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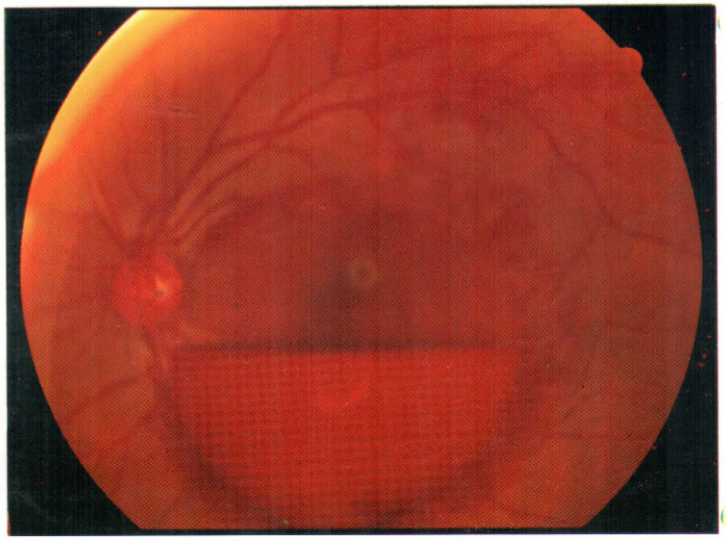

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اس دفعہ اٹھارویں ایشیا پیسیفیک اکیڈیمی آف آفتھلمالوجی کانگرس ایک حسین و دلکش شہر تائی پے-تائیوان میں منعقد ہوئی-اسمیں پاکستان کیلئے طرہِ امتیاز یہ تھا کہ صدرِ کانگرس پروفیسر محمد داؤد خان تھے-جو اس عہدہِ جلیلہ پہ محنت شاقہ سے پہنچے-انہوں نے بطریقِ احسن فرائض انجام دیئے-کانگرس علمی-ادبی-تنظیمی-سماجی الغرض ہر لحاظ سے منفرد تھی جسکے ہر پہلو میں جانا ممکن نہیں-اس میں چند فیصلے کئے گئے جو حسبِ ذیل ہیں-

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میں پہلے سنگاپور کو ہر لحاظ سے بہترین قرار دیتا تھا مگر اب تائی پے بازی لے گیا-آخر میں پروفیسران محمد داؤد خان اور محمد لطیف چوہدری صاحبان کو تہہ دل سے مبارک پیش کرتا ہوں اس درخواست کے ساتھ کہ ان پہ بھاری ذمہ داری ڈالی گئی ہے-اس میں کوتاہی نہ ہو- آمین

والسلام

ممتاز

EDITORIAL

Blindness and Diabetic Retinopathy

See also pp ...43-47

To understand the public health problem posed by diabetes we have to borrow heavily from the western experience and hope that we have arrived at the correct conclusion. Wisconsin Epidemiologic Study of Diabetic Retinopathy found that 14% of males and 20% of females who developed diabetes before age 30 were blind due to diabetic retinopathy by age 65 to 74[1]. 7% of those with maturity onset diabetes were legally blind due to diabetic retinopathy where the disease had existed for 20 years or more

Overall 12 million Americans suffer from diabetes and 700,000 have proliferative diabetic retinopathy while 500,000 have macular oedema[2]. This makes diabetic retinopathy the most common cause of blindness between age 20 and 64 years.

The population of Pakistan is 140 million. One credible study puts the prevalence of the disease at 4.6 %. Others put the rate much higher. Even at this conservative estimate we could estimate that 6.44 million Pakistanis have diabetes. There would be 370000 patients with proliferative diabetic retinopathy and 268000 would have macular oedema. A significant proportion of these would go blind due to delay or outright denial of treatment.

When I look at the Herculean task ahead of us all I find the resources at hand woefully inadequate. Our greatest enemy has been lack of awareness of Diabetic Retinopathy in the medical profession and the lay public. Most patients who are picked up either have vitreous haemorrhage or advanced macular oedema. Hardly anyone is diagnosed as a result of physician referral in an early stage of the disease. There are no screening programs anywhere in the country.

Through neglect on part of the government and lack of zeal in the Ophthalmic community most government hospitals attached to teaching institution have allowed their medical retina departments to run down. This has had far reaching consequences. The patients visiting these departments have been refused treatment and allowed to develop severe visual loss. As fewer and fewer patients have received treatment so has the awareness of the disease among the lay public declined.

Perhaps the cause that has suffered most has been that of the residents in training. If by a miracle every government teaching and district hospital as well as every doctor in private sector was to receive an Argon laser today, there would only be a handful who would be able to provide their patients proper care. Like any other surgical procedure it takes more than the ability to fire the laser to be able to treat diabetic retinopathy. We have not only lost the tools to fight the disease, but we have also forgotten know how to use those tools. We should perhaps pray for a miracle drug that will cure Diabetes Mellitus! No such miracle is round the corner.

In the meanwhile it is the responsibility of the Ophthalmic community to increase the awareness of the public about the ravages of diabetes. A campaign should be orchestrated to persuade the government that the eye departments need to be funded adequately as the disease in question causes irreversible visual loss. It is also the responsibility of everybody in the teaching profession to train the juniors if in nothing else then at least in the recognition of the various stages of the disease.

Syed Ali Haider FRCS.

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Use of Diode Laser in Diabetic Maculopathy

Aziz-ur-Rahman, Tariq M. Aziz, Jawed Hasan Niazi

Department of Ophthalmology, Jinnah Postgraduate Medical Centre, Karachi, Pakistan

ABSTRACT

A one-year prospective non-comparative study was conducted at Department of Ophthalmology, Jinnah Postgraduate Medical Center, Karachi. This study was conducted to determine the visual outcome and the effect of diode laser in treatment of diabetic maculopathy.

During this period, 1340 patients were registered and screened for diabetic maculopathy. Eighty two (6.11%) patients had diabetic maculopathy, out of which 58 eyes were selected for treatment with diode laser. Out of 58 eyes, vision in 4 eyes (6.90%) improved, 46 eyes (79.31%) remained unchanged and 3 eyes (5.17%) showed loss of 1 line and 5 eyes (8.62%) showed loss of two or more lines. At a mean period of 6 months follow-up, 49 eyes (84.49%) showed complete or partial resolution of biomicroscopically visible macular edema while 9 eyes (15.51%) developed proliferative diabetic retinopathy during the follow-up period, they had to under go additional laser treatment (panretinal photocoagulation, PRP).

The study suggests that diode laser photocoagulator, which acts by absorption within melanin of leaking retinal pigment epithelium induced closure of leaking retinal microaneurysms and is effective in the treatment of diabetic maculopathy. The prognosis is best in eyes with visual acuity 6/18 or better, with focal areas of leakage.

INTRODUCTION

The beneficial effect of photocoagulation in the treatment of focal and diffuse diabetic macular edema has been demonstrated in several clinical trials. It is proven that early laser photocoagulation either focal or grid pattern has a beneficial role in the treatment of diabetic macular edema[1]. Therefore it is mandatory to find out the best available management not only to stop progression of disease process but also to achieve visual rehabilitation. In diabetic maculopathy the type of laser used is not important, most of them have beneficial effect. The recently introduced diode laser has a number of advantages over other laser systems. There are no requirements of cooling system, does not require any special electricity supply, is compact, cheaper to maintain and has better transmission through media opacities[2]. Diode laser (wavelength 810nm) results in sufficient absorption within melanin of the retinal pigment epithelium to induce a clinically significant burn[3]. However, diode laser near infrared radiation at 810nm is not significantly absorbed by hemoglobin. On the other hand the absence of absorption within the macular pigment suggest that near infrared diode laser is an ideal for the treatment of macular disorders[2]. Maculopathy is a serious and vision threatening complication of diabetes. It may cause early impairment of central vision even though the retinopathy may not be advanced or even not clinically visible. Prevalence is approximately 9%, while 40% of these have central macular involvement[1]. A study conducted in Karachi, Pakistan showed 6.47% prevalence of maculopaty[4]. Ishaq and Rahman study at Rawalpindi showed 22.97% the prevalence of diabetic macular edema in Pakistan[5].

Maculopathy is considered the leading cause of decreased vision in patients with diabetic retinopathy. This study focuses on the management of diabetic maculopathy with diode laser.

PATIENTS AND METHODS

This study was conducted at Department of Ophthalmology, Jinnah Postgraduate Medical Center (JPMC), Karachi.

At JPMC, it is a matter of procedure that all patients who were seen and treated at diabetic clinic of JPMC, Karachi were sent to the diabetic eye clinic for screening. The vision of each patient was tested, both for distance and near with and without correction. Slit lamp examination was done for anterior segment, intraocular pressure (Applanation Tonometery) recorded and ocular movements tested. After which the patient's pupils were fully dilated and examined with direct and indirect ophthalmoscope and with 90 D lens stereoscopic biomicroscopy. Colour photographs were taken and FFA was done in a few selected patients due to limited resources.

The following was the inclusion criteria for diode laser photocoagulation.

1. Focal macular edema with and without NPDR.
2. Diffuse macular edema with and without NPDR.
3. Clinically significant macular edema.
4. Patients who did not turn up for follow-up were not included in this study.

Those cases of maculopathy which fulfilled our inclusion criteria were recruited for photocoagulation. The patients having hazy media due to corneal opacity or cataract were not included. After mydriasis volk area centralis contact lens was applied. Laser photocoagulation was usually applied in a single session. Grid laser was also performed in a single session. In mixed type, focal laser treatment was earlier than the grid laser. Photocoagulation treatment variables used were, spot size ranging from 50μm to 150μm, exposure duration of 200 milliseconds and power between 250mW and 560 mW. Any complications during photocoagulation were recorded. After completion of the procedure patients were examined after every 3rd week upto 6 months for evaluation of the effects of diode laser and assessment of vision.

RESULTS

In this study of one year, 1340 diabetic patients were screened out for diabetic maculopathy at diabetic eye clinic, JPMC.

Out of 1340 diabetic patients 96 (7.16%) were found to be IDDM and 1244 (92.84%) were found to be NIDDM. 397 (29.62%) were male and 943 (70.38%) were female. Minimum age was 8 years, maximum age was 86 years and average was 40.07 years.

Out of 1340 diabetic patients, 82 (6.11%) had maculopathy. 56 (4.17%) of these presented with non-proliferative diabetic retinopathy along with maculopathy and 26 (1.94%) presented with only maculopathy.

Out of 82 selected patients 77 i.e. 93.90% were NIDDM and 5 i.e. 6.10% were IDDM, 51 (61.20%) were female and 31(37.80%) were male. On the basis of age, diabetic maculopathy cases were divided into four groups. The largest group of 34(41.46%) belonged to 51-60 years of age group. Second major group was 41-50 years of age which constituted 25 (30.48%) patients, and patients above 60 years of age were 16(19.52%). Only 7(8.54%) were below 40 years of age.

In our study, out of 82 patients with diabetic maculopathy, 38 (46.34%) were diabetic for more than 10 years, while 29(35.36%) were suffering from diabetes for less than 5 years. 47 (57.31%) had a positive family history of diabetes whereas 35(42.69%) patients had no family history of diabetes. 24(29.26%) patients had controlled diabetes and 58 (70.74%) had uncontrolled diabetes mellitus.

Out of 156 eyes of 82 patients, 82 (52.56%) eyes were with diffuse maculopathy, 45(28.85%) eyes presented with focal maculopathy and 29(18.59%) eyes with ischaemic type of maculopthy.

During one-year period of this study 58 eyes were treated with diode laser photocoagulation.

Table-1: Treatment techniques used in maculopathy.

Technique	No. of eyes	%
Focal photocoagulation	27	46.55%
Grid photocoagulation	09	15.51%
Focal & grid photocoagulaion	22	37.94%
Total	**28**	**100%**

Visual acuity improved in 4(6.90%) eyes, remained unchanged in 46(79.31%) eyes, deteriorated by one line in 3(5.17%) eyes and deteriorated by two or more lines in 5(8.62%) eyes.

Table-2: Visual status of 58 eyes before and after diode laser photocoagulation (n=58)

VA	VA before diode laser	%	VA after diode laser	%
≥ 6/12	17	29.31	21	36.21
6/18 to 6/24	22	37.93	15	25.86
6/36 to 6/60	15	25.86	13	22.41
< 6/60	4	6.90	9	15.52
Total	**58**	**100**	**58**	**100%**

Diode laser exposure required per eye depends on the severity of the maculopthy. Minimum 16 and maximum 271 and an average of 96 laser exposure burns were applied.

During the review period of this study, there was complete or partial resolution of macular edema biomicroscopically in 49(84.48%) out of 58 eyes, 9 (15.51%) eyes had developed proliferative diabetic retinopathy (PDR). These 9 eyes had to undergo PRP for developing PDR.

Choroidal hemorrhage was noticed in 2(3.44%) eyes, pain was noticed in 2 (3.44%) eyes. There was accidental foveal burn in one (1.72%) eye and exacerbation of macular edema was observed in 2 (3.44%) eyes.

DISCUSSION

Diabetic macular edema is a leading cause of visual impairment in individuals with diabetic retinopathy, it may cause early impairment of central vison[6]. Visual loss by diabetic maculopathy is now a greater problem numerically than visual loss from proliferative diabetic retinopathy. The usefulness of laser photocoagulation for the management of diabetic macular edema has been demonstrated in several clinical trials. It is proven that early laser photocoagulation, which may be in the shape of focal or grid laser have the beneficial effect in the treatment of diabetic macular edema and decreases the chances of visual loss by approximatley 50%[7].

