± 8.70 mmHg and at last follow-up was 17.38 ± 7.57 mmHg (p value = 0.001 by T-test) (Figure 2).

Intraocular pressure was controlled by medication in 8(32%) patients. Among them 6 patients were with topical timolol maleate 0.5% and Brimonidine tartrate 0.2% eye drop. In 2 patients travoprost (0.004%) was added with to the previously mentioned two drops.

Five patients (20%) presented with normal intraocular pressure. They are still on observation. Those patients (N=12; 48%) in whom IOP was not controlled with 2 or 3 medications and with advance visual field loss IOP was controlled with filtration surgery that is Trabeculectomy or Trabeculectomy and Cataract Surgery. Mitomycin– C was used in all cases during filtration surgery. One patient needed penetrating keratoplasty for corneal opacity.

Table 7 : Treatment options for controlled IOP.

Mode of treatment	Frequency	Percent (%)
Drug	8	32
Surgery	12	48
Observation	5	20
Total	25	100

Discussion

Iridocorneal endothelial (ICE) syndrome is a spectrum of conditions affecting the eye. Iris naevus (Cogan-Reese) syndrome, Chandler's syndrome and essential iris atrophy are all manifestations of the disease spectrum. Associated ocular pathology includes glaucoma as well as corneal and iris changes. Iris changes may manifest as stromal atrophy, corectopia, pseudopolycoria and the induced nodular irregularity of iris naevus syndrome, created by evaginations of iris stroma through holes in the multilaminar membrane that covers the iris in this condition. In any case in which the pupil is displaced or enlarged or if the stroma is insufficient to block light, glare and other unwanted optical phenomena may occur.

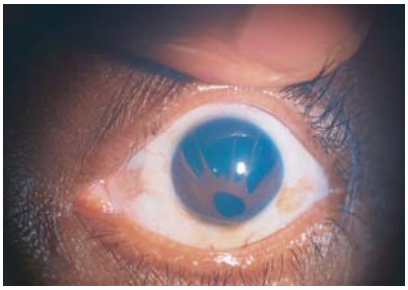

Figure showing Corectopia with diffuse iris atrophy

Diagnosis of ICE syndrome is based on abnormalities in the corneal endothelium, distortion of the pupil with ectropion uveae, thickening of the iris stroma with increased pigmentation, iris atrophy, peripheral anterior synechiae, glaucoma and unilaterality of disease.[8]

Most of our cases had iris abnormalities like corectopia, peripheral anterior synechiae, iris atrophy, diffuse iris naevus and iris atrophy which are predominant a noted in another study.8 Among the three clinical variants, Cogan-Reese syndrome and progressive iris atrophy have been suggested to induce more severe

glaucoma.[9] In our study those patient who presented with high IOP and advanced glaucomatous disc and field changes were associated with multiple iris abnormalities, both atrophic and pigmentary (Figure 3).

ICE syndrome has been suggested to affect primarily one eye.[12] However bilateral cases have also been reported.[12,13] In recent years there is growing evidence about the sub clinical abnormalities of the fellow eye.[14] In our study all cases were unilateral and no abnormalities were detected in the other eye.

To diagnose ICE syndrome slitlamp findings are enough but in cases with atypical clinical features (such as lack of iris holes or corectopia or with severe corneal edema) diagnosis of this rare disorder can be difficult. Ultrasound biomicroscopy was found to be a good tool in detecting the feature of anterior chamber angle giving detail information of PAS and iris atrophy. It has special merit when the cornea does not permit a good view by slitlamp microscopy or gonioscopy.15 In majority of our cases the cornea was clear. There was mild corneal edema in 6 cases.

Poor vision in patients with ICE syndrome might be related to corneal edema, glaucomatous optic nerve damage, cataract formation or due to a combination of these factors.[16-17] In our study, decrease visual acuity was due to similar causes. Chandler's syndrome occurred in 7 cases. 6 patients presented with corneal oedema and 1 patient with corneal scar. The others presented with either Cogan-Reese syndrome or with iris atrophy. Teekhasaenee and Ritch[18] reported that Cogan-Reese syndrome was the most common form in Asian patients, while Chandler's

syndrome was more common in white patients. This is consistent with our findings.

With regards to the sexual difference in patients with ICE syndrome, we found that women composed of the majority of the patient group (80%) which is in support of the description by Sherrard[9] that "the typical patient is a woman". Specular microscopy is a good tool for visualizing endothelial abnormalities directly and for assisting in differential diagnosis.[20] Other causes of endothelial abnormalities are Fuch's endothelial dystrophy and posterior polymorphous dystrophy. Focal and secular microscopic examination reveals ICE cells and subtotal ICE (+) tissue in ICE syndrome.[20] It would have been better to perform specular microscopy on all of our ICE syndrome cases.

Histopathological studies have found that endothelial cells undergo epithelial changes including alterations in the desmosomal junctions, surface microvilli and increased intracytoplasmic filaments. These endothelial changes can lead to corneal edema and growth of the membrane onto the iris. Contraction of the membrane may cause peripheral anterior synechiae with secondary glaucoma and various changes in the iris.[21-23] In our study 9 patients presented with peripheral anterior synechiae of more than 1800. Many investigations have been done to investigate the causative agent or stimulus for abnormal endothelial growth in ICE syndrome. No definitive proof has been established but a relationship may exist with the herpes simplex and Epstein-Bar viruses.[24] In our study we did not attempt to investigate causative factors. Further investigations are needed to determine the causative factors.

Glaucoma due to ICE syndrome is difficult to treat.[5] Medical therapy is usually ineffective.[4] Filtration surgery is needed to control intraocular pressure.[4] The success rate of filtration surgery is also believed to be lower than that with most other forms of glaucoma.[6-7] Few studies have described the success rate of filtration surgery which can be improved by using antifibrotics and glaucoma drainage implants.[7] In 32% of our patients IOP was controlled by 2-3 antiglaucoma medications at the end the 10 months. Most of them presented at early stages of the disease. 48% needed filtration surgery with mitomycin C to control intraocular pressure and are still doing well after 10 months. Most of them have a thin polycystic functioning bleb. IOP was normal in 20% of our cases at presentation. They are still under observation.

We can not define a final success due to short term follow-up. Further long term follow-up is needed to determine the success. Attvim PT25 showed that a favorable outcome can be achieved in patients with ICE syndrome involving cornea but may require multiple procedures. Penetrating keratoplasty(PK) was done in one of our cases that presented with a corneal scar. Visual acuity was improved by 2 lines post-PK.

Conclusion : Although ICE syndrome is an established cause of refractory glaucoma, medical control of intraocular pressure can be achieved. Early diagnosis with proper examinations and investigations are needed. Explanation to the patients, proper counseling and strict follow-up is mandatory to achieve proper treatment outcomes. Glaucoma filtration surgery with antimetabolites is usually successful when done early, but may fail later on due to endothelialisation of the fistula by the abnormal corneal endothelium.

Acknowledgement : This work was done with the help of my Consultant Dr M A Karim, Dr Tasmia Tahmid, Dr. Shailendra Sugrim, Mr. Didarul Alam (Research Officer) and our Secretarial Assistant, Mrs. Poly Das Gupta. Without their supervision and help this article would not have been possible.

