

**Laser in situ Keratomileusis**

**Patients' Satisfaction with Cataract Surgery**

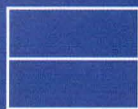
**Suprachoroidal Haemorrhage after Valsalva**

**Bilateral Retinal Detachment in Acute Myeloid Leukaemia**

**New Treatment Options for Glaucoma**



Asian Journal of  
**OPHTHALMOLOGY**



Scientific Communications

In the management of elevated IOP ...

**Xalatan**<sup>®</sup>  
latanoprost

**XALATAN<sup>®</sup> is indicated for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma, ocular hypertension and chronic angle closure glaucoma.**

**XALATAN may gradually change eye colour by increasing the amount of brown pigment in the iris; this change may be permanent.**

**Most commonly reported side effects included eye irritation, conjunctival hyperaemia, transient punctate epithelial erosions, blepharitis, increased iris pigmentation, and eye pain.**

**\*In a 3-month, open-label, randomised study (n=213), patients were treated with XALATAN or 2% dorzolamide hydrochloride.**

**†Meta-analysis of 3 studies of 6 months (n=717) with open-label long-term study and spontaneous reports.**

**‡Available safety data include a 4-year, open-label long-term study and spontaneous reports.**

**§IMS D&HT audit from July 2000 to June 2001 (based on value share).**

References: 1. Hedman K, Alm A. A pooled-data analysis of three randomised, double-masked, six-month clinical studies comparing the intraocular pressure reducing effect of latanoprost and timolol. *Eur J Ophthalmol*. 2002;16:103-109. 2. Hedman K, Alm A. A pooled-data analysis of three randomised, double-masked, six-month clinical studies comparing the intraocular pressure reducing effect of latanoprost and timolol. *Eur J Ophthalmol*. 2002;16:103-109. 3. O'Donoghue EP, et al. UK and Ireland Latanoprost Study Group. A comparison of latanoprost and dorzolamide in patients with glaucoma and ocular hypertension. *Br J Ophthalmol*. 2002;86:579-582. 4. Sasaki K, Cavanaugh J, et al. A double-masked, randomised, 5-day study comparing latanoprost and timolol in patients with glaucoma and ocular hypertension. *Invest Ophthalmol Vis Sci*. 2000;41:2566-2575. 5. Hedman K, Alm A. Long-term effect of latanoprost on intraocular pressure. Presented at the International Congress of Ophthalmology (ICO), June 1998, Amsterdam, the Netherlands. 6. Data on file. A long-term open study of latanoprost as adjunctive therapy in glaucoma. Presented at the International Congress of Ophthalmology (ICO), June 1998, Amsterdam, the Netherlands. 7. Data on file. Summary report on benchmark studies from 1999 to 2001. Pharmacia & Upjohn Company, a subsidiary of Pharmacia Corporation, Kalamazoo, MI. 8. Data on file. Integrated summary of safety data (ISS). Pharmacia & Upjohn Company, a subsidiary of Pharmacia Corporation, Kalamazoo, MI.

# A New Standard Is Taking Shape

## Confident Control

- Superior IOP reduction versus<sup>1-4</sup>
  - timolol
  - brimonidine tartrate 0.2%
  - dorzolamide hydrochloride 2%\*
  - unoprostone isopropyl 0.12%
- Consistent 24-hour IOP control<sup>5</sup>
- Proven long-term IOP control<sup>16,7</sup>
- Benchmark that others measure against<sup>8</sup>
- No. 1 brand of glaucoma agent in the world<sup>†</sup>

## Trusted Tolerability

- Well-established ocular tolerability and systemic safety profile
- Only ophthalmic prostaglandin derivative with 4-year safety data<sup>§</sup>
- Low incidence of conjunctival hyperaemia<sup>9</sup>

**Xalatan**<sup>®</sup>  
latanoprost

Confident Control. Trusted Tolerability.



Further information is available upon request  
Asia and Australasia/New Zealand Region  
Suite 701, 1 Pacific Place  
88 Queensway, Hong Kong

<b>Original Articles</b>	<b>2</b>
Laser in situ Keratomileusis with Flying Spot Excimer Laser <i>S Srivannaboon</i>	
Satisfaction of Patients after Cataract Surgery in Oman — a Hospital-based Descriptive Study <i>R Khanolkar, A Al Raisi, M Rao, K Nair, HM Al Tahan</i>	<b>6</b>
<b>Case Report</b>	<b>11</b>
Suprachoroidal Haemorrhage after Valsalva in a Myopic Eye with Circular Buckle <i>HY Jabaly-Habib, M Naftali, HJ Garzosi</i>	
Bilateral Retinal Detachment in Acute Myeloid Leukaemia <i>K Pavithran, BV Ajithkumar, R Aruna, M Thomas</i>	<b>13</b>
<b>Conference Report</b>	<b>15</b>
New Treatment Options for Glaucoma From the 4th Congress of the Asian-Oceanic Glaucoma Society, held in conjunction with the 5th Hong Kong International Symposium of Ophthalmology and the 6th Asia Pacific Society of Eye Genetics, Hong Kong, 1-4 October 2003	
<b>Eye on Asia</b>	<b>17</b>
Abstracts of Asian research published in the international literature	
<b>Congress Calendar</b>	<b>20</b>

**SEAGIG**

South East Asian Glaucoma Interest Group

**SEAGIG now Online**

The South East Asia Glaucoma Interest Group (SEAGIG) is now online. The website can be viewed at [www.seagig.org](http://www.seagig.org)

The Asia Pacific Glaucoma Guidelines have now been launched by SEAGIG, with the support of the Asian-Oceanic Glaucoma Society. The Guidelines may be viewed on the SEAGIG website at [www.seagig.org/apgg.html](http://www.seagig.org/apgg.html)

Asian Journal of OPHTHALMOLOGY is the official journal of the South East Asia Glaucoma Interest Group, and is a quarterly publication for the practising ophthalmologist. As new technologies and therapeutic interventions are continually being developed, ophthalmology has become a field of rapid change, particularly in the Asia-Pacific region, where disease patterns and health care delivery differ greatly from that seen in the West.

Whilst the focus of Asian Journal of OPHTHALMOLOGY is on glaucoma, other topics relevant to the region will not be ignored. Input from ophthalmologists and allied clinicians is welcomed. This will determine the content and direction of Asian Journal of OPHTHALMOLOGY.

ISSN 1560-2133

**Editor-in-Chief**

Assoc. Prof. Paul Chew  
National University Hospital  
Singapore

**Editorial Board**

**Australia**

Dr Ivan Goldberg

**Hong Kong**

Dr Vincent Lee  
Dr Siu-Ping Hui  
Dr Dennis SC Lam

**India**

Dr GC Sekhar  
Dr Kulin Kothari

**Malaysia**

Dr Fang Seng Kheong  
Assoc. Prof. Ropilah Abd. Rahman

**Singapore**

Dr Steve Seah  
Dr Aung Tin

**Taiwan**

Dr Da-Wen Lu

**Thailand**

Dr Chaiwat Teekhasaenee  
Dr Prin Rojanapongpun

**The Philippines**

Dr Manuel Agulto  
Dr Mario Aquino

**Managing Editors**

Mary Smith (United Kingdom)  
Neville Lobo (Hong Kong)

**Publisher**

Scientific Communications International Limited  
Suite C, 10/F, Wo On Building  
10 Wo On Lane, Central  
Hong Kong  
Tel: (852) 2868 9171  
Fax: (852) 2868 9269  
E-mail: [editor@scientific-com.com](mailto:editor@scientific-com.com)

**Editorial Office**

Pfizer Global Pharmaceuticals -  
Asia and Australia/New Zealand Region  
Suite 701, 1 Pacific Place  
88 Queensway, Hong Kong

© Scientific Communications 2003

This publication has been prepared and published by Scientific Communications International Limited. All rights reserved. No part of this publication may be translated, reproduced or stored in a retrieval system, in any form, without the written consent of the publisher.

Asian Journal of OPHTHALMOLOGY is made possible by an educational grant from Pfizer as a service to the medical profession. The opinions expressed herein do not necessarily reflect those of the sponsor or publisher. Although every effort is made to ensure technical accuracy, no responsibility is accepted for errors or omissions.



# Laser in situ Keratomileusis with Flying Spot Excimer Laser

Sabong Srivannaboon

Department of Ophthalmology, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand

**Objective:** To evaluate the use of laser in situ keratomileusis with flying spot excimer laser for myopia.

**Patients and Methods:** A prospective study of all patients who had laser in situ keratomileusis at the excimer laser clinic from January to February 2002. Preoperative evaluation including slit lamp examination, indirect ophthalmoscopy, manifest and cycloplegic refraction, corneal topography, and corneal thickness. All procedures were performed using the Hansatome microkeratome and Meditec MEL 70 G Scan flying spot excimer laser. Postoperative follow-up included visual acuity and manifest refraction at 1 day, 1 week, 1 month, and 3 months.

**Results:** 116 eyes of 58 patients were enrolled in this study. Mean preoperative refractive error (spherical equivalent) was  $-5.05 \pm 1.89$  diopters (range,  $-1.50$  to  $-12.00$  diopters). At 3 months, mean refractive error (spherical equivalent) was  $-0.28 \pm 0.45$  diopters (range,  $+0.75$  to  $-1.25$  diopters) and 92.73% were within  $\pm 1.00$  diopter of refraction (spherical equivalent). Uncorrected visual acuity of 20/40 or better was achieved in 91.67% of patients and 33.33% achieved 20/20 or better. One Snellen line was gained in 25.42% of patients whereas 8.47% lost 1 Snellen line.

**Conclusion:** Laser in situ keratomileusis using flying spot excimer laser is safe and effective for the treatment of myopia.

Key Words: Keratomileusis, laser in situ, Refractive error

Asian J Ophthalmol 2003;5(3):2-5.

## Introduction

Most refractive correction derives from the step of excimer laser. The results of the treatment mostly depends on the quality of the laser profile system. There are several laser beam

delivery profile systems available. The broad beam profile was the first to be introduced, followed by the slit beam and flying spot profile. These were developed to correct the disadvantages of the broad beam system.<sup>1</sup> Although the flying spot shows good results in refractive outcome for laser refractive surgery,<sup>2-5</sup> few local studies are available to

evaluate this new technology. This study was conducted to evaluate the efficacy, safety and stability of laser in situ keratomileusis (LASIK) in a Thai population using flying spot laser technology.

## Patients and Methods

From January to February 2002, all patients who visited the Excimer Laser Clinic at Siriraj Hospital, Mahidol University, Bangkok, Thailand, were examined for possible inclusion in the study. All patients eligible for the LASIK procedure were enrolled. Preoperative evaluation included complete eye examination, tonometry, manifest and cycloplegic refraction, corneal thickness and corneal topography. The surgery was performed using the following technique. Under topical anesthesia, a Hansatome microkeratome (Bausch and Lomb, Irvine, USA) with an 8.5 mm ring size and 160 microns head was used to create a corneal flap. The flap was then lifted and the artificial limbus ring was placed to initiate the eye tracking system. The eye tracker was locked on the ring and fine adjustment for centration was made. Dehydration time was set to 45 seconds and laser ablation was performed using the MEL 70 G - Scan Excimer Laser (Carl Zeiss Meditec, Jena, Germany). Laser ablation was carried out with a direct setting of manifest refraction. The flap was replaced. Irrigation was done to clean the interface of the flap. Postoperative antibiotic eye drops (tobramycin) and non-steroidal anti-inflammatory eye drops were applied. The patient was examined 1 day, 1 week, 1 month, and 3 months postoperatively. Manifest refraction, and uncorrected and best-corrected visual acuity (UCVA and BCVA) was recorded. Statistical analysis was calculated using Microsoft<sup>®</sup> Excel 2002.

Efficacy of the treatment was defined as UCVA of 20/40 or better. Safety of the treatment was measured by loss of BCVA and would be considered significant if the loss of BCVA was greater than 1 Snellen line.