The early treatment diabetic retinopathy study group (ETDRS) confirms that photocoagulation is most effective if applied before there is significant foveal edema or central visual loss. ETDRS investigators use argon blue-green and argon green wave length laser for macular treatment[8]. Tunable dye laser also has been used[9]. In this study we selected diode laser for the management of diabetic macular edema. We have compared our visual results and observations with ETDRS results[8] and with another study of diode laser for diabetic macular edema on 33 eyes.

ETDRS group divided the final status into three sub groups[8].

1. Group of patients having improved visual acuity.
2. Group of patients having no change in visual acuity.
3. Group of patients having loss of 3 or more lines from the baseline.

Ulbig divided the final visual results into three sub groups[2].

1. Group of patients having improved visual acuity.
2. Group of patients having no change in visual acuity.
3. Group of patients having deterioration in visual acuity.

In our study final visual status was divided into 4 groups.

1. Group of patients having improved visual acuity.
2. Group of patients having no change in visual acuity.
3. Group of patients having loss of one line from the baseline visual acuity.
4. Patients having loss of 2 or more lines from baseline visual acuity.

Table-3: Comparison of visual status

Group	JPMC study	EDTRS[8]	Ulbig study[2]
1	6.90%	16.0%	9.09%
2	79.31%	77.0%	87.88%
3	13.79%	7.0%	3.03%

Our study shows 6.90% of eyes had improved vision, in comparison to ETDRS groups, which show 16% of eyes having improved vision[8] and

Ulbig study shows 9.09% of eyes having improved vision[2].

In this study 79.31% of eyes had unchanged visual acuity, while the ETDRS groups show 77% of eyes having unchanged vision[8] and Ulbig study shows 87.88% of eyes having unchanged vision[2].

In this study 5.17% of eyes showed loss of one line of baseline visual acuity and 8.62% of eyes having loss of baseline visual acuity of 2 or more lines. ETDRS group shows 7% of eyes having loss of baseline visual acuity of 3 or more line[8] and Ulbig shows deterioration of vision in 3.03% of eyes[2].

In our study the visual acuity improved or remained unchanged in cases who were suffering from focal maculopathy and visual acuity 6/18 or better.

Our results show that diode laser photocoagulation in macular edema is equally effective as Argon laser used in ETDRS.

So if we compare our results with ETDRS results and Ulbig results, it is evident that treatment with diode laser resulted either in no or minimal change in visual acuity over the period of 6 months follow-up.

Table-4: Comparison of resolution of macular edema

JPMC study	Ulbig study[2]	Seiler study[9]	Dastur study[10]
84.49%	81.81%	90.0%	87.1%

There was complete or partial resolution of macular edema biomicroscopically in 49(84.49%) out of 58 eyes and 9(15.51%) eyes had developed proliferative diabetic retinopathy during follow-up period. These 9 eyes had to undergo additional pan-retinal photocoagulation for developing proliferative diabetic retinopathy.

The 1995 Ulbig study with diode laser photocoagulation for diabetic macular edema shows that there was complete resolution of biomicroscopically visible retinal thickening in 27(81.81%) out of 33 treated eyes[2].

Another study with dye laser photocoagulation by Seiler shows that morphological status improved in more than 60% of eyes with focal edema but only in 40% of eyes with diffuse macular edema[9].

In yet another study with Argon laser photocoagulation by Dasture in 1994, it was seen that macular edema regresses after one year in 87.1%[10].

Our study as compared to other studies shows that diode laser photocoagulation is as effective as any other laser photocoagulation.

During the follow-up period of this study it was observed that there was no evidence of any acute laser induced effect on the micro-aneurysms, they were often still present at the two months follow-up and at this stage the exudates may have increased during the initial drying process. However after 3-4 months the exudates showed signs of regression and most of the micro-aneurysms were closed by six months.

During photocoagulation it was observed that diode laser has better transmission through retinal edema and slightly hazy vitreous.

Few complications were noticed during the treatment of diode laser photocoagulation.

In our study during diode laser photocoagulation out of 58 eyes, 4(6.89%) eyes of 3 patients felt pain, so they were treated with retrobulbar injection of xylocaine.

In one (1.72%) eye accidentally fovea was burnt and this patients had drop in visual acuity from 6/6 before laser to 6/18 at final follow-up visit.

Choroidal haemorrhage was noticed in 2 (3.44%) eyes, this was due to difficulty in proper power setting. It was observed that the appearance of diode laser burn was weaker immediately after photocoagulation, giving false impression about affectivity of laser where by examiner is tempted to increase power unnecessarily.

During the follow-up period exacerbation of macular edema was observed in 2(3.44%) eyes. In these patients the visual acuity decreased and the exudates had increased.

It was observed that the long-term efficacy of diode laser photocoagulation in the treatment of

diabetic maculopathy was more or less similar to the other lasers used for the treatment of diabetic maculopathy.

CONCLUSION

1. Diode laser photocoagulation induces the resolution of macular edema. The early focal or grid laser photocoagulation stabilizes the visual acuity and visual prognosis is best in eyes with visual acuity 6/18 or better, with focal areas of leakage.
2. Diode laser burns appearance was weaker immediately after photocoagulation. The chances of choroidal haemorrhage are more in diode laser photocoagulation because of difficulty in power setting.

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The Authors:

Aziz-ur-Rehman
MCPS, FCPS
Ophthalmologist
Department of Ophthalmology
Jinnah Postgraduate Medical Center
Karachi.

Tariq M. Aziz
FRCS, FRCOphth
Associate Professor and Head
Department of Ophthalmology
Jinnah Postgraduate Medical Center
Karachi.

Javed Hasan Niazi
FCPS
Assistant Professor
Department of Ophthalmology
Jinnah Postgraduate Medical Center
Karachi.

Address for Correspondence:

Aziz-ur-Rehman
MCPS, FCPS
Ophthalmologist
Department of Ophthalmology
Jinnah Postgraduate Medical Center
Karachi.

Role of Bifonazole in Keratomycosis

Muhammad Zafarullah, Ashraf Ali Tayyab, Tehseen Sahi, Muhammad Ijaz Kanju

Department of Ophthalmology, Nishtar Hospital, Multan

ABSTRACT

A study of 10 cases of fungal keratitis was carried out. The role of 1% Bifonazole as topical antifungal agent was studied. Dermatological preparation of Bifonazole (mycospor) was used.

The disease was more common in fifth decade of life and was more frequent in males. The condition was unilateral in 100% of cases. Trauma was the main triggering factor. Topical Bifonazole in 1% concentration was found to be an effective drug to treat the disease.

INTRODUCTION

Fungal keratitis has increased in incidence since 1950s. It is due to frequent use of topical antibiotics and steroids[1]. Association between vegetative trauma and keratomycosis is known since the first reported case of the disease[2]. The healing results in corneal opacity. At present there is inadequate supply of donor corneas in Pakistan, so that the patient remains visually handicapped for the rest of his life. The disease may be confused with bacterial keratitis, acanthamoeba keratitis and some times with viral keratitis (stromal necrotic variety). However with proper history, clinical examination and especially with the help of laboratory investigations, we can diagnose the case and can manage properly. In all cases topical bifonazole in 1% concentration was used. The drug belongs to imidazole group. It has got an active substance 1-Bisphenyl-phenyl methyl-1H imidazole. Its empirical formula is C_{22} H_{18} N_2. It has got very broad spectrum of antifungal activity.

PATIENTS AND METHODS

All the cases presenting in eye outpatient department and being suspected of fungal keratitis were subjected to laboratory investigations and only those cases were included in the study who had positive laboratory reports for fungal infection.

The following points were recorded:

1. Occupation of the patients.
2. Duration of the disease.
3. History of trauma.
4. Previous history of drug use.
5. General health of the patient.

Biomicroscopy was performed and with its help extent of the ulcer and its stromal involvement were recorded. Activity in the anterior chamber was noted. All these patients were treated in ophthalmic ward.

RESULTS

Table-1: Age distribution

Age (Yrs)	Patients	Male	Female	%
21-30	1	1	0	10
31-40	3	2	1	30
41-50	4	3	1	40
51-60	2	1	1	20

In our study, the disease was more prevalent in middle aged persons, (40%).

Table-2: Sex distribution

Sex	Number	Percentage
Male	7	70
Female	3	30

The disease was more prevalent in males than in females (Table-2). It is because males are more involved in outdoor activity and are more prone to trauma.

Table-3: Seasonal incidence

Duration	Number	Percentage
May to Oct.	6	60
Nov. to April	4	40

It was noted that disease was more prevalent from May to October. It may be due to more humidity in the environment. In Pakistan the months of July and August are rainy season and fungus grows best in hot and humid environment.

Table-4: Triggering factor

Factor	Number	Percentage
Trauma	5	50
Trachoma	2	20
Trichiasis	1	10
Unknown	2	20

Trauma was found to be responsible in 50% of cases. Trauma with vegetable matter is notorious to cause the disease.

Table-5: Occupation of the patient

Occupation	Number	Percentage
Farmer	5	50
Labourer	3	30
Old patients (No specific occupation)	2	20

The disease was more prevalent in farmers (50%). Probably the farmers are more prone to get trauma with vegetable matter. The next most common victim is labourer class (30%). It may be due to their low socioeconomic status.

Table-6: Laboratory findings

Name of fungus	Number	Percentage
Aspergillus	5	50
Fusarium	3	30
Candida	2	20

Table-7: Healing time

Number	Heating time
3	4 weeks
3	6 weeks
2	8 weeks
2	10 weeks

DISCUSSION

In our study, corneal ulcer was encountered after the second decade of life. This is different from other studies where ulceration was encountered in all ages[3]. Trauma was found to be the most common triggering factor (50%). This percentage is almost similar to other studies (52.8%). Sex distribution in male to female was in ratio of 2.3:1. It is slightly higher than that noticed by Upadhyay and associates. They had mentioned a ratio of 2:1.

The occupation of patients reflects the economic status of the patient. Almost all patients belonged to poor community of society. The patient at top of the list were farmers (50%). For treatment purpose we have used Bifonazole.

Other azole derivatives have also been used. Here they are discussed briefly. In a study miconazole was used hourly for prolonged period. It resulted in superficial punctate keratitis[4]. O'Day et al[5] quoted that fluconazole is active against some yeasts and filamentous fungi, especially Aspergillus species.

Baumann et al[5], has found topical fluconazole, as highly effective against candida species. In our study bifonazole was used in cream form and was found to be effective against most of the fungi responsible for causing keratitis.

CONCLUSION

It is found that 1% bifonazole in dermatological preparation (Mycospor) has no toxic/allergic effects on cornea or conjunctiva. Most of the common fungi are sensitive to it. When used alone ulcer takes about 4 to 10 weeks for complete healing.

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The Authors:
Muhammad Zafar Ullah
FCPS
Department of Ophthalmology
Nishtar Hospital
Multan.

Ashraf Ali Tayyab
FCPS
Department of Ophthalmology
Nishtar Hospital
Multan.

Tehseen Sahi
FCPS
Department of Ophthalmology
Nishtar Hospital
Multan.

Muhammad Ijaz Kanju
Department of Ophthalmology
Nishtar Hospital
Multan.

Address for Correspondence:
Muhammad Zafar Ullah
FCPS
Department of Ophthalmology
Nishtar Hospital
Multan.

OSP News

OSP Research Foundation

CALL FOR RESEARCH PROPOSALS FOR GRANTS-IN-AID

Applications are invited by the OSP Research Foundation for financial grants for research projects in basic and clinical aspects, Corneal disease, glaucoma and Eales' disease being quite common in Pakistan are the suggested topics. Ocular complications of diabetes, retinitis pigmentosa and cataracts may be some other topics of research. The applicants are requested to submit, in triplicate a synopsis of the research plan, along with a description of the existing infrastructure and other resources to carry out the project, to:

Prof. Ziauddin Sheikh
Dow Medical College
Karachi.

Etiology of Retinal Artery Occlusions in Adolescence

A. Osman Saatci, Zeynep Özbek, Işıl Saatci, Salih Kavukçu , Gül Sağın Saylam

Departments of Ophthalmology and Paediatrics, Department of Neuroradiology, Dokuz Eylül University zmir, Turkey.

ABSTRACT

We reviewed the records of 53 consecutive patients with various types of retinal artery occlusion examined between December 1993 and May 2000. Four of 53 cases (7.5 %) were in adolescence period . While two of those had cardiac abnormalities, one had neurofibromatosis type I and one had systemic non-Hodgkin's lymphoma. In two patients, the systemic disorder was diagnosed during systemic screening after the detection of retinal artery occlusion.

A thorough systemic evaluation is mandatory in adolescent patients with any type of retinal artery occlusion.

INTRODUCTION

Youngsters with retinal artery occlusion have unusual systemic or ocular associations such as trauma, sickle cell hemoglobinopathies, other hematologic disturbances, cardiac disorders, systemic lupus erythematosus, intravenous drug use, varicella infection and systemic lymphoma[1-5]. We carried out a retrospective study in order to investigate the etiology in adolescent patients with retinal artery occlusions.

MATERIALS AND METHODS

A chart review of consecutive patients with various types of retinal artery occlusion examined between December 1993 and May 2000 were conducted. All patients underwent complete ophthalmic examination. Systemic examinations with pertinent laboratory and radiologic investigations were performed in collaboration with several other departments.