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Review Article

Preservative-free drugs for the Treatment of Glaucoma- Western View

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Abstract

The satellite symposium 'Role of Preservative-free Therapies in the Treatment of Glaucoma' at the 2013 annual meeting of the European Society of Ophthalmology in Copenhagen included presentations from four leaders in the field of glaucoma treatment. The first of these stressed that among patients with glaucoma, 20–30 % have severe ocular surface disease (OSD). The risk of OSD is significantly increased by preservatives such as benzalkonium chloride in topical glaucoma medications. To reduce this risk, preservative-free (PF) treatments have been developed. One such treatment, PF-tafluprost has proved effective in 'real-world' use in controlling intraocular pressure (IOP) and patients may benefit when switched to this medication from other treatments. When using these treatments it is important to recognize that continuous monitoring in glaucoma is vital to fully assess the IOP profile and determine the risk of disease progression. It is also important that advances in glaucoma treatment are reflected in current recommendations. Since 1998, the European Glaucoma Society has published guidelines that aim to improve definitions, diagnosis, treatment goals and practice in this disease. These have been regularly updated and constitute the consensus on best practice in glaucoma including recommendations on use of PF medications and patient management at all stages of the disease. Purpose of this article to update preservative free therapy in the treatment of glaucoma.

Keywords : Glaucoma, ocular surface disease, preservative-free (PF) therapies, PF-tafluprost, glaucoma guidelines

(Courtesy = Christophe Baudouin and Carlo E Traverso·Proceedings of a Symposium Presented at the European Society of Ophthalmology (SOE) 2013 Congress in Copenhagen, 9 June 2013)

Prevalence and Risk Factors for Ocular Surface Disease among Glaucoma Patients

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Ocular surface disease (OSD) is common in glaucoma and its incidence is markedly increased with the use of medications applied as eye drops to the eye. Various observational studies conducted in recent years in Europe and the US have shown a consistent prevalence of OSD in glaucoma of approximately 50 % (range: 40 %–60 %)1–5 with 27 % of patients suffering from severe OSD (see Figure 1).

These studies have also shown that patients using medications containing preservatives, particularly benzalkonium chloride (BAK), are significantly more likely to have OSD than those using preservative-free (PF) medications and that OSD is positively correlated with the number of medications used.[1,3–7]

This association was emphasised in one study on 101 patients in the US showing that each additional BAK-containing eye drop administered was associated with approximately two fold higher odds of abnormal results on the lissamine green staining test.[4]

A recent study of 516 patients with glaucoma in France found that the disease could be divided into three groupings in terms of OSD: Group A who were considered normal (score 1–4, 49 %), Group B who were mild to moderate (score 5–10, 30 %) and Group C who were severe (score 11–30, 21 %).[1] The proportions of Group B and C patients were found to be substantially higher in groups who had received two or three medications compared with those who had received only one and this correlation was significant ($p<0.0001$) (see Figure 2). In addition, increasing proportions of patients in groups A, B and C had changed their medication due to ocular surface concerns (24.0 %, 46.1 % and 70.4 %, respectively, 40 % in total).

A multicentre cross-sectional epidemiological study in four European countries that surveyed 9,658 patients with glaucoma over a 6-year period found that symptoms including a stinging or burning, a dry eye sensation, tearing, anterior blepharitis, conjunctival follicles and superficial punctate keratitis were all significantly more frequent among patients receiving preservative-containing than PF medication.

It should be stressed that allergies and toxic effects of medications are always possible and can occur in a delayed manner in patients who previously appeared to tolerate them. Damage induced by BAK or other preservatives at the ocular surface can appear as allergic

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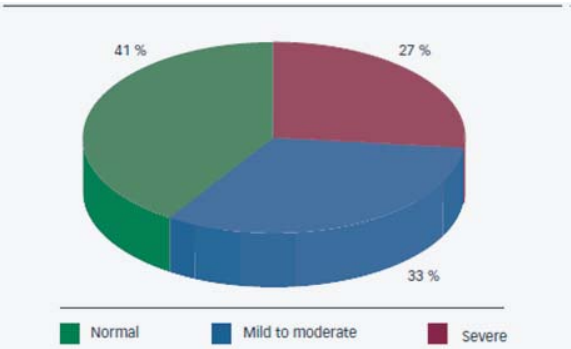
or toxic effects and often arises when the eye is sensitised by the repeated application of preservatives during long-term use.[8,9] Such allergic reactions to preservatives often manifest as a conjunctivitis-type condition that may consist of simple hyperaemia of the conjunctiva or papillary conjunctivitis, with or without eczema of the eyelids.

During the early stages of OSD, notable symptoms may not be present but important inflammatory process are underway that cause increasing damage. Such processes can also be triggered during long-term treatment of glaucoma. A study of 69 patients with glaucoma in France who were treated with preserved and unpreserved beta-blockers (0.5 % timolol and other medications) and 27 normal individuals, found that various inflammatory and degenerative markers were over-expressed in conjunctival cells in glaucoma patients compared with normal individuals.[10-12] Similarly, increased expression was seen in patients who had received multiple treatments or preserved medications. These markers included human leukocyte antigen DR (HLA-DR), interleukin 6 (IL-6), IL-8, IL-10, chemokine receptor type 4 (CCR4), CCR5, chemokine (C-C motif) ligand 2 (CCL2 or monocyte chemotactic protein-1 (CCL2/ MCP-1), extracellular matrix metaloproteinase inducer (EMMPRIN) and the chemokine fractalkine. The conjunctival cells in glaucoma patients also showed increased infiltration by inflammatory cells, increased fibroblast density and decreased goblet cell density.[10] A survey of 581 glaucoma patients found that the symptoms of OSD are responsible for substantial decreases in quality of life (QoL).[13] Responses showed that burning, itchy eyes, dry eyes and hyperaemia reduced QoL by between 15 and 20%.

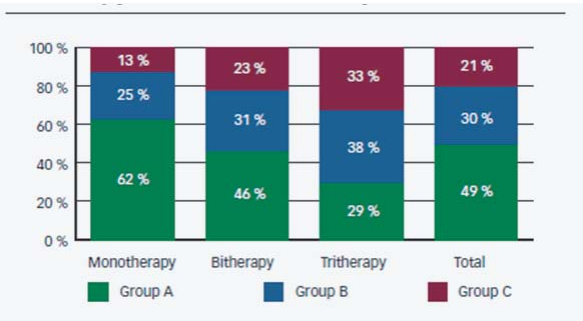
Receiving preserved glaucoma medications is also associated with poor surgical outcomes. Several studies have shown increased infiltration by inflammatory cells related to glaucoma medication and this was correlated with filtration surgery failure.[14,15] Another study showed a positive correlation between successful surgery and low HLA-DR/high mucin-5AC (MUC 5AC).[16] The duration of use of topical medication has also been correlated with increasing levels of MCP-1, which is associated with increased corneal scarring and poorer surgical outcomes.[17] The recent Preservative Exposure and Surgical Outcomes in Glaucoma Patients (PESO) study investigated 128 patients with glaucoma and showed that preoperative exposure to BAK significantly increased the risk of surgical failure (p=0.032).[18]

Figure 1: Prevalence of Ocular Surface Disease in Glaucoma



Each additional benzalkonium chloride-containing eye drop was associated with approximately twofold higher odds of abnormal results on the lissamine green staining test. Source: Leung et al., 2008.[4]

Figure 2: Effect of Mono-, Bi- and Tritherapy on Disease Severity in Glaucoma



Group A: Normal scores 1–4; Group B: Mild scores of ocular surface disease 5–10; Group C: Moderate to severe, scores of ocular surface disease 11–30. Source: Baudouin et al., 2012.[1]

In OSD, therefore, symptoms such as chronic conjunctivitis, allergy, dry eye, blepharitis and toxic keratitis do not give the complete picture. It is important to consider that low-grade subclinical inflammation, exacerbated by medications with preservatives, can cause continuous cytokine release, goblet cell loss and fibroblast stimulation that result in damage and can affect surgical and IOP outcomes. This significance of the inflammation is often underestimated and the resultant cytokines, chemokines and matrix metaloproteinases may influence glaucoma surgery, the efficacy of medications or trabecular meshwork function.