Stability of the treatment was assessed by refractive outcome (SE) over time.

**Results**

116 eyes of 58 patients were enrolled in this study. The mean preoperative manifest

refraction (spherical equivalent, SE) was  $-5.05 \pm 1.89$  diopters (range,  $-1.50$  to  $-12.50$  diopters). There were no intraoperative complications such as incomplete flap, button hole flap, free cap, or decenter ablation. Suction ring and centration of microkeratome was easily accomplished. The eye

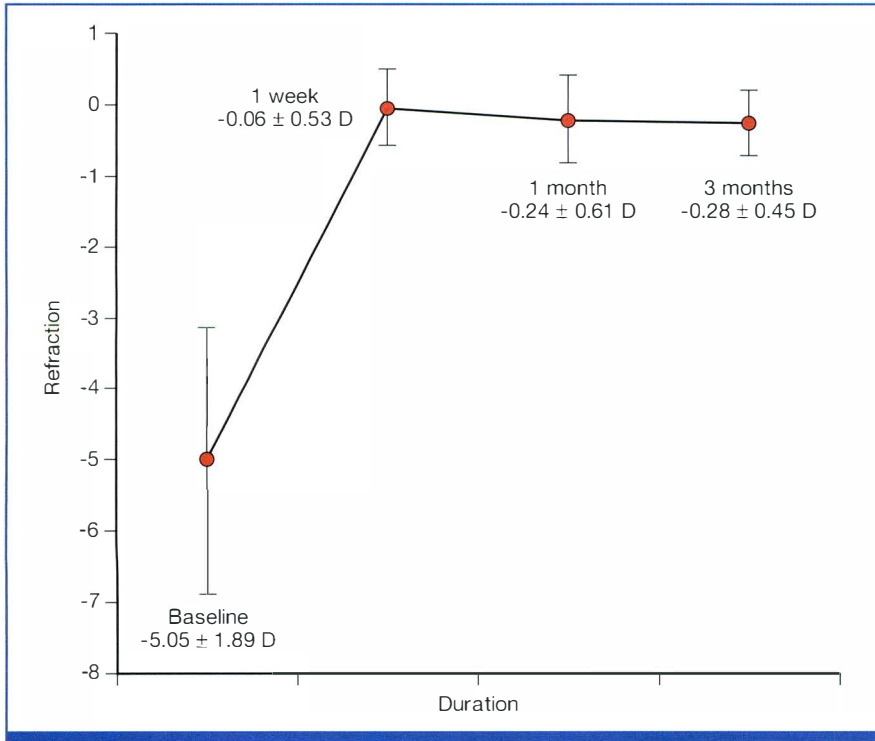
tracker operated without problems and laser energy was homogeneous throughout the operation.

Manifest refraction (SE) over time is shown in Figure 1. Three months after the surgery, the mean manifest refraction (SE) was  $+0.28 \pm 0.45$  diopters (range,  $0.75$  to  $-1.25$  diopters). There was slight regression during the 3 months follow-up period but this was within  $-0.50$  diopters of refractive error. Attempted versus achieved correction shows good correlation and predictability up to  $-9.00$  diopters ( $r^2 = 0.87$ ) but slight undercorrection of achieved refraction (Figure 2). 92.73% of the eyes were within  $\pm 1.00$  diopter of intended correction. Four eyes (7.27%) had undercorrection of more than 1.00 diopter of target refraction.

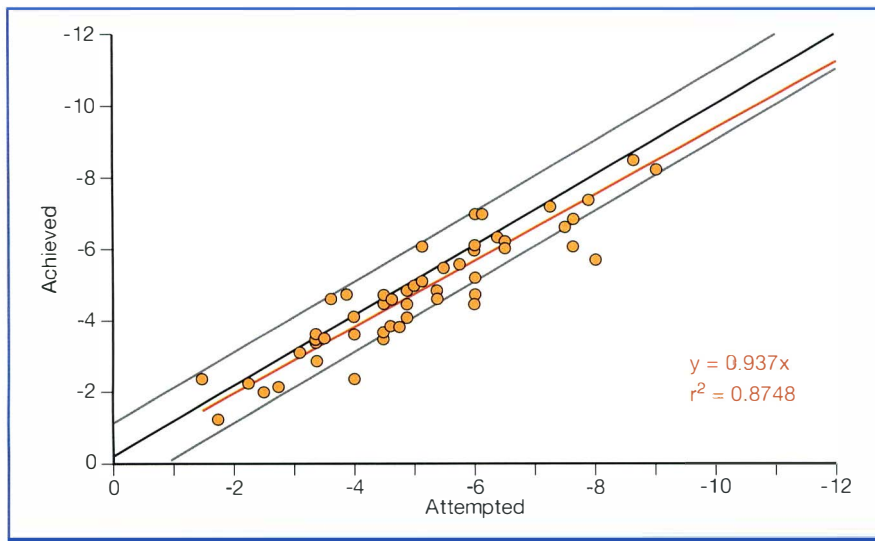
Preoperatively, 7.7% of eyes had UCVA of 20/100 or better. At 3 months, 91.67% achieved UCVA of 20/40 or better and 33.33% achieved UCVA of 20/20 or better. Only 8.33% had UCVA worse than 20/40 (Figure 3). 66.1% of eyes remained unchanged in BCVA; 25.42% gained 1 line and 8.47% lost 1 line of Snellen BCVA. No eye lost more than 1 line of BCVA (Figure 4). The defocus equivalent bar graph shows that 41.38% had a value less than 0.50 diopters and 100% had a value of 2.00 diopter or less (Figure 5).



**Figure 1.** Stability curve shows slight regression at 3 months but remains within 0.50 diopter of intended correction.



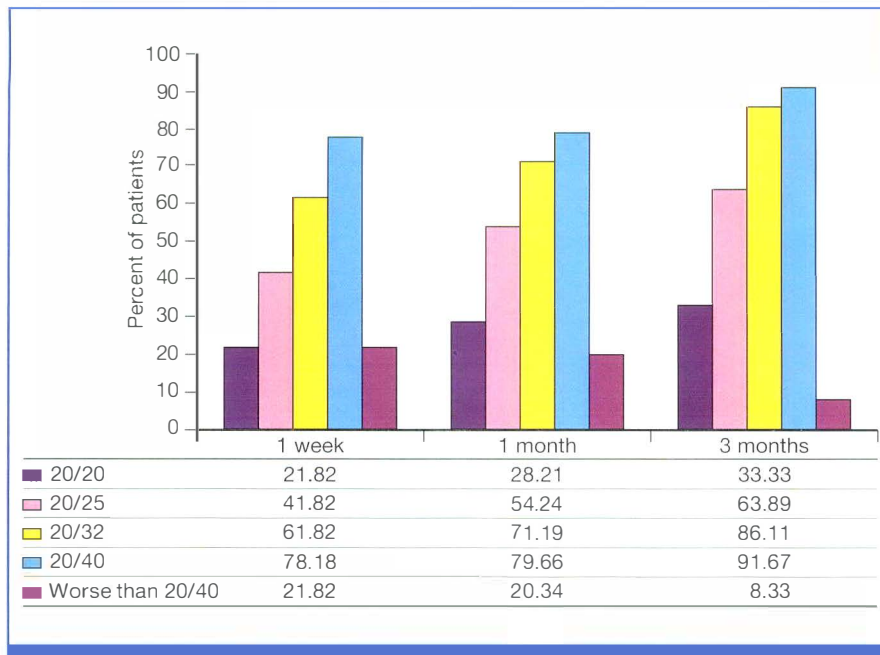
**Figure 2.** Attempted versus achieved correction graph shows very good predictability ( $r^2 = 0.87$ ) and the trend line indicates slight undercorrection of the treatment by 6%. Normogram adjustment is required to achieve a predictable result.



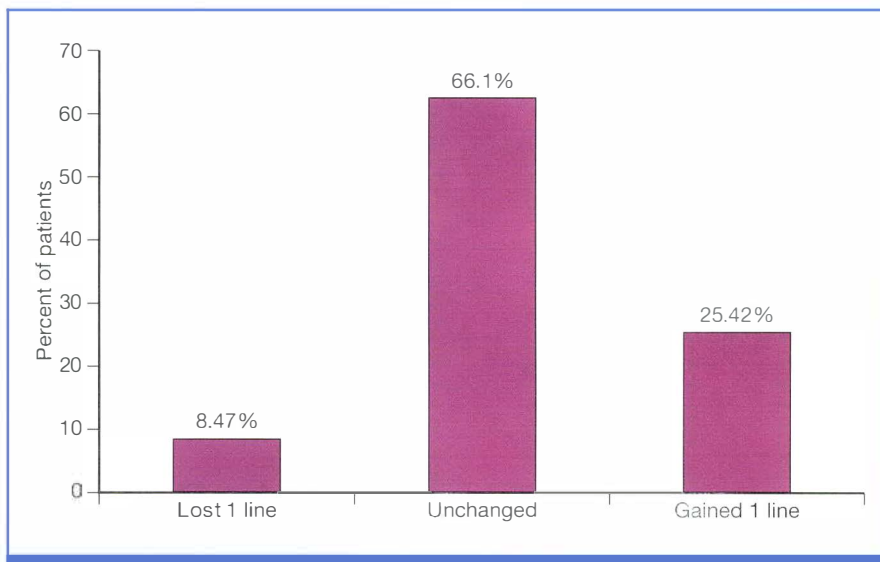
**Discussion**

The advantage of laser refractive surgery with the flying spot technology excimer laser system has been documented.<sup>6,7</sup> Among these advantages, the smoother surface is one of the greatest influences on the visual outcome. Due to the small area of ablation, the energy power is more homogenous, less shock wave, and easier to control. There was almost no step on the corneal surface after the laser treatment.<sup>8</sup> The smoother surface produces faster visual recovery, better UCVA and less loss of BCVA. There are several laser machines

**Figure 3.** Efficacy of the treatment is shown by cumulative uncorrected visual acuity (UCVA) bar graph. More eyes achieved better UCVA through the follow up period of time. Only 8.33% had UCVA worse than 20/40 at 3 months.



**Figure 4.** Safety of the treatment is shown by line change in best corrected visual acuity (BCVA). Only 8.47% lost 1 line but 25.42% gained 1 line of BCVA.



capable of generating a flying spot energy pattern. The Meditec MEL 70 G Scan is one of these flying spot excimer lasers, producing a 1.8 mm Gaussian energy profile with a repetition rate of 35 Hz. With an additional cone for a controlled atmosphere, the environment above the treatment area is well controlled. The laser energy that reaches the corneal surface is

homogeneous, producing a smooth surface. In this study, the efficacy, safety and stability of LASIK using the MEL 70 G-Scan were analysed.<sup>9</sup>

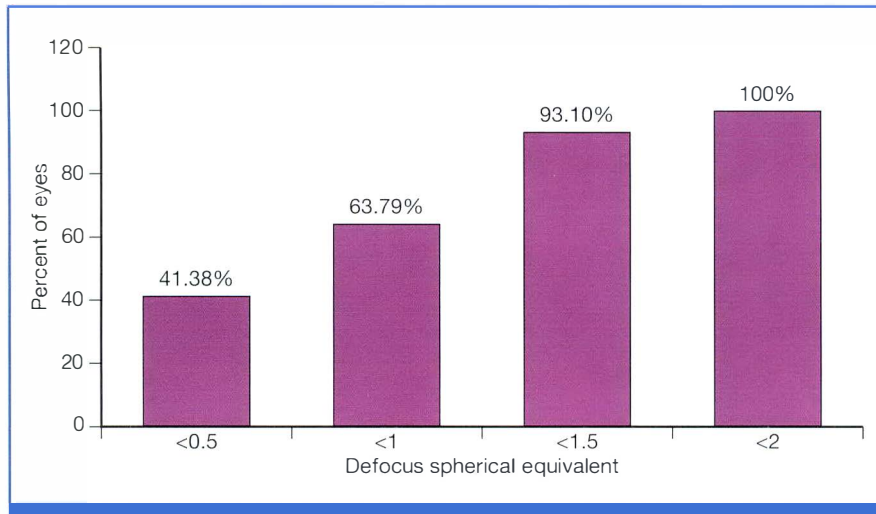
No eyes in this study lost more than 1 line of Snellen acuity and 25.42% of eyes gained 1 line. The stability graph shows slight regression toward 3 months but within -0.50 diopter of SE. 92.73% were within

$\pm 1.00$  diopter of refraction. Refractive outcome is commonly reported as the SE refraction, which is computed as the spherical component added to one-half of the cylindrical component, respecting the sign of the cylinder, but this can be misleading. The sign can add or subtract each other, resulting in zero SE. For example,  $-2.00 + 4.00 \times 180^\circ$  also has an SE of 0.00 diopter despite the bad outcome. This problem can be solved by using a defocus equivalent bar graph.<sup>10</sup> This is computed as SE added to one-half of the cylinder, ignoring the sign. This example will have a defocus equivalent value of 2.00 diopter. The defocus equivalent values more accurately represent the reality of the refractive state of the eye by eliminating the inequity between eyes that had similar spherical equivalent refractions but different amounts of astigmatism. The defocus equivalent is proportional to the area of the blur circle of the conoid of Sturm. The defocus equivalent bar graph is presented as a cumulative graph, building in one direction and presenting the number of eyes with a given defocus equivalent value. In this study, 63.79% of the eyes had a defocus equivalent value of less than 1.0 diopter — slightly lower than expected. This could be due to the pre-operative refractive error of the eyes that had a high defocus value and also had a high degree of astigmatism (-2.00 to -3.00 diopters).