RESULTS

Four of 53 cases (7.5 %) with various types of retinal artery occlusion were in adolescence period. In all four cases, we were able to detect an underlying systemic disorder. Characteristics of the patients were summarized in Table-1. In two cases, the systemic disorder was diagnosed prior to retinal artery occlusion and in the remaining two, systemic screening revealed the underlying systemic disease. Case 1 and 2 were reported separately in detail previously[6,7].

DISCUSSION

Etiologic aspects of retinal artery occlusion in young patients still remain relatively obscure in contrast to elderly patients with retinal artery occlusion. Brown and his colleagues[1] studied the records of 338 patients examined between 1967 and 1979 at Wills Eye Hospital and identified only six patients in pediatric ages (1.8%). Four had unilateral central retinal artery occlusion and two had unilateral branch retinal artery occlusion. In three of these six cases, no systemic abnormality could be detected. Various hematologic disturbances were present in the remaining three patients (one with hemoglobin SS, one with hemoglobin AS and one with increased factor VIII activity, decreased PT and PTT). Axer Siegel et al[8] described a 40-day-old female neonate with bilateral ophthalmic artery occlusion precipitated by hypotension and diffuse intravascular coagulation due to sepsis. Very recently, Talman et al[9] reported a 9-year-old girl with unilateral branch retinal artery occlusion caused by a combination of factor V Leiden and thermolabile methylene tetrahydrofolate reductase homozygosity and they strongly advised thorough evaluation of thrombophilia in children with retinal artery occlusion.

Cardiac disorders have been well-recognised as an etiologic factor in young patients with retinal artery occlusion. Cardiac problems were detected in two of our cases in which probable thromboembolic etiology may be suggested.

Table-1: Characteristics of patients under 18 years of age with retinal artery occlusion

Age (Years)	Gender	Involved eye	Initial visual acuity	Type of retinal artery occlusion	Type of systemic disorder	Detection of underlying systemic disorder
14	Male[6]	Left	No light Perception	Combined central retinal artery and vein occlusion	Non Hodgkin's lymphoma	Prior to occlusion
15	Male[7]	Left	No light perception	Ophthalmic artery occlusion	Neurofibromatosis type I	After occlusion
16	Female[7]	Left	20/200	Cilioretinal artery occlusion	Mitral regurgitation	After occlusion
17	Female	Left	20/25	Central retinal artery occlusion with patent cilioretinal artery	Mitral stenosis	Prior occlusion

However, there is little information in literature about the prevalance of cardiac problems in pediatric patients with retinal artery occlusion. Sharma et al[5] reviewed the records of 243 consecutive patients with retinal artery occlusion between 1980 and 1995 at four tertiary North American hospital centers. Only 11 patients were under 45 years of age but none was under 21. Five of 11 patients had heart disease documented by transthoracic echocardiography.

Unilateral retinal artery occlusion has been reported in childhood following Varicella infection[2,3]. The most likely cause was arterial vasculitis analogous to that seen in adults with varicella-zoster retinitis.

Retinal artery occlusion may be caused by systemic non- Hodgkin's lymphoma such as in our case 1[6]. It may be caused by the compression of the retinal artery by lymphomatous infiltration of optic nerve head, direct periarterial tumor infiltration, paraneoplastic hypercoagulability and septic emboli if septicemia is present[4,6].

Our case 2 had neurofibromatosis type I diagnosed with the presence of large and multiple cafe-au-lait spots over the trunk, axillary freckling and brain MRI changes consistent with hamartomas[7]. Unilateral ophthalmic artery occlusion in this case may be attributed to growth of Schwann cells and dysplasia of arteriolar smooth muscle cells leading to vascular lumen occlusion[10].

Despite various systemic diseases stated above, retinal artery occlusion in childhood may be rarely idiopathic in origin. Recently, Sebban and associates[11] described a 11-year-old healthy girl with unilateral branch retinal artery occlusion but no systemic abnormality could be evaluated despite meticulous systemic work-up

Four of our 53 cases (7.5 %) with various types of retinal artery occlusion were in adolescence period. In light of our study, pediatricians and ophthalmologists should be aware of the serious underlying diseases in pediatric and adolescent cases with retinal artery occlusion and collaborate in further work-up.

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The Authors:

A. Osman Saatci
Professor
Department of Ophthalmology
Dokuz Eylül University
İzmir, Turkey.

Zeyneo Özbek
Fellow
Department of Ophthalmology
Dokuz Eylül University
İzmir, Turkey.

Işıl Saatci
Associate Professor
Department of Neuroradiology
Hacettepe University
Ankara, Turkey.

Salih Kavukçu
Professor
Department of Pediatrics
Dokuz Eylül University
İzmir, Turkey.

Gül Sağın Saylam
Associate Professor
Department of Pediatrics
Dokuz Eylül University
İzmir, Turkey.

Address for Correspondence:

A. Osman Saatci
Mithatpaşa cad. 91/7
Balçova 35330
İzmir, Turkey
E-mail: o.saatci@unimedya.net.tr

Laser Peripheral Iridectomy for Pupillary Block Glaucoma in Thick Brown Irides

P.S. Mahar

Division of Ophthalmology, Department of Surgery, The Aga Khan University Hospital, Karachi

ABSTRACT

Sixty-three eyes of 39 patients with dark brown irides had laser peripheral iridotomy carried out using combined argon and Nd-yag technique, with various forms of pupillary block glaucomas. A total of 21 female and 18 male patients were followed up from 3 months to 4 years. All patients had successful outcome with patent iridotomy. Only 2 patients required extra laser treatment. Blurred vision, raised intraocular pressure and anterior uveitis were seen after the laser treatment. These complications however were found to be of transient nature, with all patients settling down during first week of their treatment.

Laser peripheral iridectomy is an effective and safe alternative to surgical iridectomy and could be easily performed in our local population with heavily pigmented irides.

INTRODUCTION

Von graefe suggested the use of surgical iridectomy as an effective treatment for glaucoma in 1857[1]. Hundred years afterwards in 1956, Meyer-Schwikerath reported the first iridectomy in the human eye, using xenon arc photocoagulator[2]. High incidence of corneal and lenticular burns however limited its further use. In 1973 Beckman and Sugar carried out peripheral iridectomy using argon laser[3]. The laser peripheral iridotomy (LPI) gained increasing popularity in the early 1980s due to introduction of Abraham iridotomy lens and improvement in the laser technique and safety. The Neodymium yag (Nd-yag) was successfully used by Robin and Pollock in 1984 creating an iridotomy in non-pigmented human eyes .

The argon laser creates an iridotomy through a thermal effect, depending on heat absorption by melanin present in the iris tissue. The Nd-yag laser creates an iridotomy through an electro mechanical photodisruption.

LPI is presently the treatment of choice for most forms of pupillary block glaucoma. Although argon laser is widely used for such procedure, there are few eyes in which argon laser is incapable of penetrating the iris. These eyes are with extremely shallow anterior chambers resulting in corneal burns, light blue irides containing little pigment showing suboptimal tissue absorption of laser energy and eyes with thick dark brown irides in which laser energy fails to penetrate through, with charring effect which further inhibits the uptake of laser energy.

Our earlier experience using argon laser in local population having thick dark brown irides has been disappointing. We report here a prospective study using Q switched Nd-yag and argon laser in creating iridectomy in various forms of pupillary block glaucoma.

SUBJECTS AND METHODS

Sixty-three eyes of 39 patients having various forms of pupillary block glaucoma were treated for LPI using combined argon and Nd-yag laser technique.

Each patient gave informed consent. Prior to laser therapy, each eye was treated with one drop of Pilocarpine 4% and one drop of Apraclonidine (lopidine-Alcon). Once Apraclonidine was not available a drop of Betaxolol (Betoptic- Alcon) was used. After instillation of topical anesthesia, Abraham contact lens was placed on the eye (Fig. 1 & 2) and patient was positioned on the slit-lamp. Patients were treated with argon laser first. The preferred site for LPI was between 10 to 2'O clock

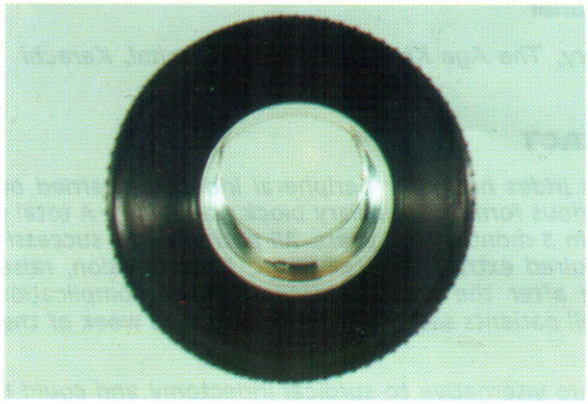

Fig.1:

Fig.2:

position as peripherally as possible in clear cornea. Area near arcus senilis was avoided as it dissipates the laser energy. Beam of laser was focussed slightly obliquely over the chosen site, and not perpendicular to the iris, as once through, laser can hit the macular area inadvertently over the temporal side. The argon laser settings used were spot size of 50 microns, power at I watt and time duration of 0.05 seconds. A total of 75 to 100 applications were given. The argon energy cauterizes the iris creating partial thickness burns. Patients were then switched to Nd-yag laser, with Abraham lens in the eye, which usually does not fall off. With HeNe spot size fixed at 25 microns, power setting was turned to 4.5 millijoules. Using single pulse energy, on the average 6-10 applications were applied to the argon treated area (Table-1). Visibility of the lens capsule is taken as the end point (Fig.3). Patency of the iridotomy is confirmed by retro-illumination, (Fig.4) deepening of anterior chamber and widening of angle on gonioscopic examination. Extra energy may be required to enlarge the iridotomy size. There is usually no bleeding at the iridotomy site but couple of patient did show micro bleeding which was stopped immediately by applying firm pressure with the contact lens. Once procedure was completed, one drop of Dexamethasone 0.1% (Maxidex-Alcon) and one drop of Apraclonidine (lopidine-Alcon) was instilled in the treated eye. All patients' intraocular pressure was monitored at one-hour time and later on they were discharged home to use a drop of Dexamethasone 0.1% (Maxidex-Alcon) 4 times a day and a drop of Betaxolol (Betoptic-Alcon) twice a day. In case of unduly high intraocular pressure, Acetazolamide tablets were added. Patients were scheduled for visits at 1 day, 1 week and 1 month subsequently. 63 eyes of 39 patients were treated with LPI (Table-2).

Fig.3:

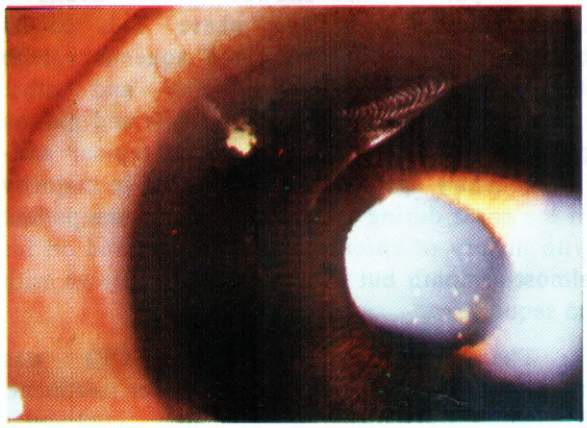

Fig.4:

Fifteen patients (30 eyes) had history of seeing haloes with one or both eyes associated with headache. They were diagnosed having intermittent or subacute attacks of angle closure glaucoma. Some of these patients showed high intraocular pressure in emergency room at the time of presentation while some were confirmed after provocative tests along with gonioscopic examination.

Eight patients (8 eyes) had previous attacks of angle closure glaucoma treated somewhere else with surgical peripheral iridectomy. These patients were using pilocarpine drops several times a day in the non-effected eyes on prophylactic basis. They happily opted for LPI to get rid of their medication.

Table-1: Combined argon and Nd-yag Technique.

Argon	Spot Size	50 microns
	Power	1 W
	Duration	0.05 Sec.
	Applications	75-100
Nd-Yag	Spot-size (HeNe)	25 microns
	Power	4.5 mJ (single pulse)
	Applications	6-10

Table-2: Characteristics of treated patients

Glaucoma type	No. of Patients	No. of eyes
IACG	15	30
Prophylactic (2nd eye)	8	8
Secondary □apillary block (uveitis)	5	5
CACG	4	8
AACG	3	6
Secondary pupillry block (Ac-IOL)	2	2
Partial thickness PI (Laser)	1	2
Partial thickness PI (surgical)	1	2
Total	**39**	**63**

IACG = Intermittent angle closure glaucoma
CACG = Chronic angle closure glaucoma
AACG = Acute angle closure glaucoma

Table-3: Indications for laser peripheral iridectomy

- Intermittent or sub-acute angle closure glaucoma
- Acute angle closure glaucoma
- Chronic angle closure glaucoma
- Mixed or combined mechanism glaucoma
- Aphakic or pseudophakic pupillary block
- Before laser trabeculoplasty
- Partial thickness surgical iridectomy
- Prophylactic iridotomy
- Nanophthalmos

Five patients (5 eyes) presented with secondary pupillary block due to uveitis causing 360 degrees of posterior synechie formation. Their intraocular pressure settled down with LPI.

Four patients (8 eyes) had chronic angle closure glaucoma diagnosed with raised intraocular pressure, cupping and extremely narrow angles. Irido corneal block was successfully relieved with LPI.

Three patients (6 eyes) were seen with acute attack of angle closure glaucoma. Once their eyes were stabilized medically, LPI was carried out on both of their eyes.