Patients who may benefit from PF treatment include those with OSD that is independent of glaucoma, such as those with moderate to severe dry eye symptoms (e.g. keratoconjunctivitis sicca), patients with moderate to

severe blepharitis or those with allergic conjunctivitis or rosacea. Patients with OSD caused by glaucoma treatment, especially those who have had two or more medications, will also benefit and this group includes patients who are expected to receive long-term topical treatment for glaucoma and patients who may need glaucoma surgery (e.g. taking three to four drugs but IOP still not controlled).

Twenty to thirty per cent of glaucoma patients suffer from severe ocular surface disease.

Forty per cent of glaucoma patients have had a change of their medication due to ocular surface concerns.

Preoperative exposure to BAK significantly increases the risk of surgical failure.

Real-world Efficacy and Tolerability of Glaucoma Therapy

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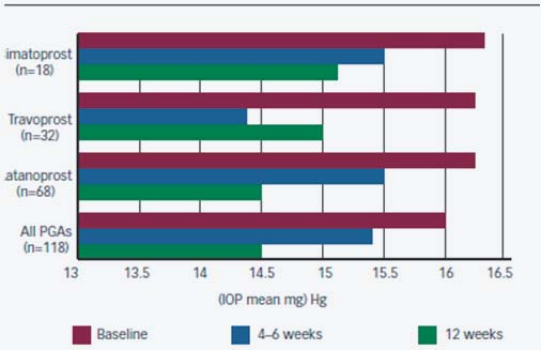
There are now several PF medications available for the treatment of glaucoma, including the betablocker, timolol maleate, the carbonic anhydrase inhibitor (CAI) dorzolamide hydrochloride, a timolol and dorzolamide combination (Cosopt) and the prostaglandin analogue tafluprost (Taflotan/Saflutan/ Zioptan). Among glaucoma treatments, the prostaglandins are currently the first-line choice in that they have a stronger IOP-lowering effect and fewer systemic side effects than other treatments.[19] Each of the prostaglandins has a different binding profile from the FP and EP receptors and as a result, has differing effects on blood vessels, blood flow and hyperaemia.[20–22] Consequently, individual patients show varying responses to the range of prostaglandins that are available and changing these drugs can have an effect on efficacy and/or tolerability.

As stated above, many of the topical treatments for glaucoma contain preservatives, particularly BAK, which cause irritation and inflammation that often causes poor compliance with worsening disease symptoms and OSD.[6,23,24] PF-tafluprost 0.0015 % (Taflotan/Saflotan/ Zioptan) was developed to minimise these effects by being PF while being highly effective in the reduction of elevated IOP in open angle glaucoma and ocular hypertension. PF-tafluprost can be used as monotherapy in patients who would benefit from PF eye drops or are insufficiently responsive to first-line therapy or are intolerant or contraindicated to first-line therapy.[25,26] It can also be used in combination with beta-blockers. The efficacy and safety of PF-tafluprost in glaucoma treatment has been shown in a series of phase II and III trials and its non-inferiority to latanoprost has also been reported.[25,27–29] These studies showed that the preservative is not needed to provide drug efficacy. PF-tafluprost was approved for use in glaucoma in European countries in 2008 and by the US Food and Drug Administration (FDA) in 2012.[30] It is useful therefore to also consider 'real-world' clinical experience with this drug since its introduction.

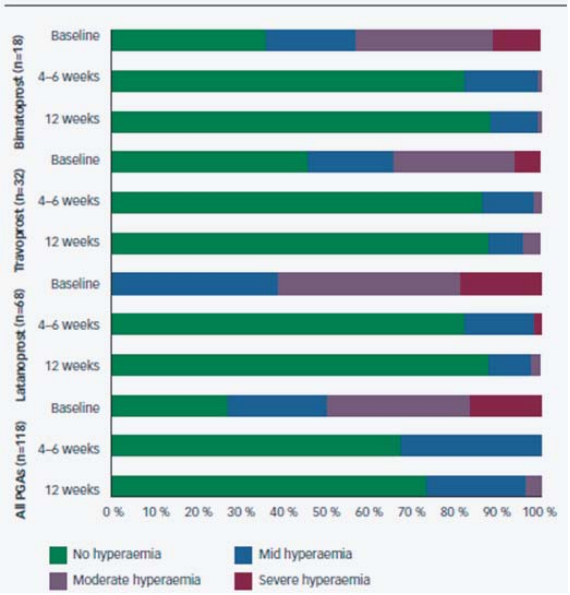
A European open-label observational study recruited 544 patients at 132 centres who had poor IOP control and/or poor local tolerance of their medication and had received prior treatment with PF-tafluprost.[31] Patients were either new to therapy (n=45), were receiving monotherapy (n=360) or were receiving combination therapy (n=139). Patients (mean age 65.5 years, male/female: 205/339, had glaucoma for a mean 6.5 years) were then either treated with PF-tafluprost as their primary therapy, switched to PF-tafluprost monotherapy or PF-tafluprost as part of their combination therapy for a 12-week duration. The reasons for this switch to PF-tafluprost included: insufficient lowering of IOP, target pressure not achieved (54.4 %), ocular symptoms (irritation, burning, etc.) (17.3 %) and objective clinical signs (13.4 %). Mean IOP was lowered from 19.4 mmHg at baseline to 15.3 mmHg at 12 weeks ($p<0.001$). Similarly, significant reductions in mean IOP were shown in the subgroups of patients who were treatment-naive or had previously received betablocker-monotherapy, prostaglandin/ prostamid-ponotherapy and CAI monotherapy. Switching patients from PF betablocker therapy or PF carbonic anhydrase treatment to PF-tafluprost also produced significant reductions in IOP ($p<0.001$ and $p<0.05$, respectively). In addition, PF-tafluprost produced reductions in mild, moderate and severe hyperaemia and blepharitis during treatment and reduced tear break-up time (TBUT).

Figure 3: Effect of Switching to Preservative-free-tafluporost on Intra-ocular Pressure



During 12 weeks of treatment with 0.0015 % tafluprost in a subset of all patients (n=118) in a European open-label observational study who were previously treated with PGA monotherapy. IOP = intraocular pressure; PGA = prostaglandin analogue; SD = standard deviation. Source: Hommer and Kimmich, 2011.[32]

Figure 4: Effect of Switching to Preservative-free-tafluprost on Hyperaemia



Conjunctival hyperaemia was monitored during 12 weeks of treatment with 0.0015 % tafluprost in a subset of all patients (n=118) in a European open-label observational study who were previously treated with prostaglandin analogue (PGA) monotherapy. Source: Hommer and Kimmich 2011.[3]

The major reasons for terminating PF-tafluprost therapy were efficacy (3.1 %), tolerability (2.6 %) and adverse events (1.5 %). Overall PF-tafluprost was effective, comfortable and safe, and it improved subjective symptoms and clinical signs significantly compared with previously used medications in the observed glaucoma patients.