The attempted versus achieved correction graph normally shows the correlation and predictability of the outcome. In this study, there was an 89% chance of prediction for the outcome using the regression formula. With this formula, an added 6% correction is needed to achieve better results (normogram adjustment).

In conclusion, these results of LASIK using flying spot excimer laser (Meditec MEL 70 G-Scan) show it to be safe, effective, and stable for eyes with low to moderate myopia. The procedure results in

**Figure 5.** Defocus spherical equivalent bar graph indicates the true refractive state of the eyes. 63.79% of eyes had the value of 1.0 diopter or less.



slight undercorrection for higher myopia. Normogram adjustment is required in the beginning.

## References

- Othenin-Girard P. Excimer laser: history, development and comparison of equipment. *Bull Soc Belge Ophthalmol* 1997;266:11-20.
- Nagy ZZ, Munkacsy G, Popper M. Photorefractive keratectomy using the meditec MEL 70 G-scan laser for hyperopia and hyperopic astigmatism. *J Refract Surg* 2002;18:542-550.
- Fiore T, Carones F, Brancato R. Broad beam vs. flying spot excimer laser: refractive and videokeratographic outcomes of two different ablation profiles after photorefractive keratectomy. *J Refract Surg* 2001;17:534-541.
- Stojanovic A, Nitter TA. 200 Hz flying-spot technology of the LaserSight LSX excimer laser in the treatment of myopic astigmatism: six and 12 month outcomes of laser in situ keratomileusis and photorefractive keratectomy. *J Cataract Refract Surg* 2001;27:1263-1277.
- Nagy ZZ, Fekete O, Suveges I. Photorefractive keratectomy for myopia with the Meditec MEL 70G-Scan flying spot laser. *J Refract Surg* 2001;17:319-326.
- Coorpender SJ, Klyce SD, McDonald

MB, et al. Corneal Topography of small beam tracking excimer laser photorefractive keratectomy. *J Cataract Refract Surg* 1999;25:675-584.

- Pallikaris IG, Koufala KI, Siganos DS, et al. Photorefractive keratectomy with a small spot laser and tracker. *J Refract Surg* 1999;15:137-144.
- Nagy ZZ, Surveges I. Results of photorefractive keratectomy after the treatment of 2053 eyes. *Orv Hetil* 1999;140:747-754.
- Waring GO. Standard graphs for reporting refractive surgery. *J Refract Surg* 2000;16:459-466.
- Holladay JT, Lynn MJ, Waring GO, Gemmill M, Keehn CG, Fielding B. The relationship of visual acuity, refractive error, and pupil size after radial keratotomy. *Arch Ophthalmol* 1991;109:70-76.



### Address for Correspondence

Sabong Srivannaboon  
 Department of Ophthalmology  
 Faculty of Medicine  
 Siriraj Hospital  
 Mahidol University  
 2 Prannok Rd  
 Bangkoknoi  
 Bangkok 10700  
 Thailand  
 Tel: (66 2) 419 8033/4  
 Fax: (66 2) 411 1906  
 E-mail: sabong@pol.net

### SEAGIG and EMBASE

It gives the editors great pleasure to announce that Asian Journal of OPHTHALMOLOGY has joined forces with the South East Asia Glaucoma Interest Group (SEAGIG) to become the official SEAGIG Journal. The journal will continue to publish relevant articles related to ophthalmology, while the focus will remain on glaucoma.

We are also proud to announce that Asian Journal of OPHTHALMOLOGY is now indexed in the EMBASE database. The database can be found on the Internet at [www.elsevier.com/locate/esbd](http://www.elsevier.com/locate/esbd) and there will be links to the Asian Journal of OPHTHALMOLOGY website at [www.scientific-com.com/AJO](http://www.scientific-com.com/AJO)

We are grateful for the support that Asian Journal of OPHTHALMOLOGY has received from our authors and readers, which has enabled both of these steps to take place. Please continue to send your contributions to the Editorial Office.

# Satisfaction of Patients after Cataract Surgery in Oman — a Hospital-based Descriptive Study

Rajiv Khandekar,<sup>1</sup> Abdulatif Al Raisi,<sup>2</sup> Murli Rao,<sup>3</sup> Keshav Nair,<sup>3</sup> Hamed Makki Al Tahan<sup>3</sup>  
<sup>1</sup>Ophthalmologist In Charge of Eye & Ear Health Care, <sup>2</sup>Head of Ophthalmic Services, and <sup>3</sup>Regional Ophthalmologists, Sohar Hospital, Sur Hospital, Nizam Hospital, Oman



**Objective:** This study was undertaken to determine the magnitude and determinants of patients' satisfaction levels after cataract surgery

**Patients and Methods:** 126 patients with cataract were randomly selected from 3 hospitals in Oman. The patients were interviewed and examined pre- and postoperatively to determine their level of satisfaction with the visual outcome and services provided. Using closed-ended questions, patients' responses at the time of the follow-up visit 6 to 8 weeks after cataract surgery were noted.

**Results:** Seventy eight percent of the patients were satisfied with the visual gain at the time of discharge and 90% were satisfied 6 weeks after surgery. The gender difference for the satisfaction was not significant. The age of the patients was negatively associated with the rate of satisfaction. Patients with associated ocular pathology had significantly poorer visual gain and satisfaction compared with those without co-morbidity.

**Conclusion:** In view of the high satisfaction rate among operated cataract patients, poor patient satisfaction is unlikely to be a barrier to increasing the uptake of cataract surgery in Oman. Evaluation of the receiver's satisfaction could be an important tool for the health programme to monitor the quality of cataract care.

Key Words: Cataract, Oman, Patient satisfaction

Asian J Ophthalmol 2003;5(3):6-10.

## Introduction

Cataract is the leading cause of curable blindness in developing countries.<sup>1</sup> Even though a large cataract backlog is a challenge to the national

health programmes, it can effectively be addressed through timely intervention. National programmes are encouraged to focus on increasing the cataract surgery rate.<sup>2</sup> Provision of high quality cataract surgery and fulfilling patients' visual

needs are important strategies for reaching this goal and therefore should be an integral part of the programme management.<sup>3</sup> To monitor cataract services, periodic evaluation of the visual gain should be undertaken. For this, visual gain could be measured objectively through vision tests and subjectively via the feedback of operated patients.<sup>4</sup>

The Sultanate of Oman has a prevalence of cataract of 3.3/100 and had nearly 8,000 unoperated cataract patients in 1996 to 1997. The existing ophthalmic services had 75% coverage of the need. Hence the Ministry of Health aims to reduce the burden of cataract blindness by increasing the cataract surgery rate from 1500/million reported in 1997 to 3000/million by 2010.<sup>5</sup>

The standard practice of cataract surgery in Oman includes extracapsular cataract extraction with intraocular lens implantation either in the capsular bag or in the posterior chamber. In cases of dense central corneal opacity limiting the per operative view of the lens, extracapsular cataract extraction is planned prior to the surgery. The power of the required lens is estimated with the help of biometry by 'A' scan. The surgeries are performed using either peribulbar or retrobulbar anaesthesia and an operative microscope. If the patient is a child, mentally challenged, or apprehensive about surgery, general anaesthesia is preferred. All the surgeries performed by the Ministry institutions in Oman are free of cost.

The national eye health care programme has implemented quality assurance procedures for cataract surgeries since 1997 to 1998. However, it has been observed that multiple associated pathologies such as trachoma complications, glaucoma, and myopic retinal degeneration affect the visual outcomes of otherwise successful cataract surgeries in Oman. The evaluation procedures of the programme currently use objective methods of measuring visual gains



and correlate them to the constraints for high visual achievement. However, they do not involve the operated patients' perspective. Many countries have included subjective assessment of the visual needs of patients with cataract as a tool for monitoring the cataract services.<sup>6-8</sup> However, it was found that patients' expectations and satisfaction after cataract surgery are influenced by factors such as occupation, literacy, exposure to information on newer interventions for cataract, experience of cataract operations among relatives and friends, pre-operative counselling, timing of surgery, and skill of the surgeon.<sup>3,9</sup>

In view of the limited information in Oman, a study was undertaken to determine the magnitude and determinants of patients' satisfaction levels after cataract surgery. Based on the results, policies for monitoring cataract services were proposed.

## Patients and Methods

This was a hospital-based cross-sectional descriptive study, performed at the Sohar Hospital of North Batinah region of Oman, Sur Hospital of South Sharqiyah region, and Nizwa Hospital of Dhakhiliyah region. These hospitals have uniform and standard cataract care facilities. The study was conducted during 8 months of 2002

To represent 210 cataract operations at the study sites during a 3-month study period, 120 patients needed to be randomly selected. This would achieve a 95% confidence interval (CI), 90% power of the study. The acceptable error would be 5% and it is assumed that 80% of the patients will have vision gains and satisfaction measured by both subjective and objective methods. The sample was further stratified into the Sohar, Sur, and Nizwa Hospitals in proportion to their total cataract surgeries performed during the 3-month period.

All patients with cataract undergoing planned cataract surgery at the study sites

were included in the study. All patients with cataract being operated as an emergency procedure and children younger than 15 years with cataract were excluded from the study.

Four interviewers comprised the field investigators. The interviewers visited the patients in the outpatient clinics. After obtaining consent, they conducted the interview in the presence of one of the attendants. The 'Activities of Daily Vision Scale'<sup>10</sup> was adopted to prepare the closed-ended questions. Twenty two questions related to the satisfaction for preoperative care, operative comfort, postoperative care, counselling offered by the health staff, and the visual gain were included in the questionnaire. The interviewers were native Arabic speakers and had experience of developing a rapport with ophthalmology patients.

The interviewer presented the questions and noted the response of the patient without prompting or using influence to extract the expected response. The response of the attendant was taken into consideration only if the patient did not remember the events. Each question had 3 to 5 options from which one was to be selected. The interviewers were not aware of the visual gain recorded by the ophthalmologist at the time of the interview.

The postoperative visual status of the patients was noted 6 to 8 weeks following surgery using Snellen's distant vision chart with best possible correction. If information was not available due to non-compliance with the scheduled follow-up visits, the vision status noted at the 1-week follow-up visit was used to determine the postoperative visual status.