Two patients (2 eyes) had secondary pupillary block due to anterior chamber intraocular lens implants. They did not have any periphal iridectomy carried out during the surgical procedure. Their block was successfully relieved with laser treatment.

One patient (2 eyes) with history of intermittent attacks of angle closure glaucoma had LPI carried out with argon laser somewhere else. Argon laser however achieved only partial thickness burns to the iris (Fig.5). These were successfully converted into fill thickness holes by applying extra bursts of Nd-yag energy. One patient (2 eyes) with history of intermittent attacks of angle closure glaucoma had surgical peripheral iridectomy carried out on both of her eyes. She had thick dark brown irides with layer of pigment epithelium still intact in her iridectomy site. This was successfully converted into full thickness iridectomy with additional laser treatment.

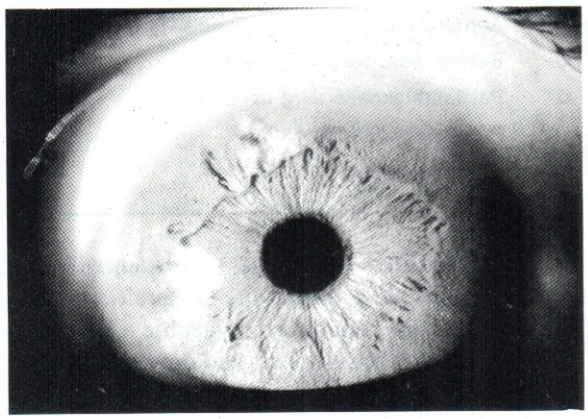

Fig.5:

Our patients' age was between 43 to 71 years (mean 57 years). Twenty-one patients were females and 18 were males. Their follow up ranged between 3 months to 4 years.

RESULTS

The laser procedure was well tolerated with full thickness penetration of iris in all cases. All patients however experienced blurred vision in the treated eye soon after the procedure. This was due to contact lens liquid coating the cornea and release of tissue debris due to photodisruption. Blurring of the vision is a transient process and usually settles down within a day or two with the use of topical anti-inflammatory medication.

All patients also showed anterior uvetis in the immediate post laser phase. This occurs because of disruption of blood aqueous barrier with release of prostaglandins and other inflammatory mediators causing cells and plasma pouring out of iris vessels. With topical anti-inflammatory agent this settled down in majority of the cases during the first week. In one patient with history of chronic uveitis, it lingered on for almost a month but eventually settled down with no sequelae.

The intraocular pressure (IOP) was monitored about an hour after the laser treatment. 27 patients (69%) showed their intraocular pressure between 20-30mmHg. Patients, having their IOP over 20mmHg were prescribed anti-glaucoma medication before discharging them home. All patients had their intraocular pressure re-checked at 1 day interval showing it to settle down within normal limits.

Closure of iridotomy site was seen in 2 patients. The first patient had history of chronic uvetis with complicated cataract and 360 degrees of posterior synechie formation. Although the iridotomy appeared open, patient's intraocular pressure was increased at 2 weeks time after the laser treatment. Extra Nd-yag energy was applied to enlarge the size of iridotomy. Intraocular pressure settled down but rose again after another couple of weeks interval. Cause of raised pressure was thought to be due to formation of posterior synechie between iridotomy site and the lens. The iridotomy was further enlarged and since then the intraocular pressure has remained under control. The second patient with history of acute attack of angle closure glaucoma had his iridotomy site closed at 4 weeks time from the initial laser treatment. With a couple of extra bursts of Nd-yag at 4.5mj, iridotomy was further enlarged which remained patent after wards.

DISCUSSION

LPI is a safe and preferred alternative to the conventional surgical iridectomy. It is the choice

of treatment for all types of pupillary block glaucoma. The conditions where LPI is performed include acute angle closure glaucoma, chronic angle closure, mixed or combined mechanism glaucoma and Aphakic or pseudophakic pupillary block glaucoma. It is carried out on prophylatic basis in the second eye of patient with acute attack of angle closure glaucoma, before performing laser trabeculoplasty with the narrow angle, in nanophthalmos and in eyes with partial thickness surgical iridectomy (Table-3).

Presence of corneal edema, corneal opacification and shallow anterior chamber make this procedure extremely hazardous to perform.

Laser contact lenses with their antireflective coating facilitate the procedure. These lenses keep the lids separated and reduce the eye movements. They also focus the laser beam anteriorly over the iris and defocussing it behind the iris plane. The gonio liquid acts as a sink to absorb the extra heat. The Abraham lens consists of a fundus lens with + 66 diopter planoconvex lens button placed on its anterior surface. The button provides magnification without loss of depth of focus. The Wise lens is similar but has a + 103 diopter button allowing even greater concentration of laser energy.

Topical anesthesia is all that is required to perform the procedure obviating the need for any local block.

Small-constricted pupil is mandatory for achieving a successful outcome. More dilated the pupil, thicker the iris stroma, and this necessitates more energy for complete penetration.

It has been shown that use of topical aparaclonidine prevents the sharp increase in the intraocular pressure induced by laser energy[5,6].

Blurred vision and anterior uveitis are the common complications seen in our patients after the laser treatment. The blurred vision is of transient nature, with possible causes including retinal pigment bleaching, pigment dispersion, anterior segment inflammation and methylcellulose from the gonioscopy solution. The anterior uveitis is usually mild and disappears within a few days with the use of topical anti-inflammatory agents. It is mediated by prostaglandins and occurs due to the break down in the blood- aqueous barrier. The break down again is of short term as iris angiography in humans, 6 months after the laser treatment has failed to demonstrate any long-term effect.

Other complications shown in different series include pupillary peaking when iridotomy site is near the pupil, diplopia and glare when iridotomy is performed more horizontally in palpebral fissure rather than superiorly[7].

Corneal complications include epithelial and endothelial burns which occur frequently when iridotomy is performed in shallow anterior chamber[8].

Bleeding from the iridotomy site is rare with combined argon and Nd-yag technique. However micro bleeding has been seen in some patients. This can be stopped by applying gentle pressure with the contact lens.

The most common long-term complication of conventional surgical iridectomy is cataract formation. Although focal anterior subcapsular lens opacities have been shown to occur with argon and Nd-yag iridotomy, most of these changes are found to be non progressive in nature[9].

Apart from two patients requiring extra treatment, all of our patients showed patent iridotomies throughout their follow up. The incidence of closure of iridotomy site is rare with combined laser technique. With argon laser, almost one third of the patients require re-treatment as pigment poliferation occludes the iridotomy opening. On the other hand, patients treated with Nd-yag, 15% of cases require more treatment because of iridotomy closures[10].

Although incidence of retinal burns is less with the use of the contact lens[11], inadvertent foveal photocoagulation has been reported[12]. This signifies proper positioning of the laser beam with iridotomy preferably carried out on nasal side avoiding the temporal position of macular area.

Laser peripheral iridotomy is a non-invasive procedure. It avoids all the potential complications associated with the local block ranging from retrobulbar haemorrhage to ocular perforation. It also prevents such dreadful complication such as endophthalmitis associated

with incisional surgery. The laser procedure is cost effective as no aseptic precautions and operating room facilities are required. With the present technique, one should be able to achieve virtually 100% success rate at perforating through the iris.

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The Author:
P.S. Mahar
FRCS, DO, FRCOphth
Consultant Ophthalmic Surgeon
Division of Ophthalmology
Department of Surgery
The Aga Khan University Hospital
Karachi.

Address for Correspondence:
P.S. Mahar
FRCS, DO, FRCOphth
Consultant Ophthalmic Surgeon
Division of Ophthalmology
Department of Surgery
The Aga Khan University Hospital
Karachi.

Indications and Results of DCR with Silicon Tube Intubations

Raj Kumar Advani, Faiz Mohammad Halepota, Syed Imtiaz Ali Shah, Wasif M. Kadri

Departments of Ophthalmology Chandka Medical College, Larkana, Liaquat Medical College, Jamshoro and Punjab Postgraduate Medical Institute, Lahore

ABSTRACT

This prospective study was conducted at Chandka Medical College Hospital from May 1998 to April 2000. A total of forty procedures were performed on 34 females and 6 male patients. The study was conducted to evaluate the efficacy of external dacryocystorhinostomy (DCR) with silicon tube intubation in selected cases.

The diagnoses was done on the basis of regurgitation, syringing, probing, lacrimal scintilography and dacryocystography (in few selected cases).

In all cases standard surgical procedure was done by anastomosing anterior and posterior sac flaps to the respective nasal mucosal flaps in ninteen cases, only anterior lacrimal sac flap and respective nasal flaps in nineteen cases and anterior sac flap to periosteum at the anterior bony margin in two cases. The silicon tube was kept in place for six months except in one case where it was for four months, she was intolerant to it and rest tolerated it well. The patients were followed-up for another period of six months more after tube removal. Out of forty, 38 procedures (95%) were successful. Success was judged by relief of epiphora and positive Jones Dye test I. The two failed cases (5%) lost tube in early post-operative period.

INTRODUCTION

Lacrimal sac and/or nasolacrimal system obstruction causes an annoying epiphora and some times an eye threatening problem, which affects patients of all ages. The obstruction may be idiopathic, inflammatory stenosis, primary inflammation, neoplasm, traumatic, or mechanical obstruction[4]. It may be congenital due to failure of nasolacrimal duct to open into the inferior meatus.

Primary obstruction of nasolacrimal duct results in stagnation of tears and bacterial infection. The initial treatment of congenital obstruction is hydrostatic massage and topical antibiotics. If it fails to canalize spontaneously by the age of one year then probing/syringing is required. In case of failed probing, they are treated with closed silicon tube intubation of lacrimal drainage system or DCR at the age of 4 years.

A French Adeo Toti first performed external DCR in 1904[9]. Dupuy Dutemp and Bourget (1921) in Germany modified Toti technique by dissecting anterior and posterior nasal mucosal flaps and lacrimal sac flaps and suturing the respective flaps. Gibbs[3] used silicon tube with probe, which is a softer material, non-irritant and does not ride-up over the cornea. Now-a-days a curved Bodkins type probe attached to silicon tube is used. Older[6] and Shun Shin and Thurairajan[9] advocated the use of silicon tube intubation with external DCR.

The aim of DCR surgery is to make a fistula between the lacrimal sac and nasal cavity for flow of tears through this newly created fistula, which in turn keeps the patient symptoms free.

MATERIALS AND METHODS

This study was conduced from May 1998 to April 2000 at Chandka Medical College Hospital, Larkana. Patients with complaints of epiphora and/or positive regurgitation were included in this study. The patients were evaluated by:

1. History of epiphora
2. Regurgitation
3. Jones dye test
4. Diagnostic probing and syringing
5. Nasal examination
6. Dacryocystography where canaliculi were patent.
7. Lacrimal scintillography

All cases were operated under local anaesthesia (infiltration of Abocain and Xylocaine with adernaline, 1:1), except two cases, one child of 4 years and other non-co-operative young female, who were operated under general anaesthesia. In all cases nasal packing was done (soaked in a mixture of Xylocaine 4% and three drops of adernaline 1/1000), an hour before surgery.

In all cases the standard surgical procedure was adopted to make mucosal lined channel between the lacrimal sac and nasal cavity to facilitate the flow of tears to nasal cavity. Except in two cases (Previously DCT done), where large anterior flap was made and sutured with remaining anterior sac stump, while posterior flaps were excised. Intubation was done by using Bodkins curved probes mounted on silicon tube (made by Visitec, USA). In repeat operation cases (DCT and failed DCR) and cases with extensive continuous bleeding not allowing proper suturing of posterior nasal and lacrimal sac flaps, only anterior lacrimal sac and nasal mucosal flaps were sutured (In nineteen cases only anterior flaps were sutured) while posterior flaps were excised. Where nasal mucosa was friable, we sutured the anterior sac flap with periosteum at the anterior edge of bony window.

Patients were discharged on the next day with the topical and systemic antibiotics. Skin sutures were removed after one week. The tube was manipulated at monthly intervals to avoid epithelial adhesions and removed after six months. Patients were followed for six months after tube removal. The successful patients were symptom free with positive Jones Dye test and failed cases were marked by recurrence of symptoms as well as negative Jones Dye test.

Table-1: Indications for silicon tube intubation

Cause	No. of cases
Common canalicular obstruction	15
Severe bleeding	5
Lower canalicular obstruction	2
Punctal + lower canalicular obstruction	1
Lower + common canalicular obstruction	3
Failed DCR	6
DCT done previously	2
Child	1
Fibrosed sac	2
Friable nasal mucosa	2
Traumatic	1

RESULTS

Results are shown in tables 2-7.

Table-2: Sex ratio

Sex	No. of cases	Percentage
Female	34	85.0
Male	6	15.0

Table-3: Economic condition

Socioeconomic condition	No.	%
Very poor	5	12.5
Poor group	29	72.5
Lower middle group	2	5.0
Higher middle group	4	10.0

Table-4: Laterality

Involved Side	No.	%
Right	23	57.5
Left	15	37.5
Bilateral	2	5.0

Table-5: Intra-operative complications

Complications	No. of cases
Bleeding from angular vein	5
Bleeding from nasal mucosa	16
Ethmoid sinus exposure	3
Nasal mucosal tear	3
Friable nasal mucosa	2

Table-6: Postoperative complications

Complications	No. of cases
Scar/keloid formation	5
Lacrimal fistula formation	1
Conjunctival irritation by the tube	10
Tube removal	2
Tube intolerance	1
Pus discharge/sump syndrome	2
Tube displacement	1

Table-7: Results of surgery

Results	No. of cases	Percentage
Success	38	95.0
Failure	2	5.0
Total	40	100

DISCUSSION

The aim of DCR surgery with silicon tube intubation is to make a bypass communication between lacrimal sac and nose. Silicon stents prevent closure or stenosis and help in epithelization of newly formed tract in complicated cases. The results of present study are comparable with other authors 90%[8] , 87%[1], 94.7%[5], 97.6%[2], and 95%[7].