A later subgroup analysis of the European open-label study revealed some interesting insights on the 118 patients who had previously received prostaglandin monotherapy (latanoprost [57.6 %], travoprost [27.1 %] and bimatoprost [15.3 %]) prior to switching to PF-tafluprost.[32] Overall, these patients showed a reduction in IOP of 1.4 mmHg (–8.7 %) ($p<0.001$ versus baseline) (see Figure 3). In this patient subgroup, the most frequent reasons for changing therapy were ocular signs and symptoms (61.0 %), insufficient lowering of IOP (20.3 %), contraindications (5.9 %) and systemic intolerability (5.1 %). After previous prostaglandin treatment in this group, the symptoms of burning, foreign body sensation, itching, irritation, stinging, tearing and dryness were more frequent than in the entire patient population, occurring in approximately 9–20 % versus 7–17 % or patients, respectively, whereas after subsequent PF-tafluprost treatment they occurred in 0–10 % of patients. In addition, hyperaemia was reduced from 64.5 % to 13.7 % (see Figure 4). The main reasons for termination of PF-tafluprost were efficacy (2.5 %), patient preference (1.7 %) or hyperaemia (1.7 %), but 89.8 % of patients remained on this therapy.

PF-tafluprost lowered IOP effectively

PF-tafluprost may benefit glaucoma patients with objective signs and subjective symptoms.

Conjunctival hyperaemia was reduced during PF-tafluprost treatment compared with prior treatment with preserved PGA.

New Perspectives on 24-hour Intraocular Pressure Management

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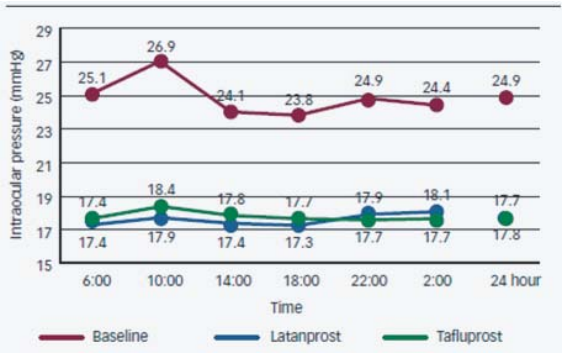
When monitoring patients with glaucoma it is important to be aware that it is a 24-hour disease: IOP can vary widely during this period and a single IOP reading will fail to capture most of IOP-related pathology.[27,33] IOP in glaucoma is often monitored just once daily. This single IOP reading provides evidence for only 1 out of 1,440 minutes, that is, 0.0007 % of the day. It is therefore vital to assess how well drug treatments control elevated IOP at all times in order to determine how suitable they are in treating any individual patient.[34,35] In addition, tolerability, resulting from the maintenance of good ocular surface health and reduction in hyperaemia, are vital to the success of any medication in glaucoma.[36] In recent years, various clinical studies have demonstrated the efficacy and tolerability of PF-tafluprost versus other treatments in glaucoma and the absence of preservatives improved ocular surface health, but these studies used single point IOP determinations.[11,37] Consequently, we conducted the first study that monitored the 24-hour lowering effects of PF-tafluprost and a comparator (latanoprost). This was a prospective, observational, single-masked study that included 38 patients (52.6 % female, mean age: 66.7 years) with primary open angle

glaucoma. The untreated baseline IOP was 24–33 mmHg. Three months after starting treatment with either prostaglandin, IOP was monitored using with Goldmann applanation tonometry38 (sitting IOP at 10:00, 14:00, 18:00, 22:00) and Perkins tonometry 39 (supine IOP at 02:00 and 06:00).

IOP during treatment with either latanoprost or PF-tafluprost was markedly reduced compared with baseline (29.3 % and 28.5 %, respectively) and the IOP profiles of the two drugs were almost identical during the 24-hour monitoring period (mean difference 0.1 mmHg) (see Figure 5). The study showed that obtaining the efficacy profile of PF-tafluprost would not have been possible without 24-hour monitoring and that this approach revealed the true IOP-lowering characteristics. PF-tafluprost lowered IOP to a greater extent at night whereas latanoprost reduced it to a greater extent during the day. In addition, latanoprost produced a larger 24-hour trough IOP reduction but PF-tafluprost provided a significantly lower 24-hour fluctuation and such fluctuation is considered to be a risk factor for glaucoma progression.[40,41] PF-tafluprost was generally better tolerated: 22 patients experienced adverse events on latanoprost and 14 on PF-tafluprost. The results of this study concur with the findings of a meta-analysis of 11 previous studies (386 patients) that compared the three previously available prostaglandin analogues in the treatment of glaucoma (bimatoprost, travoprost and latanoprost) in which IOP was reduced by 24–29 %.[42]

Figure 5: Monitoring of Intraocular Pressure Over 24-hours in Patients Newly Diagnosed with Glaucoma or Ocular Hypertension



Prior to treatment and during treatment with either latanoprost or preservative-free tafluprost.Source: Konstas et al. 2013.[27]

The differences in day/night lowering of PF-tafluprost versus latanoprost were also similar to those of a study in 30 healthy individuals in Japan in which the mean difference in IOP between the two drugs was 0.1 mmHg.[43] The results were also consistent with previous experience showing good tolerability for PF-tafluprost.6,7 In this study, therefore, PF-tafluprost showed similar efficacy but improved tolerability compared with latanoprost. PF-tafluprost will also be more suitable for use in combinations of medications in which maintaining ocular surface health is a concern.

When treating open angle glaucoma and ocular hypertension it is necessary to consider both 24-hour efficacy and tolerability and avoid exposure to BAK wherever possible.

The cross-over trial data from 38 patients with glaucoma reported above showed that 24-hour efficacy of PF-tafluprost is similar to latanoprost but has improved tolerability suggesting it can be considered as first choice in glaucoma therapy.

PF-tafluprost provided a significantly lower 24-hour fluctuation, which may be important in prevention of glaucoma progression.

The European Glaucoma Society Guidelines – Evidence, Consensus and Updates

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Glaucoma is a potentially blinding disease affecting up to 10 % of the population in some countries,[44,45] is the second largest cause of blindness worldwide and constitutes a serious healthcare need. There are, however, large variations in the diagnostic definition, treatment patterns, goals of treatments and resources available for the care of patients with glaucoma. In the mid-1990s it was considered that there were substantial potential benefits to be gained from formulating diagnostic definitions, devising agreed treatment guidelines and performing outcome analyses in glaucoma. This would help make the treatment more consistent and evidence-based. In 1996 the European Glaucoma Society (EGS) assembled an international panel to discuss and draft the guidelines. These guidelines were required to be dated, they should gather feedback on QoL (as assessed by patients and physicians) and costs and should be periodically reviewed (every 5 years). The first edition of the guidelines was published in 1998 with following mission statement:

Preservation of visual function adequate to the individual needs with minimal or no side effects for the expected lifetime of the patient, without any disruption of his/her normal activities at a sustainable cost.'