To ensure the high standard of the study, the following steps were taken: holding standardisation workshops/meeting of field staff, printing, distributing, and using guidelines and case definitions during the field part of the study, pretesting of the

methodology and forms, interviews with cataract patients in Arabic, use of closed-ended questionnaires, and blinding the interviewers to patients' postoperative visual status. To minimise the attrition rate, the operated patients were contacted by telephone and encouraged to attend the follow-up visit and interview.

The data collection forms were audited in the region and then forwarded to the data manager. The data was computed in pre-tested format using EPI6. Data was checked using range and frequency checks. The analysis was carried out using the Statistical Package for the Social Sciences program (SPSS 9). The codebook for the variables was maintained. Univariate analysis model was used for the analysis. Responses suggestive of strongly satisfied patients were given +10 points. Those that were partly satisfied were given +5 points.

Those with a high dissatisfaction rate were given -10 points. Patients with some dissatisfaction were given -5 points. Those who opted not to answer a question were given 'Nil' points. All points were added to determine the overall satisfaction of the patients. The level of satisfaction was further sub-grouped as high, intermediate, and poor satisfaction, depending on a total satisfaction score of 67% and above, 33% to 66%, and less than 33% respectively. The frequencies and percent proportions were calculated to present the results and compare the subgroups. 95% CI and chi square were used for validation of important results.

The consent of national and regional health authorities was obtained to conduct and support this non-invasive operational research. Verbal consent of the patients for their participation was part of the study procedure. The identity of the patients was maintained by giving each a unique identification code and de-linking their outcomes from their names. The information



gathered in this study was not used for or against the patients or staff who provided cataract care.

**Results**

Of the 126 patients with cataract, postoperative interview was conducted for 110 (87.3%). Sixteen patients (4 men and 12 women) were lost to follow up. The profile of the study group is shown in Table 1. The number of respondents of both genders and of different study sites were similar. A large proportion of the patients were in the 50 to 69 years age-group. Thirty six patients (28.6%) had previously undergone cataract surgery in the fellow eye.

**Patients' Satisfaction with Visual Gains**

Patients' satisfaction with postoperative vision on the day of discharge (2 to 5 days following surgery) and at follow-up after 6 to 8 weeks is shown in Table 2. Three-quarters of the patients were satisfied with the visual gain. The satisfaction level improved after 6 weeks. The gender difference was not significant. Younger patients had a significantly higher rate of satisfaction compared with older patients. Patients from Nizwa Hospital had lower satisfaction rates than patients of Sohar and Sur Hospitals. Patients with associated ocular pathology had significantly poorer visual gain and satisfaction than those without co-morbidity.

**Postoperative Vision and Level of Patients' Satisfaction**

The visual status of the operated eye, as noted at the follow-up visit 6 to 8 weeks after cataract surgery, was grouped into <0.05, 0.05 to 0.09, 0.1 to 0.7, and >0.7. Patients' satisfaction was grouped into 'highly satisfied', 'partly satisfied', and 'not satisfied.' The frequencies and proportion for these parameters are given in Table 3.

Patients with highly compromised vision were satisfied with whatever vision they gained. Those achieving very good postoperative vision were also found among the highly satisfied group. However, a large number of patients with vision <0.1 were

not happy with the vision after surgery. The satisfaction among patients who had been operated in the fellow eye was not significantly different to that of those operated for the first time for cataract ( $\chi^2 = 0.58$ , degree of freedom = 2 and  $p = 0.75$ )

**Patients' Responses to the Cataract Services**

109 patients responded to the question on the time spent for preoperative investigative procedures. Of these, 106 (96.4%) considered that time spent for the procedures was genuine and much needed while the rest suggested that it was too long and could be avoided. Preoperative counselling was given by ophthalmologists to 87 patients (79.1%) while 6 patients said they were not counselled. Fifty patients (45.5%) were advised about the procedure and the prognosis was explained in local language by other health staff in addition to the

**Table 1. Profile of patients for the postoperative satisfaction interview.**

Patients	Number	%
Number of patients	110	
Sex		
Male	53	48.2
Female	57	51.8
Study site		
Sohar Hospital	30	27.2
Sur Hospital	40	36.4
Nizwa Hospital	40	36.4
Age (years)		
<40	4	3.6
40-49	10	9.1
50-59	26	23.6
60-69	48	43.6
≥70	22	20.1
Previous cataract surgery in fellow eye		
Yes	36	28.6
No	90	71.4

**Table 2. Satisfaction of patients with visual improvement.**

Respondents (n = 110)	Satisfied with vision on day of discharge		Satisfied with vision at 6 to 8 weeks follow up	
	Number	%	Number	%
Number of patients	86	78.2	99	90
Sex				
Male	39	73.6	50	94.3
Female	47	82.5	49	86.0
Study site				
Sohar Hospital	26	86.7	29	96.7
Sur Hospital	24	60.0	37	92.5
Nizwa Hospital	36	90.0	33	82.5
Age (years)				
<40	4	100.0	4	100.0
40-49	8	80.0	10	100.0
50-59	21	80.8	23	88.5
60-69	36	75.0	43	89.6
≥70	17	77.3	19	86.4
Associated ocular pathology				
Present	42	85.7	47	95.9
Absent	44	72.1	52	85.2

**Table 3. Visual status after cataract surgery and patients' satisfaction.**

Visual status in the operated eye (n = 110)*	High satisfaction Number (%)	Intermediate satisfaction Number (%)	Not satisfied Number (%)
<0.05	8 (50.0)	6 (37.5)	2 (12.5)
0.05-0.09	5 (35.7)	5 (35.7)	4 (28.6)
0.1-0.6	45 (76.3)	11 (18.6)	3 (5.1)
≥0.7	14 (73.7)	5 (26.3)	0 (0.0)

\* Information missing for 2 patients.



doctor's explanation. Twenty six patients said that they experienced pain during and 1 day after cataract surgery. For 20 patients, the pain was tolerable. All except 1 patient said that the staff in the hospital were cordial, caring, and understanding. Only 34 patients stayed in hospital for 1 day, 60 patients stayed for 2 days, and the remaining 16 patients stayed for more than 3 days. 102 patients (93%) considered their duration of hospital stay was justified. 106 patients (96%) considered their hospital stay pleasant.

Eighty two patients (76%) said that the ophthalmologist explained the prognosis before surgery, while 74 (67%) said they were also told about the care they would have to take at home after surgery. Eighty patients (72.7%) were ready to have the fellow eye operated in the same institution. 104 (95%) patients were ready to recommend their relatives and friends to undergo the surgery in the same institution. 24 patients (22%) believed that if surgery were performed in a private hospital, the result could have been better. Seventy eight patients (71%) attributed the good care given in the hospital to the good vision they gained after cataract surgery. Two patients believed that their poor vision was due to improper care given in the hospital.

## Discussion

This study was crucial for the eye health care programme to determine the level of visual gain and the gap in the perception of the success of the cataract surgery by patients compared with vision testing. The study sample was randomly selected, so is representative of all planned cataract surgeries at the study sites. The study sites closely matched the other trachoma-endemic areas of Batinah, Sharqiya, and central Oman. They are also of a similar demographic, socioeconomic situation. The results could therefore be extrapolated to

cataract surgery in the northern and central trachoma-endemic areas of Oman.

The postoperative information for 16 of 126 patients was missing. If these patients who were lost to follow up had poor vision after surgery, non-differential bias could cause under-representation of poor outcome. If all the patients lost to follow up are believed to have poor vision, the proportion of 'poor vision' is likely to increase by an additional 5%. The selected study sites had excellent resources. Hence, poor visual gain and lack of patients' satisfaction are unlikely to be due to lack of resources.

Anisometropia and uncorrected aphakia were responsible for poor vision and satisfaction in 7% of operated patients in Nepal.<sup>11</sup> With the lens implantation surgery used for more than 90% of the patients in the present study, such a possibility is less likely to be the cause of poor visual gain and dissatisfaction in this study.

Patients' satisfaction with the cataract services was excellent for three-quarters of patients in the present study. Total recovery from cataract was expected by 80% of the operated cataract patients in a Brazilian study.<sup>12</sup> This closely matches the present study satisfaction rates. However, the dissatisfaction rate was as low as 8% in Sweden.<sup>13</sup> The need for postoperative visual gain sufficient to resuming normal activities was expressed by 59.8% of the patients in the Brazilian study.<sup>12</sup> This was achieved for more than 67% in the present study. International variation in reporting of global vision-related functional capacity that is not explained by clinical or socio-demographic factors could be due to cultural differences.<sup>9</sup> This could explain regional differences as well as results of studies in different sites.

The satisfaction is better if visual status is evaluated at 6 to 8 weeks after cataract surgery than on the day of discharge. Stabilisation of vision and reduction of apprehension due to having undergone

recent ocular surgery might have resulted in the differential visual gains and satisfaction levels at the 2 follow-up visits.

Correlation of postoperative visual status and patients' satisfaction after surgery shows a distinct pattern. Those patients with very good vision after surgery are highly satisfied. This was also reported in Sweden<sup>13</sup> and Nepal.<sup>11</sup> Surprisingly, patients with marked compromised vision before surgery were also satisfied with whatever vision they gained. The group with substantial residual vision before surgery might have higher visual expectations and if that was not achieved, they could become highly dissatisfied. This observation shows a dilemma faced by cataract care providers. On the one hand, it is advisable to promote cataract surgery at an early stage for better results and for maintaining a high quality life. On the other hand, if patients do not achieve their expected vision, their dissatisfaction could negatively affect the cataract-related blindness reduction campaign. Hence, a balance should be maintained between intervening too early or too late. By following 0.1 as the visual status of an eye with cataract as the minimum criteria to advise cataract surgery for patients with ocular co-morbidity, the dissatisfaction rate could be reduced.

The use of the Visual Functioning Index (VF-14) and the Cataract Symptoms Score (CSS) to determine the visual function preoperatively as well as postoperatively and thus determine the visual gain and patients' satisfaction is a standard method adopted by many countries.<sup>9</sup> However, in view of the large illiterate elderly population in Oman and the lack of sociologists to undertake a sustainable campaign in the health sector, instead of the VF-14 and CSS, questions related to daily work and vision were included in the present study. Hence, comparison of the present study outcome with other studies using the VF-14 method should be done with caution.



Patients' satisfaction for the vision gain as well as visual status measured by objective methods are important indicators for evaluating cataract surgery outcomes.<sup>14,15</sup> Evaluation of visual status is currently part of the integral part of quality assessment for the cataract services in Oman. However, the feasibility of measuring patients' satisfaction on a larger scale and on an annual basis should be studied before using it as an indicator for determining the quality of cataract services.

A review of the preoperative assessment and making the procedure more patient-friendly could further reduce patients' dissatisfaction. However, multiple systemic disorders in elderly patients might prohibit prompt assessments in many cases. In such situations, patients and their relatives should be counselled to attend to any other chronic diseases well ahead of scheduled cataract surgeries. The detailed study of the satisfaction components and their weakness such as the need for counselling the patient in a local language could further improve the satisfaction level.

The overall satisfaction for the services provided seems to be good. The services should be maintained and a system of periodic spot checks and incentives to the health staff for their positive attitude in attending to patients could improve satisfaction.<sup>16</sup>

The study enabled the program to review the cataract services from the receiver's point of view for the first time. This study also helped in proposing policies for monitoring and improving cataract care on a larger scale and in the form of a system in Oman. Countries with similar objectives and resources could also use such a model

to review the satisfaction of their patients with cataract after surgery.

## Acknowledgements

The authors thank the Ministry of Health, Oman, for permitting and supporting this study. The efforts of the field investigators are much appreciated. Such a study could be possible only with full cooperation from the patients and their relatives. We thank all of them.