Because of the periosteal proliferation, fibrosis formation, adhesions, stricture and injury to canaliculi during routine procedure and subsequent healing results in closure of newly made passage[5]. In order to prevent this sequence of events, silicon tube intubation for more than three months maintains patency by canalization[5] and gives excellent results.

In our study, we obtained successful results in 38 cases (95%), while two cases (5%) failed (in both cases tube was lost in early post-operative period).

The tube was well tolerated except in one patient where it was removed at the end of four month period. Ten patients complained of conjuctival irritation and red eye. These patients required re-assurance and lubricant drops were added to topical antibiotic regimes. One case of lateral displacement of tube was corrected surgically. Excessive scaring and keloid tendency was seen in 5 cases. Injection Triamcinolone (Kenacort) 20mg was injected locally under the scar tissue to prevent further growth and to improve cosmetic appearance.

CONCLUSION

The external DCR with silicon tube intubation is a procedure with highly successful patency. The only cosmetic problem is visible scar, which has been reduced with improved suture material and by subcuticular sutures. Irritation/discomfort by tube is well tolerated by the patients with the passage of time.

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The Authors:

Raj Kumar
D.O
Department of Ophthalmology
Chandka Medical College Hospital
Larkana.

Faiz Mohammad Halepota
D.O (Ireland) FCPS
Professor
Department of Ophthalmology
Liaquat Medical College
Jamshoro.
Syed Imtiaz Ali Shah
FCPS
Professor
Department of Ophthalmology
Chandka Medical College Hospital
Larkana.

Wasif M. Kadri
DO, FRCS, FRCO, FCPS
Professor
Department of Ophthalmology
Punjab Postgraduate Medical Institute
Lahore.

Address for Correspondence:

Raj Kumar
1403/C Sagar Eye Clinic
Nawa Tak Mohalla
Larkana.

Treatment of Macular Sub-Hyaloid or Sub Internal Limiting Membrane Haemorrhage by Nd:Yag Laser

Nafis-ur-Rahman

Vision Care Centre, 5-C Markaz I-9, Islamabad

ABSTRACT

Sub hyaloid or sub internal limiting membrane haemorrhage has been associated with several conditions e.g. age related macular degeneration, proliferative diabetic retinopathy, valsalva retinopathy, macroaneurysms and trauma. This case report is about a healthy patient who developed macular sub hyaloid/sub internal limiting membrane haemorrhage in his left eye without any obvious reason which dropped his visual acuity to 5/60. Early treatment with Nd:Yag laser resulted in dramatic improvement in visual acuity to 6/6 unaided.

CASE REPORT

A 28-year-old otherwise healthy male presented with a sudden decrease of vision in his left eye of one-day duration. There was no history of trauma, diabetes mellitus, hypertension or valsalva maneuver. He was not on any medications. His eyesight had previously been good. On examination the visual acuity in his right eye was 6/6 while the visual acuity in the left eye was reduced to 5/60, which could not be improved with glasses. A dilated fundus examination revealed a normal right fundus and a left macular sub hyaloid /sub internal limiting membrane haemorrhage (Fig.1). The intraocular pressures were 14mmHg in both eyes. Blood tests including complete blood cell counts, platelet count, blood glucose and bleeding and clotting times were normal.

The patient was treated with Nd:Yag laser aimed at the anterior surface of the preretinal haemorrhage using a fundus contact lens and a pulse of 1.3mJ and increasing it gradually. Two small openings were created in the posterior hyaloid at 2.9mJ with blood flowing into the vitreous cavity. (Fig.2). One hour after treatment the visual acuity had improved to 6/36 and 24 hours after laser treatment the visual acuity had improved to 6/6 unaided (Fig.3). No pathologic condition was detected once the haemorrhage had cleared. The site of bleeding could not be identified.

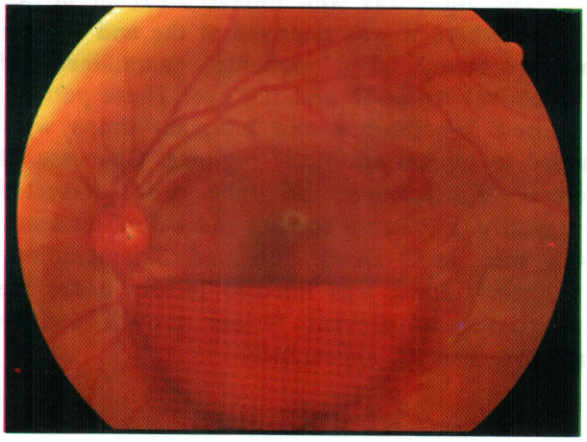

Fig.1:

DISCUSSION

Sub hyaloid or sub internal limiting membrane haemorrhage has been associated with several diseases e.g. proliferative diabetic retinopathy, macroaneurysms, age related macular degeneration, trauma, Valsalva maneuver and posterior vitreous detachment. Treatment consists of either surgical removal or Nd:Yag laser treatment. Nd:Yag laser is a non-surgical technique and shortens the recovery time while avoiding the complications associated with surgical drainage.

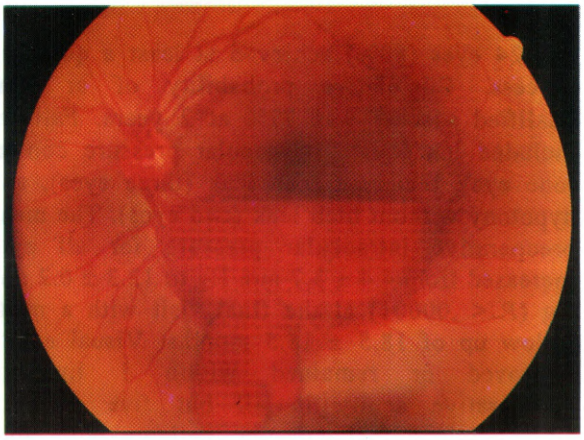

Fig.2:

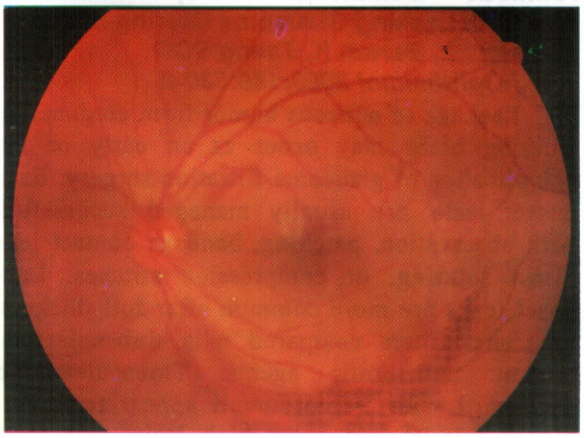

Fig.3:

This patient had no underlying pathology and none was visible once the haemorrhage cleared. Nd:Yag laser provides an alternate safe method of internal drainage in the management of macular sub hyaloid / sub internal limiting membrane haemorrhages.

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The Author:

Nafis-ur-Rahman
DO, FRCS, FRC Ophthalmology
Vision Care Centre
5-C Markaz I-9
Islamabad.

Address for Correspondence:

Nafis-ur-Rahman
DO, FRCS, FRC Ophthalmology
Vision Care Centre
5-C Markaz I-9
Islamabad.

Abstracts

Edited by Tahir Mahmood

Revision of Dysfunctional filtering Blebs by conjunctival Advancement With Bleb Preservation

Catoira Y, Wudunn D, Cantor LB
Am J Ophthalmol 2000;130:574-9

Cohen and associates proposed classifying dysfunctional filtering blebs into three basic categories: under filtration, over filtration, and excessive size or dissection onto the cornea. They observed that the over filtering bleb is usually cystic and sharply delineated by fibrous adhesions, which may limit the aqueous filtration and leave the thin stretched conjunctiva predisposed to leaks. With the advent of mintomycin C, hypotony resulting from over filtration or bleb leak have become common complications of trabeculectomy. Hypotony maculopathy and late bleb leaks are the most common indications for reoperation after trabeculectomy. The best surgical approach to revise these dysfunctional blebs is still unclear. Various surgical approaches have been reported with varying degrees of success.

The purpose of this study was to assess the outcome of advancing a conjunctival flap with preservation of the bleb in eyes undergoing filtration bleb revision after trabeculectomy.

A retrospective review of cases from a university-based referral practice identified 30 eyes of 30 patients that had undergone bleb revision after trabeculectomy by advancement of a conjunctival flap over the de-epithelialized bleb. Success was defined as resolution of the bleb-associated complication necessitating the revision (leak, hypotony, discomfort) with maintenance of intraocular pressure greater than or equal to 6 and less than or equal to 21 mm Hg without glaucoma medications. Qualified success met the above criteria but with the use of glaucoma medications.

On the 30 eyes, 30 conjunctival advancement procedures were performed. Seventeen were for bleb leaks, 10 for prolonged hypotony without bleb leak and three for dysesthetic bleb. Eighteen eyes (60%) were classified as a complete success and 24 eyes (80%) achieved at least a qualified success. Cumulative probability of at least qualified success was 77% at 2 years. Failures included inadequate intraocular pressure control (one eye), recurrent bleb leak (three eyes), and hypotony without bleb leak (two eyes). The mean preoperative intraocular pressure for all eyes increased from 4.4 ± 3.7 mm Hg to 12.3 ± 6.2 mm Hg ($P < .00001$) at the final visit with a mean follow up of 18.5 ± 15.5 months. Visual acuity improved or remained within 1 line of preoperative acuity in all but five patients. Complications included two patients with mild ptosis and four patients with hypertropia.

The authors concluded that the advancement of a conjunctival flap with preservation of the preexisting bleb often provides successful resolution of bleb-associated complication.

Amniotic Membrane Transplantation for Repair of Leaking Glaucoma filtering Blebs

Budenz DL, Barton K, Tseng SCG
Am J Ophthalmol 2000;130:580-8.

Leakage of aqueous humor from conjunctival filtering blebs may occur as an early or late complication of glaucoma filtration surgery. Early onsets leaks are usually managed successfully with observation, patching, bandage contact lens, direct suturing, or compression stitches. Late-onset leaks are more common after full thickness glaucoma filters compared with trabeculectomy without antifibrotic agents. Trabeculectomies performed with 5-fluorouracil appear to have a higher rate of late onset bleb leaks than those done without it, and trabeculectomies performed with mitomycin-C appears to have an even higher rate of late-onset bleb leaks than those performed with 5-fluorouracil. The frequency of late onset filtering bleb leaks seems to be increasing, possibly because of increased use of these antifibrotic agents. Although many non-surgical techniques have been tried to close late onset bleb leaks, successful closure often requires surgical revision. Advancement of the conjunctiva from the adjacent conjunctiva and/ or tenon layers and free conjunctival auto grafts are the two most frequent techniques employed.

The purpose of this study was to compare the safety and efficacy of human preserved amniotic membrane transplant with conjunctival advancement for repair of late-onset glaucoma filtering bleb leaks.

A prospective, randomized clinical trial compared amniotic membrane transplant with conjunctival advancement in patients with leaking glaucoma filtering blebs. Intraocular pressure, number of glaucoma medications, and reoperation for glaucoma or persistent or recurrent bleb-leak were compared in the two groups. Patients were followed for a minimum of 1 year.

Mean intraocular pressure was the same at 6 (amniotic membrane transplants, 15.4 ± 4.4, conjunctival advancement 14.1 ± 6.4, $P = 0.6$), 12 (amniotic membrane transplant, 15.0 ± 6.3, conjunctival advancement, 13.2 ± 6.6, $P = 0.5$), and 24 (amniotic membrane transplant, 17.2 ± 7.1, conjunctival advancement 15.0 ± 6.3, $P = 0.6$) months. The mean number of glaucoma medications in use was the same in the two groups at all time intervals. After an average follow-up of 19 months, there were seven failures in the amniotic membrane transplant group (two with persistent leaks that were unresponsive to further suturing, two with late-onset leaks, and three who required repeat glaucoma surgery and none in the conjunctival advancement group. The cumulative survival rate for amniotic membrane transplant was 81% at 6 months, 74% at 1 year, and 46% at 2 years. The cumulative survival rate was 100% for conjunctival advancement throughout follow up.

The authors concluded that the amniotic membrane transplantation does not offer an effective alternative to conjunctival advancement for repair of leaking glaucoma filtering blebs.

Assessment of Optic disk blood Flow in Patients with Open-angle Glaucoma

Findl O, Rainer G, Dallinger S, Dorner G, Polak K, Kiss B, Georgopoulos M, Vass C, Schmetterer L

Am J Ophthalmol 2000;130:589-96

It is well established that intraocular pressure is an important risk factor for the development of glaucoma. In recent years there is increasing evidence that vascular factors also contribute to optic nerve damage. A variety of studies using different techniques for the assessment of ocular hemodynamics indicate that choroidal, optic disk, and/or retinal blood flow is reduced in patients with glaucoma.

The purpose of this study was to investigate the optic disk blood flow in patients with open-angle glaucoma by using scanning laser Doppler flowmetery and laser interferometeric measurements of fundus pulsations and to compare it with age matched healthy control subjects.