These guidelines had an easy-to-understand approach, and incorporated novel flow charts to aid treatment decisions and proved popular among physicians worldwide. The guidelines consisted of three chapters (1. Definitions, 2. Ways to obtain the goal and on-going [quality control, independent evaluation of efficacy and cost] and 3. Defined target IOP as the 'mean IOP obtained with treatment that prevents further glaucomatous damage'). It was recognised that the rate of functional decay follows different courses in patients but the point of significant functional impairment and time to start treatment needed to be defined.

In 2003, the second edition of the EGS glaucoma guidelines were published. These were divided into five chapters (1. Introduction with summaries of glaucoma randomised controlled trials [RCTs], 2. Examination, 3. Definitions, 4. Treatment modalities, 5. Treatment strategies and flow charts). These guidelines emphasised evidence rather than consensus, took a more patient-centred approach and included concepts such as first line versus first choice, individualised target IOP and avoidance of unnecessary treatment. The third edition of the EGS Guidelines appeared in 2008[46] with the following modified mission statement:

'In general terms, the goal of glaucoma treatment is to maintain the patient's visual function and related QoL, at a sustainable cost. The cost of treatment in terms of inconvenience and side effects as well as financial implications for the individual and society requires careful evaluation. QoL is linked with visual function and, overall, patients with early to moderate glaucoma damage have good visual function and modest reduction in QoL.'

This edition of the EGS Guidelines was divided into four chapters (1. Introduction [with updated summaries of glaucoma RCTs and economic evaluation of glaucoma care], 2. Examination [more on gonioscopy and CCT], 3. Definitions [Rate of progression re-emphasised, angle closure and QoL refocused], 4. Treatment modalities and treatment strategies [adherence, compliance and persistence in glaucoma, flowcharts]. This edition also introduced the grading of strengths of recommendations (I= strong/relevant; II = weak) and strength of evidence (A= high [RCT], B= moderate, C= low [observational study], D = very low [consensus opinion]).

These guidelines also recognised, for the first time, that preservatives in medications may cause conjunctival side effects and toxicity to the ocular surface. To avoid this, the guidelines state that PF medication may be considered but they note that preservatives have been safely used for 30 years and the safety profile of the drug should be considered.

The 2008 EGS guidelines include various flowcharts to inform treatment choices including the effects of higher or lower target IOP levels and a decision tree for the therapeutic trial of glaucoma medications to achieve optimal treatment with differing patient responses (see Figure 6). 'Whom to treat' graphs are also included and these consider the level of visual impairment necessary to justify starting treatment and the varied profiles of disease course that can occur in different patients (see Figure 7). The guidelines also note that ocular hypertension is a clinical feature whereas glaucoma is a disease.

Overall, the EGS glaucoma guidelines have achieved their purpose in helping to make definitions, diagnosis, treatment patterns and goals in glaucoma more consistent and evidence based.

The fourth edition of these guidelines published in 2014 having standardised understanding and approaches to treatment and is much anticipated by many physicians involved in glaucoma management across Europe and worldwide.

The EGS glaucoma guidelines have been and will continue to be based on: evidence; consensus; common sense; and standard of care.

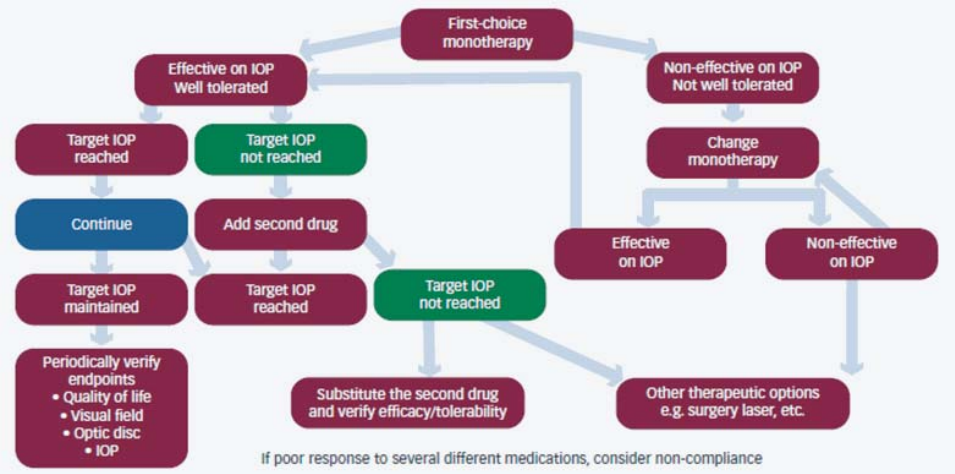
The continued development of the EGS guidelines will help ensure current best practice in glaucoma therapy is agreed by leading eye care experts and that it is adopted by physicians at treatment centres.

Conclusion of the Meeting

The use of PF-tafluprost in glaucoma has provided consistent efficacy of IOP control in both pivotal clinical

trials and in 'real-world' use and has shown improved tolerability over other available medications.

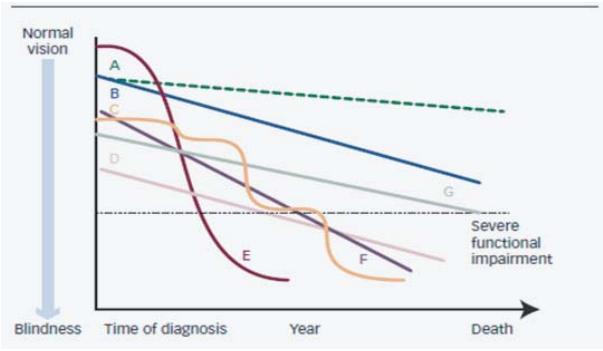
Figure 6: Therapeutic Trial of Glaucoma Medications from the European Glaucoma Society Guidelines



IOP=intraocular pressure. Source: European Glaucoma Society, 2008.[46]

This was demonstrated in a trial in which switching patients to PF-tafluprost improved IOP and substantially decreased adverse event frequency. In future it is likely that more medications will become available as PF formulations as it is realised that the preservatives can cause toxicity at any stage and chronic use can lead to accumulating conjunctival damage before notable symptoms emerge. In addition, 24-hour monitoring of IOP is likely to become increasingly popular as the day/night variations in this parameter and consequent risks are more widely appreciated.

Figure 7: 'Whom to Treat' Graph in Glaucoma Management from the European Glaucoma Society Guidelines



Source: European Glaucoma Society, 2008.[46]

The establishment of guidelines in glaucoma treatment by the EGS has been a highly successful initiative that has fostered agreement on the basics such as definitions, diagnosis and best treatment goals and practice.

These guidelines have matured into a group of valuable statements based on evidence, consensus and common standards and will likely continue to be a valuable tool for glaucoma care in many geographical areas.