## References

1. Global initiative for the elimination of avoidable blindness. An informal consultation. Geneva: World Health Organization; 1997. WHO/PBL/97.61.
2. Vajpayee RB, Joshi S, Saxena R, Gupta SK. Epidemiology of cataract in India: combating plans and strategies. *Ophthalmic Res* 1999;31:86-92.
3. Muralikrishnan R, Sivakumar AK. MHM patients' perspective: an important factor in assessing patient satisfaction. *J Com Eye Health* 2002;15:5.
4. Monestam E, Wachtmeister L. Impact of cataract surgery on visual acuity and subjective functional outcomes: a population-based study in Sweden. *Eye* 1999;13(Pt 6):711-719.
5. Eye Health Care Manual. 2nd ed. Oman: Ministry of Health Oman; 2000:13-15.
6. American Academy of Ophthalmology preferred practice guidelines, cataract in the adult eye. San Francisco: American Academy of Ophthalmology; 1996:8.
7. Brian G, Taylor H. Cataract blindness — challenges for the 21st century. *Int J Public Health* 2001;79:249-256.
8. Steingberg EP, Tielsch JM, Schein OD, et al. National study of cataract surgery outcomes, variation in 4-month postoperative outcomes as reflected in multiple outcome measures. *Ophthalmology* 1994;101:1131-1140.
9. Alonso J, Black C, Norregaard JC, Dunn E, Andersen TF, et al. Cross-cultural

differences in the reporting of global functional capacity: an example in cataract patients. *Med Care* 1998;36: 868-878.

10. Elliott DB, Patla A, Bullimore MA. Improvements in clinical and functional vision and perceived visual disability after first and second eye cataract surgery. *Br J Ophthalmol* 1997;81: 889-895.
11. Pokharel GP, Selvaraj S, Ellwein LB. Visual functioning and quality of life outcomes among cataract operated and un-operated blind population in Nepal. *Br J Ophthalmol* 1998;126: 515-523.
12. Kara-Junior N, Temporini ER, Kara-Jose N. Cataract surgery: expectations of patients assisted during a community project in Sao Paulo, state of Sao Paulo, Brazil. *Rev Hosp Clin Fac Med Sao Paulo* 2001;56:163-168.
13. Monestam E, Wachtmeister L. Dissatisfaction with cataract surgery in relation to visual results in a population-based study in Sweden. *J Cataract Refract Surg* 1999;25:1127-1134.
14. He M, Xu J, Li S, Wu K, Munoz SR, Ellwein LB. Visual acuity and quality of life in patients with cataract in Doumen County, China. *Ophthalmology* 1999; 106:1609-1615.
15. Lundstrom M, Stenevi U, Thorburn W, Roos P. Catquest questionnaire for use in cataract surgery care: assessment of surgical outcomes. *J Cataract Refract Surg* 1998;24:968-974.
16. Rao GN. How can we improve patient care? *J Com Eye Health* 2002;15:1-3.

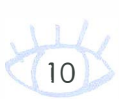
### Address for Correspondence

Rajiv Khandekar  
Eye Health Care  
PO Box 393  
Pin: 113  
Muscat  
Oman

Tel: (968) 607 524

Fax: (968) 601 832

E-mail: rajshpp@omantel.net.om



# Suprachoroidal Haemorrhage after Valsalva in a Myopic Eye with Circular Buckle

Haneen Y Jabaly-Habib,<sup>1</sup> Modi Naftali,<sup>2</sup>  
Hanna J Garzozzi<sup>1</sup>

<sup>1</sup>Haemek Medical Center, Department of Ophthalmology, Afula, and <sup>2</sup>Poria Hospital, Department of Ophthalmology, Poria, Israel

*This report is of a highly myopic patient with valsalva-induced suprachoroidal haemorrhage in the right eye with a previous encircling buckle. The choroidal haemorrhage was diagnosed primarily by B-scan ultrasound due to vitreous haemorrhage precluding fundus examination. At follow-up, all haemorrhages resolved spontaneously, and the patient's pre-event visual acuity recovered. The rare occurrence of suprachoroidal haemorrhage as a part of valsalva-induced retinopathy, and the role of the circular scleral buckle as a risk factor is discussed.*

Key Words: Hemorrhage, Myopia, Retinopathy, Scleral buckling, Valsalva

Asian J Ophthalmol 2003;5(3):11-12.

## Introduction

The Valsalva manoeuvre, which induces a sudden rise in intra-abdominal and intrathoracic pressure, may in turn raise the intra- and/or periocular pressure. If the pressure is sufficiently high, capillaries in various ocular tissues may rupture.

## Case Report

A 60-year-old man presented with sudden visual loss in his right and only eye after making himself vomit to expel spoiled food that he had unintentionally eaten. He had high myopathy of -15.00, and had undergone phacoemulsification of cataract with endocapsular ring insertion on his right eye 18 months previously. Six months

postoperatively, retinal detachment was repaired with vitrectomy and circular scleral buckle. His left eye had been irreversibly blinded by a childhood trauma.

At presentation, his visual acuity was hand movements, intraocular pressure (IOP) was 19 mm Hg, and the anterior segment was quiet. A vitreous haemorrhage precluded fundus evaluation. B scan ultrasound demonstrated a rounded elevated lesion, consistent with a choroidal haemorrhage, in addition to vitreous haemorrhage. After 4 days, as the vitreous haemorrhage was absorbed, 2 low choroidal haemorrhages were seen posterior to the scleral buckle, in addition to small intraretinal haemorrhages. The choroidal haemorrhages resolved after 10 days. At follow-up, his visual acuity returned to the pre-event level of 10/200.

## Discussion

In a literature search, the reports of only 5 patients with a suprachoroidal haemorrhage developing after a valsalva manoeuvre were found.<sup>1-4</sup> Three patients had undergone a previous encircling buckle operation in the involved eye,<sup>1,2</sup> and only 1 had any degree of myopia (-4.00 diopters).<sup>1</sup> One patient, with no prior surgery, had bilateral choroidal effusion and haemorrhage, expressed 3 days after an episode of severe vomiting.<sup>3</sup> Only the fifth patient had an acute valsalva-induced choroidal haemorrhage in one eye with no past ocular surgery or anticoagulant treatment.<sup>4</sup> All patients followed a benign course of spontaneous and complete recovery. The highly myopic patient described here, with a history of combined vitrectomy and buckle operation, also followed this course.

The rarity of suprachoroidal haemorrhage in normal eyes after the valsalva manoeuvre may be attributed to a protective centrifugal counterpressure effect of elevated IOP, which has been demonstrated experimentally during a valsalva manoeuvre and is proportional to the degree of the induced strain.<sup>5</sup> This elevation in IOP by counterbalancing the induced elevation in choroidal venous pressure would reduce the transmural gradient that would otherwise lead to vessel rupture. It seems possible that an encircling buckle may impede choroidal venous drainage by distortion of episcleral veins or by decreasing the flexibility of the sclera adjacent to the buckle. Due to the valsalva-induced increased IOP, the sclera may expand around a less-expandable buckle, kinking the vessels and further elevating venous pressure. Alternatively, the less-expandable buckle might exacerbate the shearing and tearing forces between the sclera and the choroidal tissue due to the difference in their tissue elasticity, thus predisposing to vessel rupture.



Meurs and Bosch<sup>1</sup> and Meyers and Foster<sup>2</sup> have also suggested that with an encircling buckle, interference with venous outflow and/or local vessel damage might make this type of eye more vulnerable to damage from sudden venous pressure elevation. An additional risk factor for this patient, and not stressed in the previous reports, is that of high myopia, a condition known to be more frequently associated with perioperative suprachoroidal haemorrhage.

### References

1. Meurs JC, Bosch WA. Suprachoroidal hemorrhage following a valsalva maneuver. *Arch Ophthalmol* 1993;111:1025-1026.
2. Meyers SM, Foster RE. Choroidal hemorrhage after valsalva's maneuver in eyes with previous scleral buckle. *Ophthalmic Surgery* 1995;26:216-217.
3. Suan EP, Rubsamen PE, Byrne SF. Bilateral ciliochoroidal detachment after valsalva maneuver. *Arch Ophthalmol* 1993;111:304.
4. Hammam T, Madhavan C. Spontaneous suprachoroidal hemorrhage following a valsalva manoeuvre. *Eye* 2003;17:261-262.

5. Dickerman RD, Smith GH, Langham-Roof L, McConathy WJ, East JW, Smith AB. Intra-ocular pressure changes during maximal isometric contraction: does this reflect intracranial pressure or retinal venous pressure? *Neurol Res* 1999;21:243-246.

#### Address for Correspondence

Haneen Y Jabaly-Habib  
PO Box 2222, Nazareth 16000, Israel  
Tel: (972 4) 600 0803  
Fax: (972 4) 600 0803  
E-mail: gshabib62@yahoo.com

### Conference Information Required

Is there an important conference coming up in your area? If so, please let us know the details for inclusion in the Congress Calendar. Alternatively, we can publish a full announcement of a forthcoming conference (subject to space availability). Just let us know the details and we will make an announcement.

If you wish to contribute to the Congress Report, please feel free to send a summary of a conference you have attended. We will consider all relevant, up-to-date manuscripts for publication.

Please send your contributions to:

The Editor  
Asian Journal of OPTHALMOLOGY  
Scientific Communications (Hong Kong) Ltd  
4/F, 11 Queen Victoria Street  
Central, Hong Kong

Tel: (852) 2868 9171  
Fax: (852) 2868 9269  
E-mail: editor@scientific-com.com

### South East Asia Glaucoma Interest Group (SEAGIG) 2004

26 - 28 August 2004  
Kuala Lumpur, Malaysia

For further information please contact: SEAGIG 2004,  
Ophthalmological Society of the Malaysian Medical Association,  
4th Floor, MMA House, 124 Jalan Pahang, 53000 Kuala Lumpur, Malaysia  
Tel: (60 3) 4041 1375/8972  
Fax: (60 3) 4043 4444  
E-mail: mma@tm.net.my  
Website: [www.seagig.org/news.html#2004](http://www.seagig.org/news.html#2004)  
[www.cornerstone-msc.net/SEAGIG2004/index.cfm](http://www.cornerstone-msc.net/SEAGIG2004/index.cfm)



# Bilateral Retinal Detachment in Acute Myeloid Leukaemia

**K Pavithran, BV Ajithkumar, R Aruna, M Thomas**  
 Department of Haematology and Internal  
 Medicine, Medical College Hospital, Trivandrum,  
 India

Ocular manifestations are common in patients with acute leukaemia. This can result from direct infiltration by neoplastic cells of ocular tissues, including optic nerve, choroid, retina, iris, and ciliary body, or secondary to haematological abnormalities such as anaemia, thrombocytopenia, or hyperviscosity states, or retinal destruction by opportunistic infections. Simultaneous involvement of various ocular tissues is rare. This report is of a 65-year-old man who presented with bilateral painful loss of vision. He was found to have glaucoma, hyphaema in the right eye, vitreous haemorrhages, and retinal detachment in both eyes. Bilateral retinal detachment as the initial manifestation of acute leukaemia is extremely rare.

Key Words: Acute myeloid leukemia, Retinal detachment

Asian J Ophthalmol 2003;5(3):13-14.

## Introduction

Leukaemia may affect any ocular tissue at some time during its course. The incidence of ocular involvement in leukaemia is 40% to 50%.<sup>1,2</sup> The eye may become involved either directly by leukaemic infiltration of various ocular tissues or by one of the secondary manifestations of the disease. For example, anaemia and thrombocytopenia may lead to retinal haemorrhages and ischaemia. Patients with leukaemia are more vulnerable to infection because of immunosuppression, either as a result of impaired hematopoiesis or secondary to treatment with chemotherapeutic agents and steroids. Acute leukaemias affect the eye 4 times as frequently than the chronic types.<sup>3</sup> This report is of a 65-year-old man presenting with painful loss of vision in both eyes.