In this prospective cross-sectional study, 90 eyes of 90 patients with open-angle glaucoma and 61 eyes of 61 age-matched healthy control subjects were evaluated. Flow in the optic disk cup and the neuroretinal rim were assessed with scanning laser Doppler flowmetery. Fundus pulsation amplitude in the cup and the macula were assessed with laser interferometery. Visual field mean deviation was measured with the Humphrey 30-2 program.

Flow in the neuroretinal rim (-18%, $P = .002$), and in the cup (-46%, $P < .001$) and fundus pulsation amplitude in the cup (-33%, $P < .001$) and in the macula (-24%, $P < .001$) were significantly were lower in patients with open-angle glaucoma compared with healthy control subjects. A significant association between blood flow measurements in the cup and fundus pulsation amplitudes in the cup was observed in both study cohorts. A significant association was also observed between the mean defect from visual fields testing and ocular hemodynamic parameters.

The authors concluded that reduced optic disk perfusion in patients with open-angle glaucoma is evidenced from two independent methods in the present study. Moreover, our data indicate that reduced ocular blood flow in these patients is linked to visual field changes. It remains to be established whether compromised optic disk and choroidal blood flow contributes to optic disk damage in glaucomatous eyes or is a secondary functional phenomenon.

Relationship Between Ocular Perfusion Pressure and Retrobulbar Blood Flow in Patients With glaucoma With Progressive Damage

Cherghel D, Orgül S, Gugleta K, Gekkieva M, Flammer J.

Am J Ophthalmol 2000;130:597-605

Glaucoma is a progressive optic neuropathy involving characteristic structural changes of the optic nerve and characteristic visual field defects.

Increased intraocular pressure is the risk factor most often associated with glaucomatous optic neuropathy. However, the existence of patients with normal intraocular pressure developing glaucomatous disk and visual field changes as well as the substantial number of cases with open angle glaucoma continuing to progress in damage despite therapeutically lowered intraocular pressure has urged the search for risk factors other than increase intraocular pressure. A lack of autoregulation or vascular dysregulation, featuring, among other characteristics, a vasospastic responsiveness to such stimuli as coldness or psychological stress, a propensity that has been shown to be more frequent in patients with glaucoma without increased intraocular pressure, have been advocated as possible contributing factors in the cause of glaucoma. The exact nature of vascular dysregulation remains, however, elusive. In a recent study, color Doppler measurements were obtained in the central retinal artery of otherwise healthy vasospastic subjects and in age matched and sex matched controls. This study disclosed a higher resistivity index in the central retinal artery of vasospastic individuals with lower ocular perfusion pressure, suggesting a paradoxically constricted peripheral vascular bed when perfusion pressure is low. Such a constellation would, potentially, increase the susceptibility of the eye to higher intraocular pressure or lower blood pressure. Hypothetically, because vasospasm has been suggested to be a risk factor in glaucoma, a similar vascular dysregulation may be involved in glaucoma.

The purpose of the present study was to evaluate the relationship between ocular perfusion pressure and blood flow velocities measured with color Doppler in retrobulbar vessels of patients with glaucoma progressing in damage despite an intraocular pressure lowered below 21 mm Hg.

Twenty patients with primary open-angle glaucoma with visual field deterioration in spite of an intraocular pressure lowered below 21mm Hg, 20 age-matched patients with glaucoma with stable visual fields, and 20 age-matched healthy controls were recruited. After a 20 minute rest in a supine position, intraocular pressure and color Doppler measurements parameters of the ophthalmic artery and the central retinal artery were obtained. Correlations between mean ocular perfusion pressure and color Doppler measurement parameters were determined.

Patient with glaucoma showed a higher intraocular pressure ($P < .0008$) and a lower mean ocular perfusion pressure ($P < .0045$) compared with healthy subjects. Patients with deteriorating glaucoma showed a lower mean blood pressure ($P = .033$) and a lower end diastolic velocity in the central retinal artery ($P = .0093$) compared with normals. Mean ocular perfusion pressure correlated positively with end diastolic velocity in the ophthalmic artery ($R = 0.66$, $P = .002$) and central retinal artery ($R = 0.74$, $P < .0001$) and negatively with resistivity index in the ophthalmic artery ($R = -0.70$, $P = .001$) and central retinal artery ($R = -0.62$, $P = .003$) in patients with deteriorating glaucoma. Such correlations did not occur in patients with glaucoma with stable visual fields or in normal subjects. The correlations were statistically significantly different between the study groups (parallelism of regression lines in an analysis of covariance model) for end diastolic velocity ($P = .001$) and resistivity index ($P = .0001$) in the ophthalmic artery, as well as for end diastolic velocity ($P = .0009$) and resistivity index ($P = .001$) in the central retinal artery.

In conclusion, the present findings suggest that alteration in ocular blood flow regulation may contribute to the progression in glaucomatous damage.

Measurement of Microcirculation in Optic Nerve Head by Laser Speckle Flowgraphy in Normal Volunteers

Yaoed K, Shirakashi M, Funaki S, Funaki H, Nakatsue T, Fukushima A, Abe H
Am J Ophthalmol 2000;130:606-10

The evaluation of optic nerve head microvascular blood flow is of fundamental importance for the understanding of several pathologic processes that occur in the optic nerve head, such as anterior ischemic optic neuropathy and glaucoma.

The purpose of this study was to report the blood flow in the optic nerve head between the right and left eyes or the superior and inferior neuroretinal rims in normal volunteers using laser speckle flowgraphy.

This prospective study included 120 eyes of 60 normal volunteers (mean age, 50.0 ± 16.9 years; range, 21 to 77 years). The square blur rate was measured by laser speckle flowgraphy (Kyushu Institute of Technology, Iizuka, Japan).

The sequence of eye measurements was randomized. In each eye, measurements were taken at the neuroretinal rim away from visible vessels. Linear regression analysis, paired two-tailed *t* test, and two-way analysis of variance were used for statistical analysis, *P* values less than .05 were accepted as statistically significant.

There was a significant correlation in square blur rate between the right and left eyes ($r = 0.587$, $P < .001$). Square blur rate in the superior temporal neuroretinal rim significantly correlated with that in the inferior temporal neuroretinal rim in each of the right ($r = 0.546$, $P < .001$) and left ($r = 0.465$, $P < .001$) eyes. Square blur rate in the right eye was higher than that in the left eye ($P = .049$). Square blur rate in the superior neuroretinal rim was higher than that in the inferior neuroretinal rim in both the right ($P = .035$) and left ($P = .005$) eyes.

In conclusion the authors found statistically significant differences of optic nerve head blood flow in normal volunteers using laser speckle flowgraphy between the right and left eyes and between the superior and inferior temporal neuroretinal rims. These normal data can be used for understanding physiological ocular hemodynamics.

Mini-trabeculectomy in Eyes High Risk of Scarring: Midterm Follow-up

Ophir A, Pikkel, J
Am J Ophthalmol 2001; 131: 13-18

The purpose of this study was to report the surgical outcome after at least 1 year of follow-up of mini-trabeculectomy (without scleral radial incisions), which took place in eyes at high risk of postoperative filtering bleb scaring.

In a prospective, institutional study, mini-trabeculectomy was performed on 26 eyes of 26 consecutive patients aged 40 years and older who had undergone a previous intraocular surgery or had had a post-traumatic recessed anterior chamber angle. The surgical procedure, a modification of the standard trabeculectomy, involved a 3-mm fornix-based conjunctival flap, sclerostomy at 1 mm from the limbus, and a sclerocorneal tunnel without radial incisions. During surgery, 0.4 mg per ml of mitomycin C was applied in the scleral pocket of each eye for 3 minutes. Of the 26 eyes, each of two eyes underwent an intraocular intervention during the first postoperative year and therefore was evaluated only for surgical complications. Another eye underwent inferior mini-trabeculectomy, and three other eyes did not complete 12 months or more of follow-up and were included in the midterm calculations of intraocular pressure control.

Mean preoperative intraocular pressure ($n = 20$) was 32.2 ± 9.5 mm Hg with 3.3 ± 0.9 hypotensive medications. After 12 to 37 months (mean, 22.1 ± 6.6) of follow-up, intraocular pressure was 20 mm Hg or less in 18 of 20 eyes (90%) and the mean intraocular pressure was 17.4 ± 2.9 mm Hg (range, 12 to 23) with 1.1 ± 1.2 hypotensive medications (range, 0 to 4). At that time, the filtering bleb was low and fleshy in appearance in 15 eyes (75%). Postoperative complications of the 22 eyes included early postoperative aqueous leakage in one eye (4.5%); cataract extraction took place in one eye and vitrectomy was performed in another eye, 7 and 3 months postoperatively, respectively. The four eyes that were excluded from the study had controlled intraocular pressure at the last examination.

The authors concluded that the mini trabeculectomy in eyes with high risk of scarring was found efficacious and relatively safe. The relatively small peritomy, the tunnel approach, and the avoidance of radial incisions seem to offer important advantages over the standard trabeculectomy.

Treatment of Nasolacrimal Duct Obstruction in Adults with Polyurethane Stent

Yazici B, Yazici Z, Parlak M
Am J Ophthalmol 2001; 131: 37-43

Obstructive epiphora is generally secondary to idiopathic inflammation of the nasolacrimal duct in adults. External dacryocystorhinostomy, a procedure that fistulizes the lacrimal sac to the nasal cavity and changes the natural pathway of tear drainage, is the most frequent treatment method for these cases. A more than 90% success rate with external dacryocystorhinostomy in experienced hands makes this procedure the gold standard against which all the other methods should be compared. However, external dacryocystorhinostomy is an invasive surgical

procedure requiring skin incision and osteotomy. By placement of a nasolacrimal duct stent, it may be possible to avoid dacryocystorhinostomy. The stent is 35mm long and quite flexible. The proximal end of the stent, lying within the lacrimal sac, has a mushroom tip (5 mm in diameter and 5 mm in length) that can be compressed during delivery and be expanded spontaneously when deployed. The body portion of the stent, lying within the nasolacrimal duct, is a hollow tube having an outer diameter of 2 mm and an inner diameter of 1.5 mm.

The purpose of this study was to evaluate the efficacy of polyurethane nasolacrimal duct stents in the treatment of epiphora resulting from primary acquired nasolacrimal duct obstruction in adults.

In 25 patients (21 women and four men with mean age of 44 years, range 20 to 74 years) with nasolacrimal duct obstruction, 28 hollow polyurethane stents designed by Song and associates were placed under fluoroscopic guidance. The obstruction was complete in 20 lacrimal drainage systems and partial in eight. The lacrimal sac size was normal or large on dacryocystogram in all lacrimal drainage systems. A Ritleng probe was introduced through the upper punctum and advanced past the obstruction. A guide wire with a flexible tip was then introduced through the probe, over which the stent was advanced in retrograde fashion and placed into the lacrimal sac and nasolacrimal duct. Clinical success was defined by the demonstration of a completely patent lacrimal drainage pathway through saline irrigation and no or minimal complaint of epiphora.

Stent placement was technically successful in 26 of 28 lacrimal drainage systems (93%). The mean time of fluoroscopy screening was 3.2 minutes (range, 1.4 to 5.8 minutes). The overall success rate was 82% (23 of 28 lacrimal drainage systems). Two stents were completely occluded. In one lacrimal drainage system with minimal epiphora, the stented drainage pathway was partially occluded. The patients were followed up from 4 to 22 months (mean, 7.2 months).

The authors concluded that the retrograde placement of a hollow polyurethane nasolacrimal duct stent is a technique that is simple and well tolerated by patients. This method achieves a high success rate and may be suggested as a nonsurgical procedure for adults with primary nasolacrimal duct obstruction and proper lacrimal sac size. The Ritleng probe facilitates the procedure.

Systemic Diseases Associated with Various Types of Retinal Vein Occlusion

Hayreh SS, Zimmerman B, Mccarthy MJ, Podhajsky P.

Am J Ophthalmol 2001; 131: 61-77

The purpose of this study was to investigate systemic diseases associated with various types of retinal vein occlusion.

The authors investigated prospectively in 1090 consecutive patients with retinal vein occlusion, almost all Caucasian (consistent with the racial pattern here), the prevalence of associated systemic disorders before or at the onset of various types of retinal vein occlusion. The patients were categorized into six types of retinal vein occlusion based on defined criteria: nonischemic and ischemic central retinal vein occlusion, nonischemic and ischemic hemi-central retinal vein occlusion, and major and macular branch retinal vein occlusion. The patients had a detailed ophthalmic and systemic evaluation according to protocol. For data analysis, patients were divided into three age groups: young (younger than 45 years) middle-aged (45 to 64 years), and elderly (65 years or older). The observed prevalence rates of major systemic diseases were compared among central retinal vein occlusion, hemi-central retinal vein occlusion, and branch retinal vein occlusion using a polytomous logistic regression analysis adjusting for gender and age. Logistic regression adjusting for age and gender was also used to compare the observed prevalence of systemic disease between nonischemic and ischemic in central retinal vein occlusion and hemi-central retinal vein occlusion and between major and macular branch retinal vein occlusion. These observed prevalence rates were also compared with those expected in a gender-matched and age-matched control population from estimates from the US National Center for Health Statistics.