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Central retinal artery occlusion causing neovascular glaucoma due to carotid occlusive disease-a case report

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Abstract

Ocular neovascularization is recognized as an uncommon complication of central retinal artery occlusion (CRAO) but has been associated most frequently in those patients suffering from carotid artery occlusive disease. Here we are presenting a case of central retinal artery occlusion with neovascular glaucoma due to carotid vascular disease. A 52 year old male, chain smoker suffering from diabetes mellitus, hypertension & hyperlipidemia came to us with the chief complains of headache& pain in right eye for last few days & painless loss of vision in same eye one & half months back. On examination there was no perception of light in his right eye & best corrected vision in left eye was 6/9. On slit lamp examination of the right eye there was slight circumcorneal injection and epithelial edema, middilated non reacting pupil with fine new vessels at the pupillary border.The intraocular pressure was 48 mm Hg in right eye.Ongonioscopy right eye showed 360^0 angle closure due to fibro vascular membrane. New vessels seen at inferior angle. Fundoscopy revealed arterial constriction, retinal edema at posterior pole & cherry red spot at macula. Ultrasonogram carotid doppler showed bilateral atherosclerotic changes in common carotid artery (more in right side). Fundus fluorescein angiography right eye showed delayed arterial filling & retinal ischemic area. We diagnosed the case as CRAO with neovascular glaucoma due to carotid obstructive disease. We treated this patient with both systemic & topical anti-glaucoma medications & after 3 days IOP reduced to 24 mm of Hg. We planned for intravitreal Bevacizumab followed by pan retinal photocoagulation in right eye & advised him to consult with both cardiologist & neurologist.

Introduction

Central retinal artery occlusion (CRAO) is an ophthalmic emergency in which the central retinal artery is occluded, resulting in a retinal infarct and acute vision loss. Its incidence is estimated to be one in 100,000.[1] Analogous to a cerebrovascular accident (CVA), CRAOs share the same risk factors and etiologies of a CVA, with the most common etiology being an embolus, usually arising from the carotid artery.[2] Even though visual improvement can occur in patients with CRAOs, Hayreh and Zimmerman found that 71.5% of CRAO eyes had a final visual acuity of 20/400 or worse.[3] Therefore, frequent follow-up visits to monitor visual acuity and to assess risk factors for future CVAs are needed in these patients.The occurrence rate of ocular new vessels (ONV) with a CRAO varies from 3.0% to 18.8% in studies conducted during the past 35 years.[4] Furthermore, the detection of new vessels following CRAO has ranged from as early as the day of presentation to 2 years after the CRAO diagnosis.[5] With frequent visits, many cases of ONV can be managed early with treatments such as panretinal photocoagulation and off-label intravitreal Bevacizumab.[6] Since ONV can occur early after CRAO, regular follow-up appointments should be required, especially within the first 4 months. Neovascular glaucoma is the height of CRAO. To prevent it, a fluorescein angiography should be performed a few days after each CRAO evaluate the repermeabilization. If it is not good, a Pan retinal photocoagulation should be quickly started, associated with a close follow up.

Case history : A 52 years old business man came to ophthalmology out patient department of BIRDEM general hospital with the chief complains of headache & pain in right eye for last few days & painless loss of vision in same eye one & half months back. He was suffering from diabetes mellitus for last 15 years & was treated with insulin. He was also a patient of hypertension & hyperlipidemia for last 20 years & was on antihypertensive & lipid lowering drugs. He was a chain smoker for last 30 years & had a H/O stroke 6 weeks back. On examination there was no perception of light in his right eye & best corrected vision in left eye was 6/9. On slit lamp examination there was slight circumcorneal injection and epithelial edema,

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middilated non reacting pupil, fine new vessels at pupillary margin (Fig.-1).

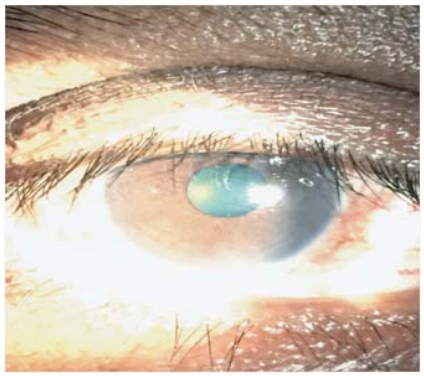

Figure : 1

Intraocular pressure was 48 mm Hg. On gonioscopy right eye showed 360È closed, due to fibro vascular membrane, new vessels seen at inferior angle. Fundoscopy revealed arteriolar constriction, retinal edema at posterior pole & cherry red spot at macula (Fig.-2).

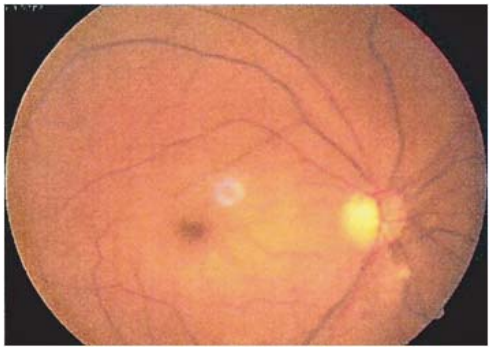

Figure : 2

On slit lamp examination left eye was within normal limit & gonioscopy showed 360 degree open angle. We treated this case with both systemic & topical antiglaucoma medications, topical steroid & atropine eye drop in right eye. He was also advised to do ultrasonogram carotid Doppler & echocardiography. After 3 days his IOP reduced to 24 mm of Hg in his right eye & advised to do fundus fluorescein angiography both eyes. Ultrasonogram carotid Doppler showed mixed echogenic & calcified plaque in both common carotid bulb and proximal part of internal carotid arteries (more in right). There was reduced flow in left vertebral artery (Fig.-3).

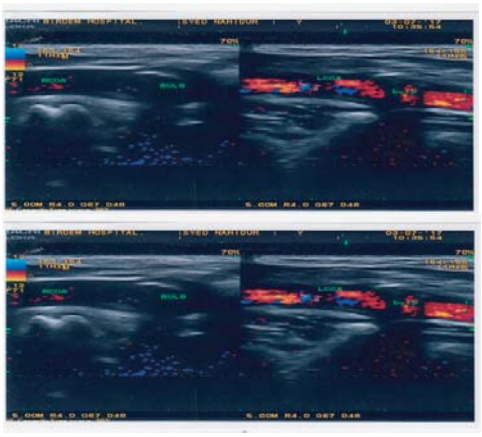

Figure : 3

Echocardiography report showed normal pericardium & there was no effusion & good left ventricular systolic function (LVEF 64%). His fundus fluorescein angiography right eye showed delayed filling of arterioles, retinal ischemia (Fig.-4).

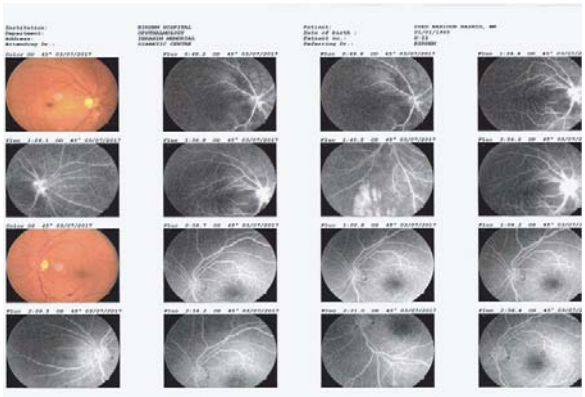

Figure : 4

Left eye was within normal limit. So we planned for intravitreal Bevacizumab followed by Pan Retinal Photocoagulation of right eye. He was advised to consult with both neurologist &cardiologist.