## Case Report

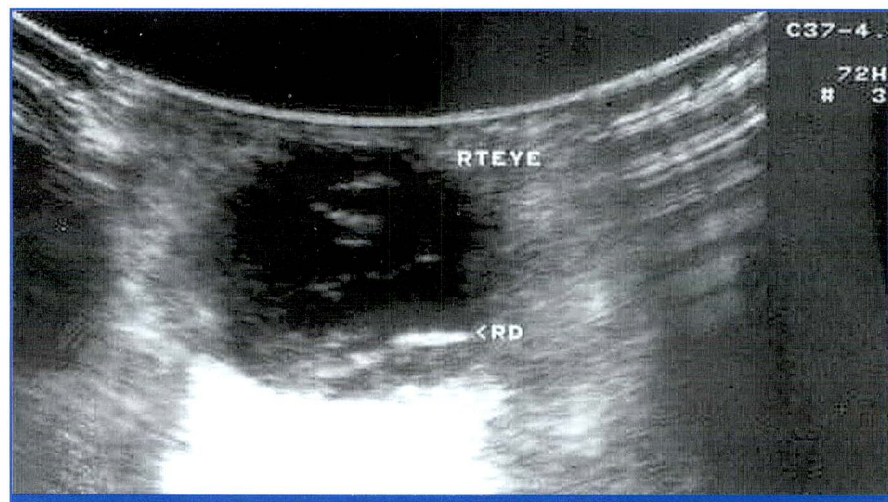
A 65-year-old man presented with a history of sudden onset of total loss of vision in both eyes of 2 weeks duration. He also had severe pain in the eyes, and bifrontal headache

with watering and redness of the eyes. He did not have hypertension or diabetes. There was no history of any trauma or any significant illness in the past. Physical examination showed bilateral chemosis and conjunctival congestion. The right pupil and anterior chamber could not be visualised due to hyphaema. The anterior chamber was shallow on the left side and the lens showed cataractous changes. Afferent pupillary reflex was absent on both sides. Gonioscopy could not be done. Fundi could not be visualised on both sides. Intraocular pressure was 69.3 mm Hg in the right eye and 75.1 mm Hg in the left eye. Ocular movements were normal. Ultrasound scan of the eyes revealed bilateral vitreous haemorrhages, with more on the right side, with bilateral retinal detachment with underlying retro retinal haemorrhage (Figures 1 and 2). Examination of the abdomen showed hepatosplenomegaly. There were no meningeal signs or any focal neurological deficit.

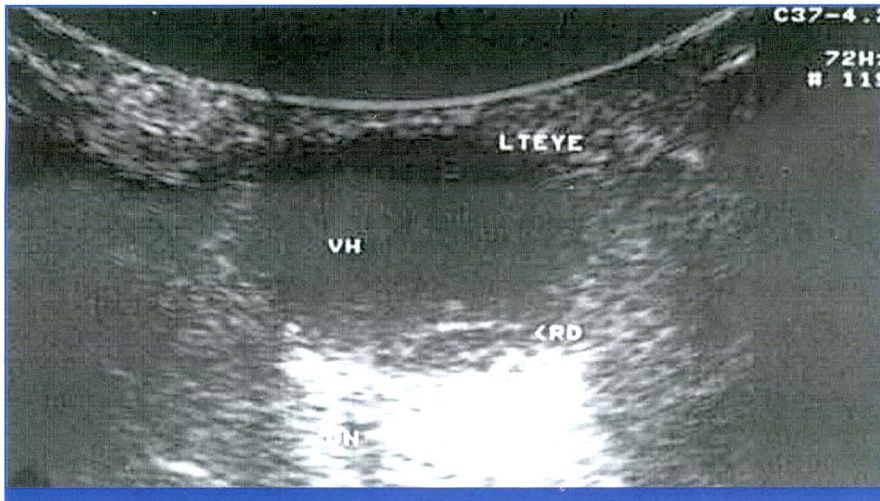
The results of the following haematological investigations were found: Hb was 70 g/L (normal range, 140-175 g/L), white blood cell count was  $192 \times 10^9/L$  (normal range, 4.5-11.0) with 68% blasts and platelet count was  $47 \times 10^9/L$  (normal range, 150-450  $\times 10^9/L$ ). Bone marrow confirmed the diagnosis of acute myeloid leukaemia, M2 subtype. Bone marrow karyotype was



Figure 1. Right eye showing increased echogenicity of vitreous with retinal detachment.



**Figure 2.** Left eye showing retinal detachment.



14

normal. Doppler study showed normal blood flow in the ophthalmic arteries. As the patient's general condition was rapidly deteriorating, his relatives discharged him and he died at home 3 days later.

## Discussion

Ocular manifestations are seen in 50% of patients with acute leukaemia.<sup>1,2</sup> The retina is the most common ocular tissue to be involved in leukaemia. Duke-Elder and Dobree suggest that up to 90% of patients will develop retinopathy at some stage of their disease.<sup>4</sup> Retinal haemorrhages are the most frequent finding. However, bilateral retinal detachments, as seen in this patient, are extremely rare. Retinal detachment occurs from a large haemorrhage extending into the sub-retinal space. The choroid is the most frequently involved tissue on histopathological examination (85%), although this is often not clinically evident.<sup>5</sup> Leukaemic involvement of the vitreous is

extremely rare and is generally involved only with extensive retinal haemorrhage. Corneal infiltrates are also extremely rare. Infiltration can occur through all layers of the conjunctiva and sclera. Anterior chamber involvement occurs most often with acute lymphatic leukaemia, but is also seen in patients with acute myeloid leukaemia and chronic lymphatic leukaemia.<sup>6</sup> Iris involvement may manifest in a variety of ways, including iritis, nodular thickening, heterochromia due to diffuse infiltration, spontaneous hyphaema and pseudohypopyon.<sup>7</sup> Glaucoma, as seen in this patient, could be secondary to obstruction of the trabecular meshwork by inflammatory cells, leukaemic cells, red blood cells, or iris infiltration.<sup>8</sup>

Initial treatment of intraocular manifestations of leukaemia is usually systemic chemotherapy. When definite leukaemic infiltrates fail to respond promptly to systemic chemotherapy, ocular radiation is usually recommended.<sup>9</sup>

Invasion of the eye by leukaemia is not rare and indicates the need for early ophthalmological examination. Therefore, all patients with leukaemia should have an ophthalmologic examination at presentation and during follow up. Rarely, ocular manifestations may be the initial presentation of leukaemia, as in this patient.

## References

1. Allen R, Straatsma B. Ocular involvement in leukemia and allied disorders. *Arch Ophthalmol* 1961;66:68-86.
2. Schachat AP, Markowitz JA, Guyer DR, Burke PJ, Karp JE, Graham ML. Ophthalmic manifestations of leukemia. *Arch Ophthalmol* 1989;107:697-700.
3. Brown G, Shields J. Tumors of the optic nerve head. *Surv Ophthalmol* 1985;29:239-264.
4. Duke-Elder S, Dobree J. The blood diseases. In: Duke-Elder S, ed. *System of ophthalmology (diseases of the retina)*. St Louis: CV Mosby Co; 1967:373-407.
5. Wolintz A, Goldstein J, Seligman B, Rosner F, Wesley A, Lee S. Secondary glaucoma in leukemia. *Ann Ophthalmol* 1971;3:1211-1213.
6. Kincaid MC, Green WR. Ocular and orbital involvement in leukemia. *Surv Ophthalmol* 1983;27:211-232.
7. Kearney WF. Leukemic hypopyon. *Am J Ophthalmol* 1965;59:495-497.
8. Glaser B, Smith JL. Leukaemic glaucoma. *Br J Ophthalmol* 1966;50:92-94.
9. Schachat AP, Dhaliwal RS. Leukemias and lymphomas. In: Ryan SJ, ed. *Retina*. 2nd ed. St Louis: CV Mosby; 1994: 873-890.

### Address for Correspondence

Dr K Pavithran  
 Department of Haematology  
 Medical College Hospital  
 Trivandrum-695011, India  
 E-mail: drkpavithran@hotmail.com



# New Treatment Options for Glaucoma

*From the 4th Congress of the Asian-Oceanic Glaucoma Society, held in conjunction with the 5th Hong Kong International Symposium of Ophthalmology and the 6th Asia Pacific Society of Eye Genetics, Hong Kong, 1-4 October 2003*

## Prostaglandins in the Management of Glaucoma

Professor Paul Palmberg  
University of Miami School of Medicine  
Florida  
USA

Recent clinical trials have shown that most glaucoma damage is pressure-dependent and therefore avoidable. However, aggressive lowering of intraocular pressure (IOP) is required to achieve optimal glaucoma management.

The Advanced Glaucoma Intervention Study found that the optimal IOP for patients with primary open angle glaucoma (POAG) and moderate to severe damage is 12 mm Hg.<sup>1</sup> Patients with an average IOP of 15 mm Hg or more experienced progression of visual field defects. According to the Comparison of Initial Glaucoma Treatment Study, an average 37% reduction in IOP from 27.0 to 17.5 mm Hg resulted in no net visual field progression over 5 years for patients with newly diagnosed POAG with mild damage.<sup>2</sup>

The Early Manifest Glaucoma Trial found an average 29% reduction in IOP achieved a 50% reduction in relative risk of

progression for newly diagnosed patients with POAG.<sup>3</sup> However, this study did not advance treatment for patients in whom the target pressure was not achieved.

So-called normal tension glaucoma also requires IOP reduction for optimum management. The Collaborative Normal-Tension Glaucoma Study showed that lowering the IOP by 30% from 16 to 11 mm Hg reduced the risk of progression from 60% to 20% after 5 years for high-risk patients.<sup>4</sup>

For patients with ocular hypertension, lowering the IOP by 20% reduces the risk of progressing to glaucoma. For each mm Hg the IOP was lowered, the relative risk was reduced by 10%.

### Prostaglandin Analogues to Achieve Target Pressures

Prostaglandin analogues are potent drugs that are capable of reducing the IOP by approximately 33% compared with only 25% for  $\beta$ -blockers. Since the results of most glaucoma studies suggest achieving an initial 30% to 35% reduction in IOP, a prostaglandin analogue is thought to be the most appropriate first-line therapy.

Three prostaglandin analogues — latanoprost, travoprost, and bimatoprost —

have been compared for efficacy and safety in the XLT study.<sup>5</sup> Nearly equal reductions were found at 8 am for the 3 drugs and there were no significant differences in the diurnal average reductions (Table 1). However, travoprost and bimatoprost caused a greater number of side effects than latanoprost, in particular red irritated eyes. Latanoprost is therefore recommended as initial therapy, and a 1-eye trial should commence to ensure efficacy.

### In Summary

Clinical trials will help to guide clinicians seeking target pressures to prevent visual field damage and progression of glaucoma. Potent medical, laser, and surgical therapies are now available to help achieve these goals. Clinical judgement remains important for evaluating the efficacy and side effects of each individual treatment and to modify the targets as time progresses.

### References

1. The Advanced Glaucoma Intervention Study (AGIS): 7. The relationship between control of intraocular pressure and visual field deterioration. The AGIS Investigators. *Am J Ophthalmol.* 2000; 130:429-440.
2. Lichter PR, Musch DC, Gillespie BW, et al. Interim clinical outcomes in the Collaborative Initial Glaucoma Treatment Study comparing initial treatment randomized to medications or surgery. *Ophthalmology* 2001;108:1943-1953.
3. Heijl A, Leske MC, Bengtsson B, Hyman L, Bengtsson B, Hussein M; Early Manifest Glaucoma Trial Group. Reduction of intraocular pressure and glaucoma progression: results from the Early Manifest Glaucoma Trial. *Arch Ophthalmol* 2002;120:1268-1279.
4. The effectiveness of intraocular pressure reduction in the treatment of normal-tension glaucoma. Collaborative Normal-Tension Glaucoma Study Group. *Am J Ophthalmol* 1998;126: 498-505.
5. Parrish RK, Palmberg P, Sheu WP; XLT Study Group. A comparison of latanoprost, bimatoprost, and travoprost in patients with elevated intraocular pressure: a 12-week, randomized, masked-evaluator multicenter study. *Am J Ophthalmol* 2003;135:688-703.