There was a significantly higher prevalence of arterial hypertension in branch retinal vein occlusion compared with central retinal vein occlusion ($P < .0001$) and hemi-central retinal

vein occlusion (P = .028). Branch retinal vein occlusion also had a significantly higher prevalence of peripheral vascular disease (P = .0002), venous disease (P = .011), peptic ulcer (P = .031), and other gastrointestinal disease (P < .0001) compared with central retinal vein occlusion. The proportion of patients with branch retinal vein occlusion with cerebrovascular disease was also significantly (P = .049) greater than that of the combined group of patients with central retinal vein occlusion and patients with hemi-central retinal vein occlusion. There was no significant difference in prevalence of any systemic disease between central retinal vein occlusion and hemi-central retinal vein occlusion. A significantly greater prevalence of arterial hypertension (P = .025) and diabetes mellitus (P = .011) was present in the ischemic central retinal vein occlusion compared with the nonischemic central retinal vein occlusion. Similarly, arterial hypertension (P = .0002) and ischemic heart disease (P = .048) were more prevalent in major branch retinal vein occlusion than in macular branch retinal vein occlusion. Relative to the US white control population, the combined group of patients with central retinal vein occlusion and patients with hemi-central retinal vein occlusion had a higher prevalence of arterial hypertension (P < .0001), peptic ulcer (P < .0001), diabetes mellitus (in ischemic type only, P < .0001), and thyroid disorder (P < .0001). The patients with branch retinal vein occlusion showed a cerebrovascular disease (P = .007), chronic obstructive pulmonary disease (P = .012), peptic ulcer (P < .0001), diabetes (in young only, P = .0005), and thyroid disorder (P = .003) compared with the US white control population.

The findings of study revealed that a variety of systemic disorders may be present in association with different types of retinal vein occlusion and in different age groups, and that their relative prevalence differs significantly, so that the common practice of generalizing about these disorders for the entire group of patients with retinal vein occlusion can be misleading. The presence of a particular associated systemic disease does not necessarily imply a cause-and-effect relationship with that type of retinal vein occlusion; the particular disease may or may not be one of the risk factors in a multifactorial scenario predisposing an eye to develop a particular type of retinal vein occlusion. Based on study in authors' opinion apart from a routine medical evaluation, an extensive and expensive work-up for systemic diseases is unwarranted in the vast majority of patients with retinal vein occlusion.

Acute Primary Angel-closure: Long-term Intraocular Pressure Outcome in Asian Eyes

Aung T, Ang LP, Chan SP, Chew PTK
Am J Ophthalmol 2001; 131: 7-12

Primary angle-closure glaucoma is a relatively rare disease among Caucasians in Europe and North America. The situation in reversed in East Asia, where primary angle-closure is a major form of glaucoma. Singapore was recently reported to have the highest incidence of acute primary angle-closure of any country studied to date, with an island-wide incidence of 12.2 per 100,000 per year in those aged 30 years and older. The high incidence of acute primary angle-closure in Singapore makes it ideal for the study of the long-term outcome of the disease after different treatment modalities.

The purpose of this retrospective study was to report the long-term outcome of intraocular pressure after laser peripheral iridotomy in Asian eyes with acute primary angle-closure.

Case records of 111 eyes of 96 consecutive patients with acute primary angle-closure, presenting at the National University Hospital, Singapore, from 1990 to 1994 were studied. The presenting features of the affected eye and the treatment instituted were recorded. The subsequent long-term intraocular pressure outcome was analyzed. An increase in intraocular pressure on follow-up was defined as increase in intraocular pressure greater than 21 mm Hg and requiring treatment by medication or surgery.

The mean follow-up period was 50.3 months (range, 9 to 107 months). The mean presenting intraocular pressure was 52.8 mmHg (range, 28 to 80 mmHg). One hundred ten eyes were treated with laser peripheral iridotomy, with resolution of the acute episode and intraocular pressure less than 21 mmHg in all eyes after laser peripheral iridotomy. Of these, only 46 eyes (41.8%) were successfully treated with laser peripheral iridotomy alone in the long term. Sixty-four eyes (58.1%) developed an increase in intraocular pressure (requiring treatment) on follow-up, of

which 49 eyes developed an increase in intraocular pressure within the first 6 months after acute primary angle-closure. Thirty-six eyes (32.7%) eventually underwent trabeculectomy because of uncontrolled intraocular pressure despite laser and medical therapy.

In this study of Asian eyes, a high proportion (58.1%) of eyes with acute primary angle closure developed an increase in intraocular pressure on long term follow up after resolution of the acute attack, despite the presence of a patent laser peripheral iridotomy. These results suggest a racial difference in the outcome of laser peripheral iridotomy after acute primary angle closure in Asians, compared with Caucasians. Because a majority of eyes that develop an increase in intraocular pressure do so within the first 6 months of presentation, close monitoring of intraocular pressure is advised in the follow-up of patients with acute primary angle-closure.

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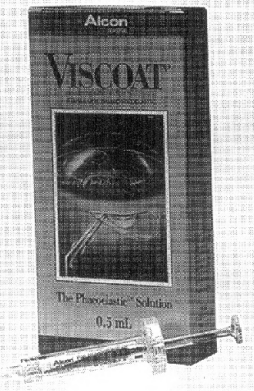

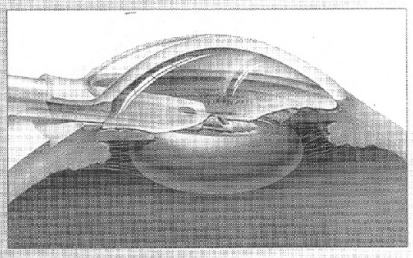

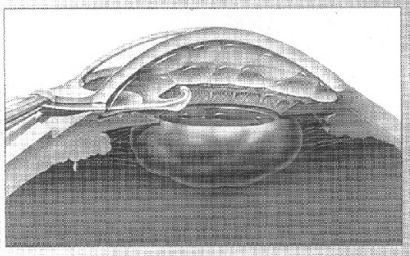

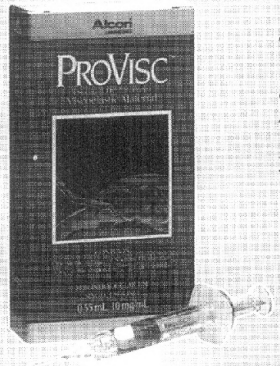

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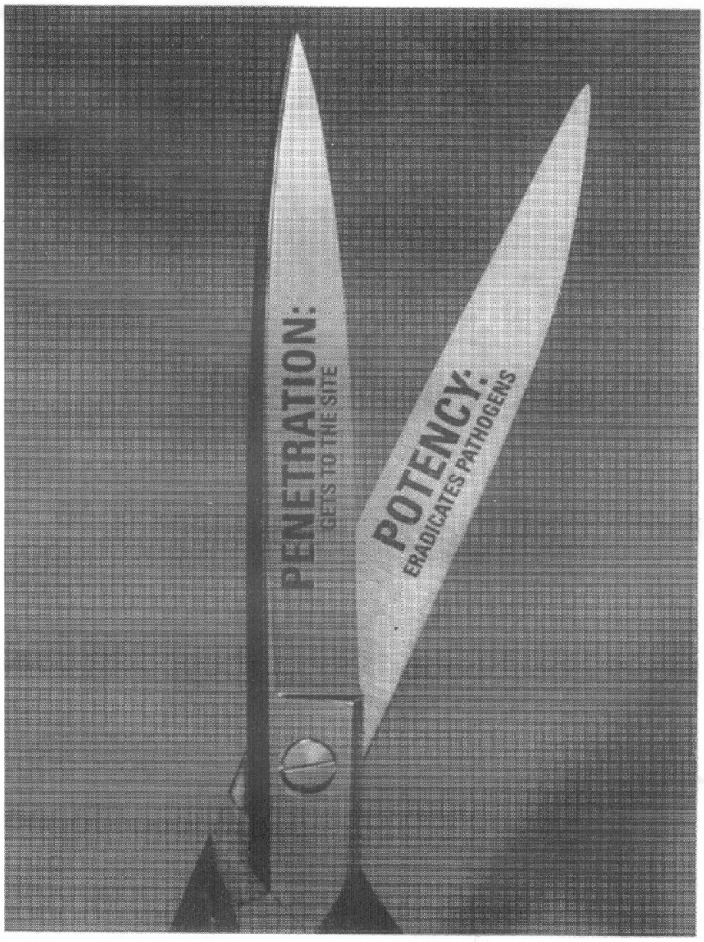

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1. Data on file, Alcon Laboratories, Inc.
2. Sabbagh LB. Survey finds infused antibiotics help prevent infection. *Ophthalmology Times.* July 15, 1998:20.

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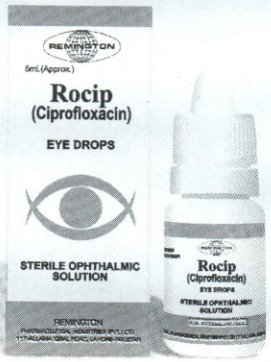

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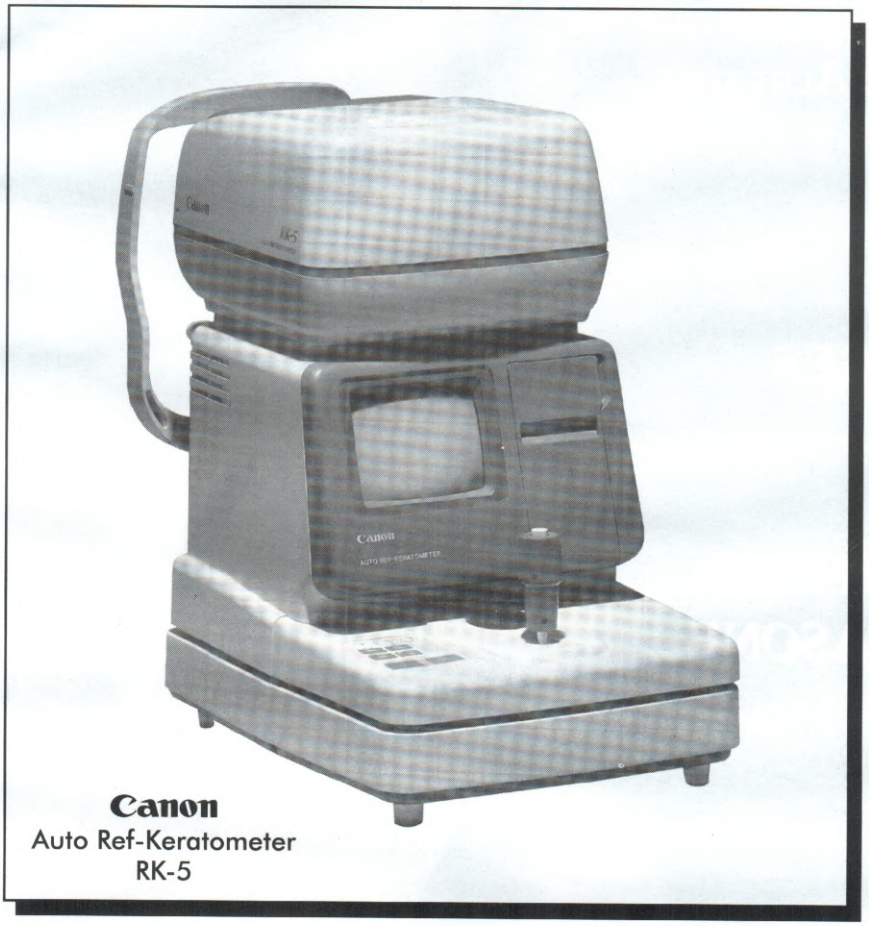