Discussion

Central retinal artery occlusion (CRAO) was first described by von Graefes in 1859.[7] It is analogous to an acute stroke of the eye and is an ophthalmic emergency. CRAO signifies end-organ ischaemia and often the underlying atherosclerotic disease. It is the same underlying atherosclerotic risk factors that in turn place an individual at risk of future cerebral stroke and ischaemic heart disease.[8] The exact

location where CRAO occurs is debated. Anatomical studies show that the narrowest part of the CRA lumen is where it pierces the dural sheath of the optic nerve and not the lamina cribrosa, and that this was the most common location where CRAO occurred. Embolism is the most common cause of CRAO, the major source of this being carotid artery disease, usually due to atherosclerotic plaques.[9] In our case there was stenosis of right common carotid artery 85% at bulb, left common carotid artery 65% at bulb, right internal carotid artery 70% & left internal carotid artery 65 %.NVI and NVG are highly correlated with retinal ischemia, and stimulate the secretion of vascular endothelial growth factor.[10] Vascular endothelial growth factor levels are reduced after PRP in patients with ischemic retinal disorders.[11] Currently, PRP is the gold standard for initial treatment. Duker and Brown[11] reported regression in 65% of patients after PRP for NVI following CRAO. Sagong et al.[6] reported three cases that achieved successful treatment of NVG secondary to CRAO with combined PRP and intravitreal Bevacizumab. Ehlers et al.[12] reported that the combination treatment group showed a significantly higher frequency & rate of neovascular regression and a significantly reduced IOP compared to the PRP-alone group. In our case we planned for intravitreal Bivacizumab followed by PRP in right eye.

Conclusion

Neovascular glaucoma is the height of CRAO. To prevent it, a fluorescein angiography should be performed a few days after each CRAO to evaluate the repermeabilization. If it is not good, a PRP should be quickly started, associated with a close follow upto prevent a painful blind eye. Cardiovascular & neurological assessments are mandatory for a patient with CRAO as they share the common pathogenesis.

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Ahmed Glaucoma Valve Implantation in Refractory Glaucoma following Penetrating-Keratoplasty –A Case Report

S J Kabir[1], B K Sarker[2], Z Hasan[3], S Abdullahi[4]

Abstract

Background : The purpose was to evaluate the outcome of Ahmed glaucoma valve (AGV) in an eye with refractory glaucoma after penetrating keratoplasty in a referral speciality eye hospital in Bangladesh.

Methods: A 21-year-old male who had undergone a penetrating keratoplasty (PK) with posterior chamber IOL implantation 3 years prior in the right eye presented to our institution complaining of persistent discomfort and gradual loss of vision despite anti glaucoma medication. Examination revealed, the visual acuity was finger count from 2 meter and with IOP of 37 mm Hg in the right eye (RE) with topical highest anti glaucoma medication. Slit-lamp examination revealed diffuse corneal edema , gonioscopy showed 360 degree angle closure and fundus examination showed glaucomatous cupping in right eye.

Surgery was performed using peri-bulbar injection and AGV were implanted in the upper fornix. The plate of the valve was secured to the sclera with 10-0 prolene interrupted sutures 8 mm posterior to the surgical limbus. The tube was trimmed bevel up, inserted at 2 mm behind the limbus, and placed in the anterior chamber through a 23-gauge needle track. Care was taken to ensure that the tube's bevel was facing away from iris. The tube was anchored to the sclera using 10-0 prolene suture covered with a rectangular piece of scleral patch graft. The conjunctiva was closed with 8-0 vicryl sutures.

Results: Post-operatively patient was followed up to six months, with the patient free from symptoms and IOP decreased to 12mmHg without medication and vision improved two lines in Snellen chart. There was no complication or hypertensive phase noted during follow up visit.

Conclusions: Though the use of AGV for controlling refractory glaucoma is well known but its use in post-PK glaucoma is scanty. By this report we can conclude that implanting AGV is a viable option for controlling IOP up to 6 months in post-PK glaucoma.

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Introductions

Glaucoma after PKP remains a difficult management issue. PKP often causes additional damage to the angle, inducing peripheral anterior synechiae formation, with further impediment to aqueous outflow. Control of post-PKP glaucoma is complicated by the need to preserve graft clarity for visual function. When medical management fails, if the angle is open and grossly normal, argon laser trabeculoplasty may be an option.[1] If further intervention is indicated, a glaucoma drainage device, in eyes with good visual potential, is recommended. Factors associated with glaucoma after penetrating keratoplasty include recipient age older than 60 years, aphakia, preexisting glaucoma, preoperative diagnosis of adherent leukoma, bullous keratopathy, herpetic keratitis, trauma or keratoconus, associated vitrectomy and anterior segment reconstruction.

The purpose was of the present paper is to report outcome of Ahmed glaucoma valve (AGV) in an eye with refractory glaucoma after penetrating keratoplasty in a referral speciality eye hospital in Bangladesh.

Case Presentation

The case is that of a 21-year-old male patient who presented to our department with history of gradual progressive dimness of vision in his right eye three years after penetrating keratoplasty (PK) with posterior chamber IOL implantation. Examination revealed the visual acuity of counting fingers at 2 meters and with intraocular pressure of 37 mm Hg measured with Goldman applanation tonometer in the right eye (RE) despite being on three topical anti glaucoma medications. Slit-lamp biomicroscopic examination revealed diffuse corneal edema as well as normal anterior chamber depth. Gonioscopy performed with four mirror Volk lenses showed 360 degree synechial angleclosure and stereoscopic fundus examination with 78D Volk lens showed features of glaucomatous optic neuropathy in right

eye. Visual field assessment was not performed due to poor vision in the index eye. A diagnosis of post-PKP glaucoma was made and Ahmed Valve implantation was advised. The examination of the left eye showed normal findings.

The Surgery was performed under peri bulbar anaesthesia and Ahmed Glaucoma Valve, PF7 model (New World Medical, Inc, Rancho Cucamonga, California) was implanted in the upper temporal fornix. The plate of the valve was secured to the sclera with 10-0 prolene interrupted sutures 8 mm posterior to the surgical limbus. Scleral tract into the anterior chamber was created 2mm with help of 23 gauge needle posterior to the limbus and the trimmed end of the silicon tube was inserted bevel up into the anterior chamber. Care was taken to ensure that the tube's bevel was facing away from iris. The tube was anchored to the sclera using 10-0 prolene suture covered with a rectangular piece of scleral patch graft. The conjunctiva was closed with 8 0 vicryl sutures.

Postoperatively, the patient was placed on steroid (Cortan) two hourly for 10 days,antibiotic (Optimox) four times daily for two weeks and steroid (Sinoxe) ointment nocte for 10 days. The patient was followed up for six months and IOP decreased to 12mmHg without medication at the last hospital visit and vision improved by two lines in Snellen chart. There was no complication or hypertensive phase noted during follow up period.

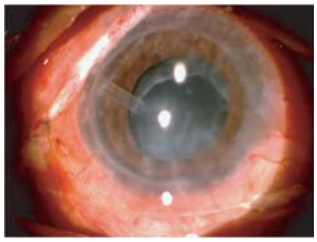

Figure 1: Postoperative picture after one month

Discussion

Our study has shown that Ahmed Glaucoma Valve has been effective in intraocular control in patients with post-PKP glaucoma. This was demonstrated in the index case where IOP was controlled without the need for anti-glaucoma medication. Previous studies have equally demonstrated the efficacy of Ahmed Valve in patients with refractory glaucoma.[2,3,4] We had no complication in the intermediate period of the follow up. Although some studies reported complication with Ahmed glaucoma valve,[3,5,6] others have no complication like in our study.[7,2,8]

Conclusions

Though the use of AGV for controlling refractory glaucoma is well known but its use in post-PK glaucoma is scanty. By this report we can conclude that implanting AGV is a viable option for controlling IOP up to 6 months in post-PK glaucoma

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Pre operative foggy eye and post operative snow storm: an unusual presentation of phacolytic glaucoma

S M Noman[1], **F Khan**[2]

Abstract

Purpose : To observe clinical presentations and post operative outcome in an atypical case of phacolytic glaucoma

Method : After doing proper history taking from the patient, and clinical examination through slit lamp as well as IOP measurement with applanation tonometer, the patient was diagnosed as a case of phacolytic glaucoma. Surgery was done. Intraoperative findings as well as post operative outcome have been recorded and documented.