**Table 1. Comparison of latanoprost, travoprost, and bimatoprost for treatment of glaucoma.**

Parameter	Latanoprost	Travoprost	Bimatoprost
Intraocular pressure reduction at 8 am (mm Hg)	8.6	7.9	8.7
Diurnal average reduction (mm Hg)	7.0	6.7	7.3

## Challenges in the Management of Glaucoma in the Next Decade

Ivan Goldberg  
 Department of Ophthalmology  
 Sydney Eye Hospital  
 Sydney, Australia

Second only to cataract, glaucoma is the leading cause of preventable blindness worldwide. Primary open angle glaucoma (POAG) is the commonest type of glaucoma overall and in Asia. Increasingly, epidemiological information is able to identify the scale of the challenge.

Diagnosis of POAG mainly depends on detection of raised IOP. Increased awareness of this among eye health care workers throughout the region is vital, as is the need for identification of glaucoma by gonioscopy and to view the optic disc. In developed countries, the availability of more sophisticated disc imaging will enhance both diagnosis and follow up.

Reduction in IOP will remain the cornerstone of treatment. Newer drugs will continue to improve compliance and safety, as will newer methods of drug delivery. Surgical techniques will continue to evolve, and newer lasers will benefit more patients. Drainage procedures will benefit from advances in control of wound healing.

Beyond IOP reduction is the hope of effective and safe neuroprotection and more effective protection of the blood supply. Intriguing possibilities for the future are offered by genetic manipulation.

## Latanoprost for Chronic Angle Closure Glaucoma

Paul TK Chew  
 Department of Ophthalmology  
 National University Hospital  
 Singapore

This double-blind randomised study compared the IOP-reducing effect and safety of latanoprost once daily with timolol twice

**Table 1.** Reduction in intraocular pressure (IOP) from baseline of patients with glaucoma treated with latanoprost or timolol.

	Latanoprost	Timolol
IOP reduction (mm Hg)	8.8 ± 1.1	5.7 ± 0.9
p Value	<0.001	<0.001

daily in 30 patients with primary chronic angle closure glaucoma (CACG).

Two patients receiving timolol were withdrawn due to inadequate IOP control. Compared with baseline, the IOP after 2 weeks of treatment was statistically significantly reduced in both groups (Table 1). The difference in IOP reduction between the 2 treatment groups was 3.1 ± 1.5 mm Hg in favour of latanoprost (p = 0.04). The main ocular adverse events were conjunctival hyperaemia and discomfort, and were reported in both groups.

This study concluded that a significantly greater IOP reduction was achieved with latanoprost than with timolol in patients with CACG. These results suggest that latanoprost may be a therapeutic choice for the medical management of primary CACG.

## Latanoprost for Normal Tension Glaucoma

T Kato  
 Department of Ophthalmology and Visual Sciences  
 Hiroshima University Graduate School of Biomedical Sciences  
 Hiroshima, Japan

This study examined the IOP-reducing effect of latanoprost in 2 groups of patients with normal tension glaucoma. One group comprised 40 newly diagnosed patients, while the second group of 40 patients had been treated with other glaucoma drugs. Newly diagnosed patients began treatment with latanoprost and the patients already being treated for

**Table 1.** Intraocular pressure (IOP) reduction from baseline after 4 and 8 weeks of latanoprost therapy.

IOP reduction (mm Hg)	Baseline	4 Weeks	8 Weeks
Newly diagnosed patients	16.9 ± 2.5	14.3 ± 1.8	14.1 ± 2.2
Known glaucoma patients	16.0 ± 2.8	13.7 ± 2.9	13.2 ± 2.5

glaucoma substituted latanoprost for the already-used glaucoma medication. IOP was measured at baseline, and 4 weeks and 8 weeks after treatment with latanoprost had started.

Among the newly-diagnosed patients, 39 were followed up for 8 weeks. Eighteen patients (46%) had ≥20% IOP reduction at 8 weeks (Table 1). In the second group, 34

patients were followed up for 8 weeks. Seventeen patients (50%) showed ≥20% IOP reduction at 8 weeks.

This study concluded that latanoprost is useful as both first- and second-line medication for patients with normal tension glaucoma. Good IOP reduction is achieved, even when the baseline IOP is not so high.

## Abstracts of Asian research published in the international literature

### Trabeculectomy with Beta Radiation: Long-term Follow-up

In a retrospective non-comparative case series, the long-term outcome and complications of trabeculectomy with beta radiation were evaluated. Patients with confirmed primary open angle glaucoma (POAG), who received trabeculectomy with adjunctive beta radiation at the Prince of Wales Hospital, Hong Kong, between June 1991 and November 1994 were evaluated. Patients fulfilling the preceding criteria were followed up longitudinally. The visual acuity, intraocular pressure (IOP), bleb morphology, and complications were evaluated. Main outcome measures included visual acuity, IOP, bleb morphology, and complications.

Forty three eyes of 43 consecutive Chinese patients were recruited and successfully followed up for a minimum of 7 years. The mean age  $\pm$  1 standard deviation (SD) was  $60.9 \pm 13.0$  years. There were 29 men and 14 women. The mean baseline IOP  $\pm$  1 SD was  $28.3 \pm 5.8$  mm Hg. The mean postoperative IOP  $\pm$  1 SD after the initial trabeculectomy was  $11.9 \pm 4.3$  mm Hg, and the mean number of preoperative IOP-lowering eyedrops  $\pm$  1 SD was reduced from  $2.8 \pm 0.5$  to  $0.7 \pm 1.0$  at 7 years follow up. The qualified success rate at 7 years follow up, defined as IOP  $\leq 21$  mm Hg with/without medication(s), was 88.4%. The complete success rate at 7 years defined as IOP  $\leq 21$  mm Hg without medication was 60.7%. Two eyes developed blebitis, and one progressed to corneal decompensation after the infection. One eye had hypotony, and one eye had a traumatic ruptured bleb. Twelve eyes (27.9%) developed significant cataract. No corneal ulceration or scleral necrosis was encountered.

Trabeculectomy with a single dose of 1000 rad beta radiation used as an adjunctive measure for POAG in Chinese eyes achieved a qualified success rate of 88.4% at 7 years.

Lai JS, Poon AS, Tham CC, Lam DS. Trabeculectomy with beta radiation: long-term follow-up. *Ophthalmology* 2003;110:1822-1826.

### Interventions for Angle Closure Glaucoma

Primary angle closure is one of the leading causes of blindness in East Asia. At present, there are few clinical guidelines on the optimal treatment of acute angle closure (AAC) or primary angle closure (PAC) in the affected or contralateral eye. This study was performed to assess the interventions for treating AAC and PAC with or without glaucomatous optic neuropathy.

All randomised clinical trials, prospective controlled clinical trials, non-prospective controlled clinical trials, and retrospective case series with  $>50$  patients that evaluated treatments for AAC or PAC were included. Studies published in the English language were identified from Medline, PubMed, EMBASE, and the Cochrane Collaboration, as well as by a hand search of the reference lists of important articles.

Nine randomised clinical trials and 24 non-randomised clinical trials and large case series were evaluated. Laser peripheral iridotomy (LPI) has been found to be as effective as surgical peripheral iridectomy in randomised clinical trials of the affected and contralateral eyes of patients with AAC or PAC with or without evidence of glaucoma. In another randomised clinical trial, latanoprost was found to decrease

intraocular pressure (IOP) more than timolol for PAC in patients for whom LPI alone failed.

This review suggests that LPI should be recommended for the treatment of affected and contralateral eyes of AAC patients. In patients with PAC and insufficient treatment with LPI, latanoprost eye drops may decrease IOP more than timolol. There is still insufficient evidence about other interventions for the treatment of AAC and PAC.

Saw SM, Gazzard G, Friedman DS. Interventions for angle-closure glaucoma: an evidence-based update. *Ophthalmology* 2003;110:1869-1878.

### Association of Intraocular Pressure with Glaucomatous Optic Neuropathy

This study was performed to examine the relationship between intraocular pressure (IOP), anthropomorphic, demographic, socioeconomic, systemic, and ocular factors and glaucomatous optic neuropathy (GON) in Chinese people. 2000 Chinese people aged 40 to 79 years were selected from the Singapore electoral register. Of the 1717 people considered eligible for examination, 1232 participated, representing a response rate of 71.8%. IOP was estimated with Goldmann applanation tonometry. The drainage angle was assessed with static and dynamic gonioscopy. The optic nerve was examined at high magnification through a dilated pupil with a fundus contact lens or a +78 D lens. Static automated visual field testing was performed on subjects with suspected glaucoma. GON was diagnosed on the basis of structural and functional abnormalities of the optic nerve.

The main independent determinants of higher IOP were higher systolic blood pressure ( $p < 0.001$ ), quadrants of any peripheral anterior synechiae (PAS,  $p = 0.02$ ),



and width of the drainage angle ( $p = 0.049$ ). A 100  $\mu\text{m}$  increase in corneal thickness was associated with an increase in mean IOP of 1.5 to 1.8 mm Hg ( $p < 0.001$ ). Odds of GON increased 1.2 times per 1 mm Hg increase in screening IOP. A clear association between corneal thickness and GON was not identified.

Clinical IOP estimates are related to systolic blood pressure and corneal thickness. Variation in IOP with angle width may suggest that trabecular compaction significantly contributes to increases in IOP, independent of angle closure. GON is an IOP-related phenomenon among Chinese Singaporeans.

Foster PJ, Machin D, Wong TY, et al. Determinants of intraocular pressure and its association with glaucomatous optic neuropathy in Chinese Singaporeans: the Tanjong Pagar Study. *Invest Ophthalmol Vis Sci* 2003;44:3885-3891.

## R368H Causing Primary Congenital Glaucoma

This study investigated the predominant mutation in the CYP1B1 gene in patients in India with primary congenital glaucoma (PCG), using polymerase chain reaction (PCR)-restriction fragment length polymorphism (RFLP) methods and characterised the molecular defect in 2 generations of an affected family. DNA samples from 146 patients with PCG from 138 pedigrees were analysed for several distinct mutations in CYP1B1 by PCR-RFLP.

PCR-RFLP screening revealed that 30.8% of patients were positive for any one of the 6 mutations (376insA, 528G→A, 923C→T, 959G→A, 1449G→A, and 1514C→A), and 17.8% of the patients were found to have the rarely reported mutation R368H (1449G→A). All mutations were confirmed by DNA sequencing.

These results suggest extensive allelic heterogeneity in Indian patients with PCG, with the predominant allele being R368H

among the 146 Indian patients tested. It appears possible to use this approach for carrier detection in pedigrees with a positive family history and in population screening. The approach also offers a method for rapid screening of potential carriers and affected individuals.

Reddy AB, Panicker SG, Mandal AK, et al. Identification of R368H as a predominant CYP1B1 allele causing primary congenital glaucoma in Indian patients. *Invest Ophthalmol Vis Sci* 2003;44:4200-4203.

## Optineurin Mutation Pattern in Primary Open Angle Glaucoma

The optineurin (OPTN) gene is the second gene besides MYOC in which mutations have been identified to be associated with primary open angle glaucoma (POAG). In this study, sequence alterations in the OPTN gene associated with POAG in Chinese people were investigated. All the coding exons of OPTN were screened for sequence alterations, including the intron-exon boundaries, by polymerase chain reaction-conformation-sensitive gel electrophoresis and DNA sequencing in a group of 119 Chinese patients with POAG and 126 unrelated controls.