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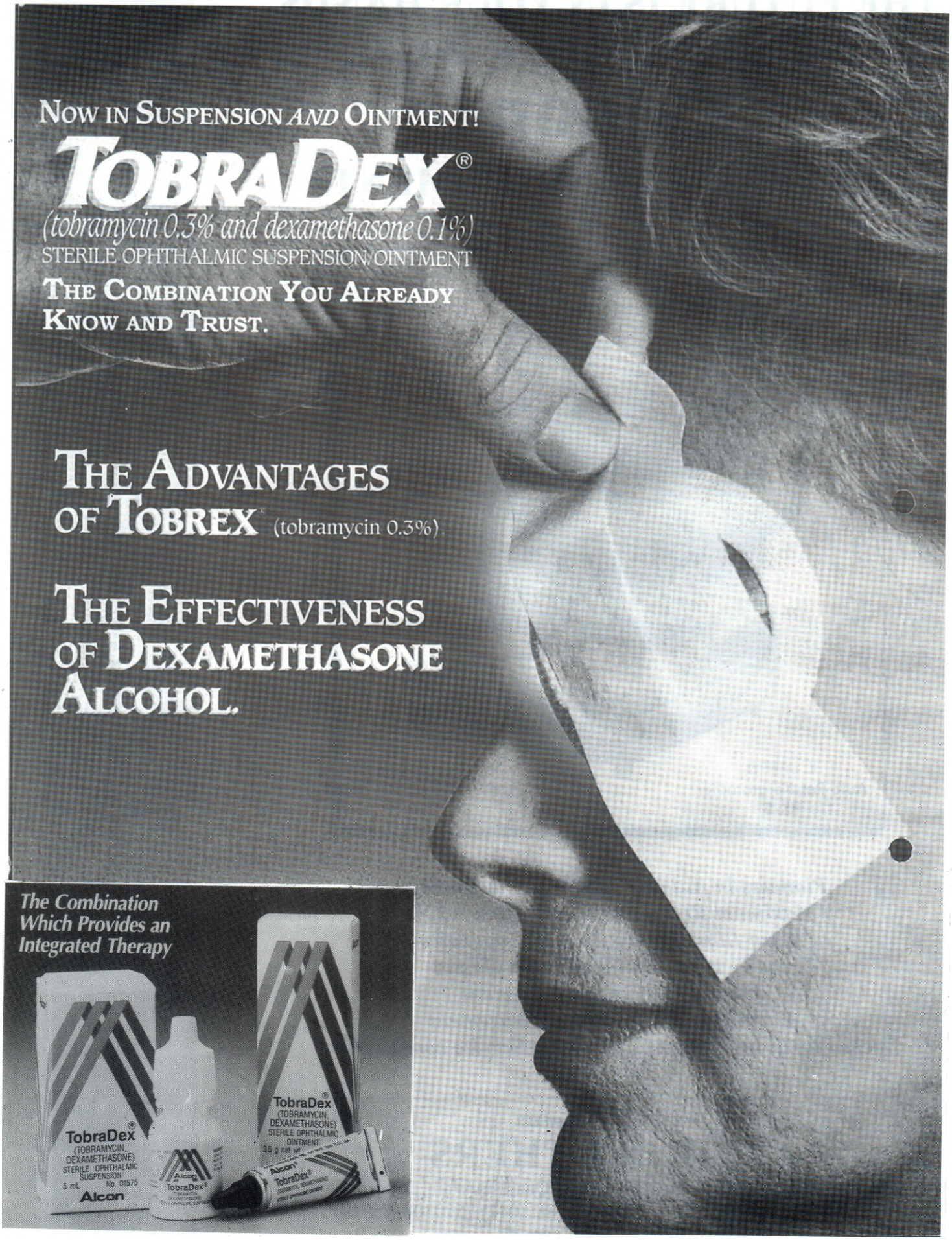
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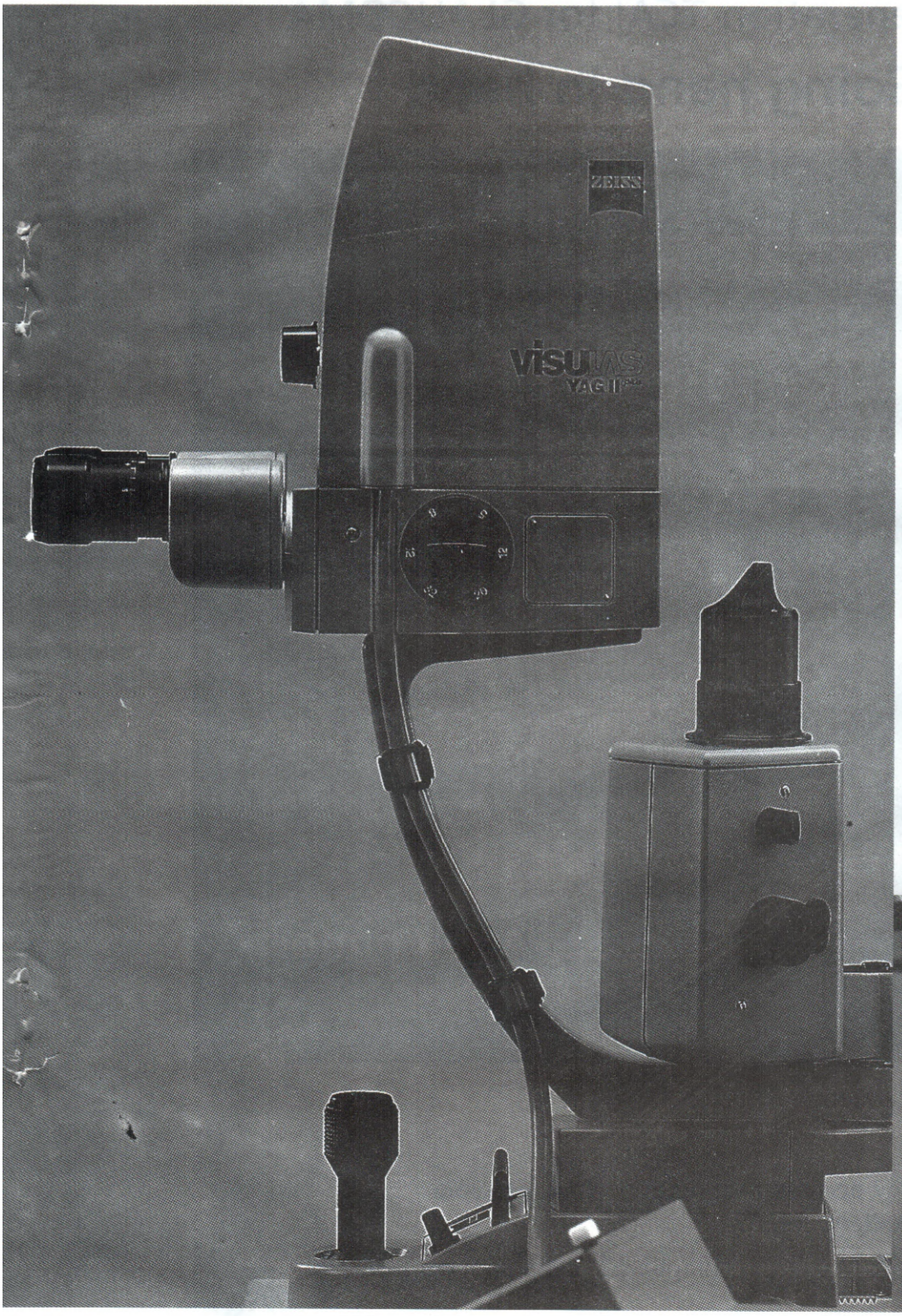

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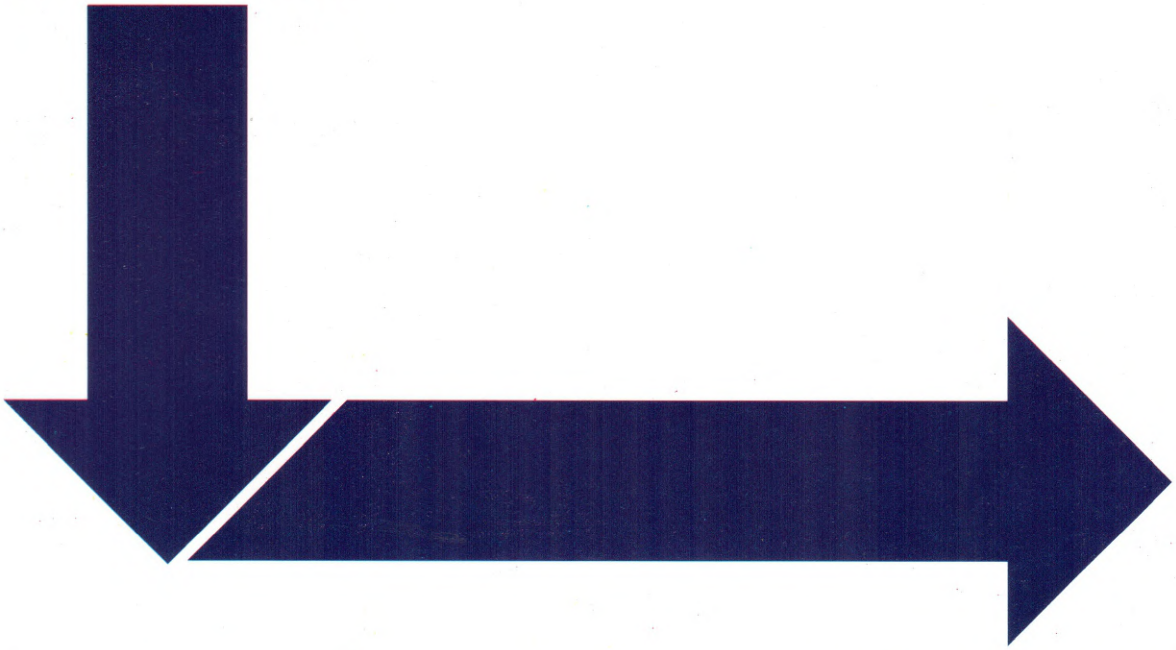

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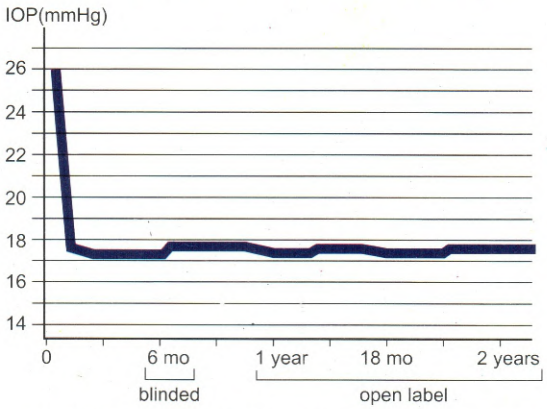

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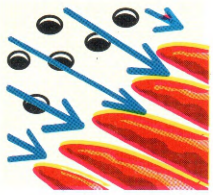

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Known hypersensitivity to latanoprost, benzalkonium chloride or any other ingredients in this product. **WARNINGS** XALATAN may gradually change eye color, increasing the amount of brown pigment in the iris by increasing the number of melanosomes (pigment granules) in melanocytes. The change in iris color occurs slowly and may not be noticeable for several months to years. Patients should be informed of the possibility of iris color change. Patients who are expected to receive treatment in only one eye should be informed about the potential for increased brown pigmentation in the treated eye and thus, heterochromia between the eyes. The increased pigmentation may be permanent. **PRECAUTIONS:**Patients may slowly develop increased brown pigmentation of the iris. This change may not be noticeable for several months to years (see WARNINGS). Typically the brown pigmentation around the pupil spreads concentrically towards the periphery in affected eyes, but the entire iris or parts of it may also become more brownish. Until more information about increased brown pigmentation is available, patients should be examined regularly and, depending on the clinical situation, treatment may be stopped if increased pigmentation ensues. XALATAN should not be administered while wearing contact lenses. Patients should be instructed to avoid allowing the tip of the dispensing container to contact the eye or surrounding structure because this could cause the tip to become contaminated by common bacteria known to cause ocular infections.
Patients also should be advised that if they develop an intercurrent ocular condition (e.g., trauma, or infection) or have ocular surgery, they should immediately seek their physician's advice concerning the continued use of the multidose container they had been using. Patients should be advised that if they develop any ocular reactions, particularly conjunctivitis and lid reactions, they should immediately seek their physician's advice. If more than one topical ophthalmic drug is being used, the drugs should be administered at least five (5) minutes apart. **ADVERSE REACTIONS** The ocular adverse events and ocular signs and symptoms reported in 5 to 15% of the patients on XALATAN in the 6 month, multi-center, double-masked, active-controlled trials were blurred vision, burning and stinging, conjunctival hyperemia, foreign body sensation, itching, increased pigmentation of the iris and punctuate epithelial keratopathy. Local conjunctival hyperemia was observed; however, less than 1% of the XALATAN treated patients required discontinuation of therapy because of intolerance to conjunctival hyperemia. **DOSAGE AND ADMINISTRATION** The recommended dosage is one drop (1.5 ug) in affected eye(s) once daily in the evening. The dosage of XALATAN should not exceed once daily since it has been shown that more frequent administration may decrease the intraocular pressure lowering effect. Reduction of the intraocular pressure starts approximately 3 to 4 hours after administration and the maximum effect is reached after 8 to 12 hours. XALATAN may be used concomitantly with other topical ophthalmic drug products to lower intraocular pressure. If more than one topical ophthalmic drug is being used, the drugs should be administered at least five (5) minutes apart. **HOW SUPPLIED** XALTAN™ (latanoprost solution) Sterile Ophthalmic Solution is a clear, isotonic, buffered, preserved colorless solution supplied in plastic ophthalmic dispenser bottles with a dropper tip and tamper evident overcap. Each bottle contain 2.5ml latanoprost (0.005%) (50UG/ML). **Storage:** Protect form light. Store unopened bottle under refrigeration at 2° to 8°C (36° to 46°F). Once opened the container may be stored at room temperature up to 25°C (77° F) for 6 weeks.

Further information is available upon request.

1. Data on file. Hedman K, Alm A. Presented at the ICO;June 1998; Amsterdam, The Netherlands. 2. Watson PG, Ophthalmology, 1998;105:82-87. 3. Bucci M, J Glaucoma. 1999;8:24-30.
4. Emmerich K-H,. Graefe's Arch Clin Exp Ophthalmol.. *Indiction: Reduction of intraocular pressure in patients with open-angle glaucoma and occular hypertension. PX 11294.00

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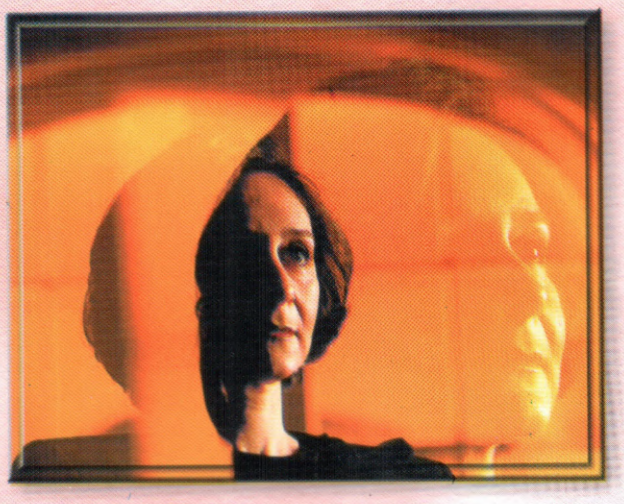

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