Result : After cataract extraction, in this case, I observed liquified cortex in the anterior vitreous like snow storm appearance. After operation, vision was gradually improved from preoperative perception of light to 6/12.Corneal edema reduced. IOP was reduced from preoperative 40 mm Hg to 15 in the last follow up. Vitreous materials were gradually absorbed.

Conclusion : Early and appropriate diagnosis with expert management in time can save the patients eye from blindness in a case of phacolytic glaucoma.Liquified lens materials can be found in the anterior chamber as well as in the anterior vitreous due to increased permeability of posterior capsule.

Introduction

Nontreated hypermature cataract may leads to lens induced glaucoma. Phacolytic glaucoma is such a secondary open angle glaucoma where liquid cortex may come out through the permeable lens capsule and accumulate in the trabecular meshwork thus block the pores. Though uncommon, liquid lens matters may accumulate in the vitreous. Cataract surgery only can reduce the inflammation as well as glaucoma.

Case Histoy

A 70 years old woman presented with bilateral progressive diminution of vision since past 3 years. She had loss of vision and pain in the left eye since one month. She had no history of acute red eye, trauma or surgery. She had visual acuity of perception of light with accurate projection in all quadrents. Cornea was edematous. There was hypermature cataract and white material pouring from the lens and collected in the anterior chamber (psudohypopyon). Both created a foggy environment within the eye (figure 1). Nucleus of the lens became settle down (Morgagnian stage) within the lens. No Keratic Precipitates was observed. Intraocular pressure was 40 mm Hg in the same eye. She was admitted in the hospital and was treated with Atropine 1% 3 times daily and Prednisolone acetate eye drops 15 times daily. She was also given hyperosmotic agent (GLYCEROL 50 %) once daily to reduce IOP. Foggy environment was cleared up after 2 days treatment. She underwent small incision cataract surgery with intraocular lens implantation. After removal of nucleus and cortex, some fluffy materials were observed underneath the posterior capsule looked like slow storm. (figure 2) Those were leaking cortex through the posterior capsule due to increased permeability of the capsule. Intraocular lens was implanted leaving the cortex behind the posterior capsule. Patient was treated with frequent steroid in the postoperative period and given follow up after one week. After one week, visual acuity was improved, IOP became normal, cortex was partially absorbed (figure 3) latalata. After 3 weeks the final visual acuity was 6/12 with correction, intraocular pressure was normal and no materials were observed behind the capsule.

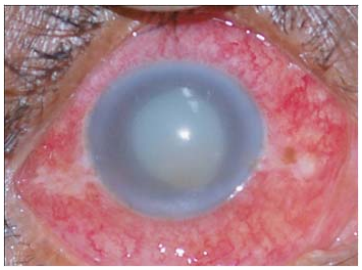

Fig.-1 Hypermature morgangnian cataract with mild psudohypopyon

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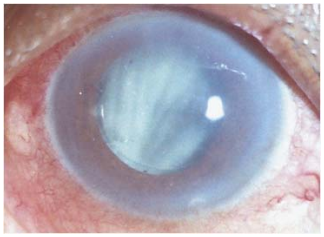

Fig.-2 Microleakase of cortex behind posterior cortex

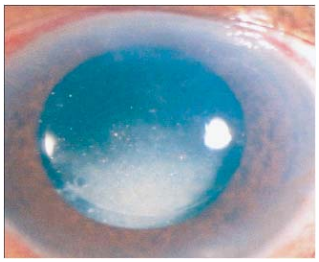

Fig.-3 Gradual absorption of cortex

Discussion

Phacolytic glaucoma is characterized by an acute rise in intraocular pressure (IOP) with advanced cataracts.[1,2] This is a common cause of visual impairment in developing countries where health facilities are difficult to reach rural areas. There is an open angle with an absence of keratic precipitates.[3,4] The hypopyon contains mainly leaking lens protein not much inflammatory cells (psudohypopyon). The pathogenesis is microleakage of high molecular-weight lens proteins through an intact anterior lens capsule causing an inflammatory response and blockage of trabecular meshwork by protein laden macrophages and inflammatory debris.[3] These patients are treated with simple cataract extraction and intraocular lens implantation with guarded visual prognosis. In this case not only in the anerior chamber, lens proteins also leaked behind the posterior capsule. Those materials were absorbed gradually with frequent steroid treatment. Snow storm stopped after coming of sunny days.

Competing interest None

Patient consent Obtained

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7th World Glaucoma Congress

The 7th World Glaucoma Congress (WGC) 2017 took place from 6th June to 9th June, 2015 at the Messukeskus Helsinki, Expo and Convention Centre from June 28-July 1, 2017 in Helsinki, Finland.

The 7th World Glaucoma Congress was the largest glaucoma meeting held anywhere in the world to date. Following the successful Congresses in Vienna, Singapore, Boston, Paris, Vancouver and Hong Kong, WGC-2017 was open to all glaucoma care providers including glaucoma specialists, visual scientists, clinicians, other ophthalmologists, optometrists, nurses, technicians, and others with an interest in glaucoma.

The WGC attracted 2057 participants from over 89 countries worldwide. The overall feedback on the educational content was very positive.

A team of 20 ophthalmologist from Bangladesh Glaucoma Society (BGS) attended there. Member society symposium was held by BGS in that international conference. Seven members of BGS presented their paper in the symposium.

Bangladesh Glaucoma Society also participated in the World Glaucoma Assembly with the national flag. Advisor Prof. Sk. MA Mannaf and Secretary General Dr. Zakia Sultana Shahid attended to the assembly as representatives from BGS.

The 7th WGC was a huge gathering for exchange our knowledge, views and ideas specially to update the latest glaucoma diagnostic and surgical procedure.

4th Asia-Pacific Glaucoma Congress

On behalf of the Asia-Pacific Glaucoma Society, The Korean Glaucoma Society we invite you to attend the 4th Asia-Pacific Glaucoma Congress (APGC) at the Busan Exhibition and Convention Centre (BEXCO) Korea, from 13-15 April 2018.

The APGC is the region's premier glaucoma congress. The three day event allows experienced and young professionals from across the field to come together to share knowledge and experiences, strengthening research, development, skills and collaboration in the Asia-Pacific region. Visit the congress website for more information. Prof. M. Nazrul Islam will present as a board Member.

8th World Glaucoma Congress

The 8th World Glaucoma Congress 2019 will be held at the Melbourne Convention & Exhibition Centre (MCEC) Australia from March 27-30, 2019. Melbourne Convention & Exhibition Centre (MCEC) is recognized as Australia's Leading Meetings and Convention Centre. It is set on the banks of the Yarra River. The MCEC is situated within 20 minutes from the airport and within 15 minutes all Melbourne landmarks are reached.

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All details will be posted as soon as there available.