Sixteen sequence changes were identified: 3 had been reported (T34T, M98K, and R545Q) and 13 were novel (T49T, E103D, V148V, P199P, T202T, H486R, IVS6-5T→C, IVS6-10G→A, IVS7+24G→A, IVS8+20G→A, IVS13+21C→G, IVS15+10G→A, and IVS15-48C→A). Among these changes, only E103D, H486R, V148V, and IVS13+21C→G were found exclusively in patients with POAG, whereas P199P, T202T, and IVS8+20G→A were present only in the controls. The genotype of IVS7+24G→A showed a significant association with POAG ( $p = 0.02$ , Fisher two-tailed exact test) and with increased cup-to-disc ratio in these patients ( $p = 0.005$ , Mann-Whitney test).

The findings of this study enrich the evidence of the OPTN gene as a causative

gene for POAG and suggest a different mutation pattern of OPTN in Chinese people than in Caucasians. The wide spectrum of putative mutations detected in this study suggests that both structural and functional disruptions in OPTN may contribute to the pathogenesis of glaucoma.

Leung YF, Fan BJ, Lam DS, et al. Different optineurin mutation pattern in primary open-angle glaucoma. *Invest Ophthalmol Vis Sci* 2003;44:3880-3884.

## Risk Factors for Cataracts in a Chinese Population

This study was performed to describe risk factors for nuclear, cortical, and posterior subcapsular (PSC) cataracts in Chinese Singaporeans. A population-based cross sectional study involved ethnic Chinese men and women aged 40 to 81 years. A stratified, clustered, disproportionate (more weights to older people), random sampling procedure was used to initially select 2000 Chinese names of people aged 40 to 79 years from the 1996 electoral register in the Tanjong Pagar district in Singapore. Eligible people ( $n = 1717$ ) were invited for a standardised ocular examination and interview at a centralised clinic, following which an abbreviated examination was conducted for non-respondents in their homes. Cataract was graded clinically using the lens opacity classification system (LOCS) III. The main outcome measures were adjusted odds ratio for risk factors for specific cataract types (nuclear, cortical and PSC), any cataract, and cataract surgery, examined in multiple logistic regression models.

Of the 1232 people (71.8%) examined, 1206 (70.2%) provided lens data for this analysis. Increasing age was associated with all cataract types, any cataract, and cataract surgery. There was no significant sex difference in the presence of any

cataract, specific cataract types or cataract surgery. After controlling for age, sex, and other factors, diabetes was associated with cortical cataract (3.1; 95% confidence interval [CI], 1.6-6.1), PSC cataract (2.2; 95% CI, 1.2-4.1), any cataract (2.0; 95% CI, 0.9-4.5), and cataract surgery (2.3; 95% CI, 1.3-4.1). Lower body mass index was associated with cortical cataract (1.8; 95% CI, 1.1-2.9; lowest versus highest quintile) and any cataract (2.3; 95% CI, 1.3-4.0). Current cigarette smoking was associated with nuclear cataract (1.7, 95% CI, 1.0-2.9; more than 10 cigarettes per day versus none).

A non-professional occupation was associated with nuclear cataract (2.9; 95% CI, 1.5-5.8; for production or machine operators and 2.6; 95% CI, 1.2-5.5; for labourers or agricultural workers, both versus professionals). Lower education was associated with nuclear cataract (2.3; 95% CI, 1.0-5.2, none versus tertiary), while lower household income was associated with PSC cataract (4.7, 95% CI, 1.1-20.0; income <S\$2000 versus >S\$4000).

Age-related cataracts are associated with a variety of risk factors among Chinese people in Singapore, similar to those reported in European, Indian, and African populations. These data support common aetiological mechanisms for age-related cataracts, irrespective of ethnic origin.

Foster PJ, Wong TY, Machin D, et al. Risk factors for nuclear, cortical and posterior subcapsular cataracts in the Chinese population of Singapore: the Tanjong Pagar Survey. *Br J Ophthalmol*. 2003;87:1112-1120.

### **Myocilin Mutations in Patients with Primary Open Angle Glaucoma**



This study was performed to screen for mutations in the MYOC gene of patients with primary open angle glaucoma (POAG) in India and to better understand the mutations using a possible model of myocilin. DNA was analysed for mutations in 107 patients with POAG and 90 controls. The exonic sequences of the MYOC gene from all subjects were amplified by polymerase chain reaction (PCR). Single strand conformation polymorphism (SSCP) was performed for all the PCR products. The DNA samples that showed mobility shift in the banding pattern in SSCP gel were sequenced. The presence of the common mutation Gln368Stop was analysed using a specific restriction enzyme Taa 1. The mutations observed here and elsewhere have been mapped onto a possible model built for myocilin using a knowledge-based consensus modelling approach.

Two heterozygous mutations, Gly367Arg (1099G>A) and Thr377Met (1130C>T), were identified in exon3 of the MYOC gene of probands 40-1 and 51-1, respectively, from material obtained from the 107 unrelated patients with POAG. These two mutations were not present in the controls. A single nucleotide polymorphism (SNP), Gly122Gly (366C>T), was identified in exon1 of proband 57-1 as a non-disease causing variation. The common mutation, Gln368Stop, found in Western populations was not observed in the Indian patients with POAG screened in this study.

The possible structural model for myocilin suggests a predominantly  $\beta$ -strand rich C-terminal region (181-504), which is connected by the  $\alpha$ -helical mid-region (111-180) to the N-terminal region (34-110), which has low secondary structure content. Both the mutations, Gly367Arg and Thr377Met, identified in this study map on to the C-terminal region. These mutations disfavour burial of this region during oligomer formation due to the charged or bulky nature of the mutants. Most of the other mutations known for myocilin are also surface exposed on the C-terminal region.

These findings indicate that the mutation frequency of the MYOC gene is 2% in the Indian population affected with POAG, which is not a well-studied ethnic group on the Asian continent. The variations identified in this study have been previously reported in Western populations. The non-sense mutation, Gln368Stop, was not observed in the present study, suggesting that it may not be a common disease-causing mutation in the Indian population. Amongst other Asian populations, studies from Japan also did not report this non-sense mutation. The location of these mutations suggest that a plausible mode of action could be by disruption of dimer or oligomer formation by the C-terminal region allowing greater chances of nucleation of aggregation by the N-terminal region.

Kanagavalli J, Krishnadas SR, Pandaranayaka E, et al. Evaluation and understanding of myocilin mutations in Indian primary open angle glaucoma patients. *Mol Vis* 2003;9:606-614.



## MARCH

11-13

### **Glaucoma 2004 — 11th International Glaucoma Congress Athens, Greece**

Contact: Greek Glaucoma Society, Glaucoma Department, University Eye Clinic of Athens General Hospital "G. Gennimatas", 154 Messogion Avenue, Athens 11527, Greece  
Tel: (30 210) 779 1808/363 1658  
Fax: (30 210) 779 1808  
E-mail: eyenet@hellasnet.gr

15-19

### **21st Annual Current Concepts in Ophthalmology Vail, CO, USA**

Contact: Office of Continuing Medical Education, Johns Hopkins University School of Medicine, Turner 20, 720 Rutland Avenue, Baltimore, Maryland 21205-2195, USA  
Tel: (1 410) 955 2959  
Fax: (1 410) 955 0807  
E-mail: cmenet@jhmi.edu

## APRIL

29-2 May

### **Beijing International Glaucoma Conference 2004 Beijing, China**

Contact: Ms Lily Huang, Beijing International Glaucoma Conference 2004  
Tel: (86 1) 6524 9989 Ext 24-56  
Fax: (86 1) 6512 3754/6524 4086  
E-mail: lilyhuang@cma.org.cn

## MAY

1-5

### **2004 Annual Symposium and Congress of the American Society of Cataract and Refractive Surgery San Diego, CA, USA**

Contact: ASCRS-ASOA, 4000 Legato Road, Suite 850, Fairfax, Virginia 22033, USA  
Tel: (1 703) 591 2220  
Fax: (1 703) 591 0614  
E-mail: ascrs@ascrs.org/asoaa@asoaa.org

2-7

### **The Association for Research in Vision and Ophthalmology Annual Meeting Fort Lauderdale, FL, USA**

Contact: ARVO, Suite 250, 12300 Twinbrook Parkway, Rockville MD 20852-1606, USA  
Tel: (1 240) 221 2900  
Fax: (1 240) 221 0370

30-3 June

### **7th Congress of the European Glaucoma Society Florence, Italy**

Contact: Organizing Secretariat, OIC s.r.l. Organizzazione Internazionale Congressi Viale G Matteotti, 7 - 50121 Firenze, Italy  
Tel: (39) 555 0351  
Fax: (39) 555 528421/570227  
E-mail: registratonegs2004@oic.it

## AUGUST

26-28

### **South East Asia Glaucoma Interest Group (SEAGIG) 2004 Kuala Lumpur, Malaysia**

Contact: Ophthalmological Society of the Malaysian Medical Association, 4th Floor, MMA House, 124 Jalan Pahang, 53000 Kuala Lumpur, Malaysia  
Tel: (60 3) 4041 1375/8972  
Fax: (60 3) 4043 4444  
E-mail: mma@tm.net.my

29-3 September

### **XVI International Congress of Eye Research Sydney, NSW, Australia**

Contact: Fiona Driver, XVI International Congress of Eye Research  
Tel: (61 2) 9248 0800  
Fax: (61 2) 9248 0894  
E-mail: icer2004@tourhosts.com.au

## SEPTEMBER

9

### **Glaucoma Surgery Toronto, ON, Canada**

Contact: Continuing Education, 500 University Ave, Ste 650, Toronto, ON M5G 1V7, Canada  
Tel: (1 416) 978 2719/1-888-512-8173  
Fax: (1 416) 971 2200  
E-mail: ce.med@utoronto.ca

18-22

### **XXII Congress of the European Society of Cataract and Refractive Surgeons (ESCRS) Paris, France**

Contact: European Society of Cataract and Refractive Surgeons  
E-mail: escrs@agenda-comm.ie

## OCTOBER

23-26

### **Annual Meeting of the American Academy of Ophthalmology New Orleans, LA, USA**

Contact: American Academy of Ophthalmology, PO Box 7424, San Francisco, CA 94120-7424, USA  
Tel: (1 415) 561 8500  
Fax: (1 415) 561 8533  
E-mail: meetings@aao.org

## NOVEMBER

14-18

### **36th Annual Scientific Congress of the Royal Australian and New Zealand College of Ophthalmology (RANZCO) Melbourne, Australia**

Contact: Dr Mark McCombe, Royal Australian and New Zealand College of Ophthalmology  
Tel: (61 3) 9417 4404  
Fax: (61 3) 9417 4408  
E-mail: markmccombe@bigpond.com



# Sharper Contrast Makes the Difference



**TECNIS, with visual acuity comparable to the SI40 lens, significantly improves contrast sensitivity in low light<sup>1</sup>**

**TECNIS™** —  
the first foldable  
IOL designed to  
enhance contrast  
sensitivity  
for improved  
functional vision

Please call a Pharmacia Corporation sales representative for more information about TECNIS

Reference: 1. Mester U, Anterist N, Dillinger P. Improvement of topical and visual quality by an aspheric intraocular lens [abstract]. Presented at: DGfI Heidelberg; February 2002; Heidelberg, Germany. Abstract.



Pfizer Global Pharmaceuticals - Asia and Australia/New Zealand Region  
Suite 701, 1 Pacific Place, 88 Queensway, Hong Kong

NEW

**TECNIS™**  
*foldable lenses*

WITH Z-SHARP OPTIC TECHNOLOGY

**A Sharp Contrast in Functional Vision.**

Now in combination therapy  
for the control of elevated IOP...



A single connection  
for powerful control

# A Powerful Source of Control and Convenience

**NEW** **Xalacom**™  
Once Daily  
latanoprost/timolol maleate

XALACOM is indicated for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma and ocular hypertension who are insufficiently responsive to topical beta-blockers.

Please refer to product insert for full prescribing information



Pfizer Global Pharmaceuticals - Asia and Australia/New Zealand Region  
Suite 701, 1 Pacific Place, 88 Queensway, Hong Kong