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PAKISTAN JOURNAL OF OPHTHALMOLOGY

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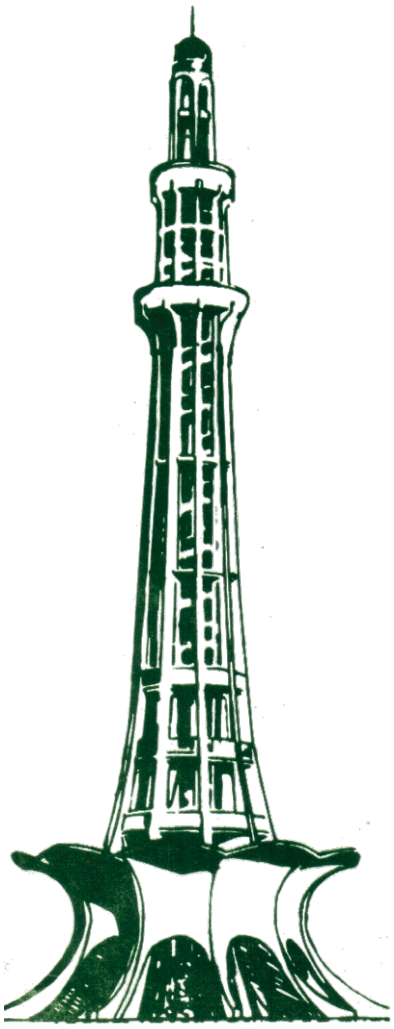

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BISMILLAHIR-RAHMANIR-RAHEEM

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Editorial

Say: "Are the blind and the seeing man equal, or are the darkness and the light equal?"
Holy Quaran 13:16

Ethambutol Ocular Toxicity

Muhammad Humayun, FPAMS

Bismillahir-Rahmanir-Raheem. Although in the United States and other developed nations tuberculosis is not an out-of-control health problem, in Pakistan at least 0.5% of the population is sputum positive for tuberculosis and the estimated mortality rate is 200 per 100,000.[1] The incidence of tuberculosis in developed nations has dropped to less than 10 per cent of all new infections in the last quarter century due to improved living and nutritional conditions, heightened social awareness, and better and specific drug therapy for tuberculosis.[2] Unfortunately, the first two objectives remain a dream even today in the poverty-stricken nations of the world. Hence, the physicians in those places are forced to become almost entirely dependent on drug therapy in caring for their tuberculous patients. This naturally leads to an inordinate aggressiveness both in the patient and the doctor for an improper and over utilization of drugs, with a decreased or a totally lacking emphasis on the undesirable effects of prescribed medicines. The paper by Rahman and Nizam[3] in this issue (page 37) is significant in that it focuses our attention on the problem of ocular toxicity from ethambutol, an antitubercular drug that has been declared to produce "very few reactions" and a reversible optic neurotoxicity in less than one percent of the patients at a proper weight-related dosage.[4] However, the rate of optic neuritis in the study by Rahman and Nizam [3] is 5.71% (20 out of a total of 350 patients), hinting at an urgent need for better monitoring of the patients and drug prescriptions in Pakistan and Bangladesh.

Ethambutol (Myambutol, Ebutol) is a highly specific bacteriostatic agent for all strains of *Mycobacterium tuberculosis*, but has no effect on other bacteria.[4] Soon after its introduction in 1961, Carr and Henkind[5] reported optic nerve toxicity in eight (44.4%) of their 18 patients who received 60 to 100 mg/kg body wt per day. Their patients had blurred vision with difficulty in color discrimination (deutranomaly) and paracentral or centrocecal scotomas. The representative case they discussed in their paper also showed a "mottled appearance of both macular areas." Although optic neuritis, which may be axial or paraxial in type, is the main manifestation of ocular toxicity of ethambutol, several authors have mentioned small retinal hemorrhages, hypremia of optic nervehead, and pigmentary changes in the central retina.[5-9]

Most of the ocular toxicity of ethambutol is dose related and reversible on the discontinuation of therapy.[5-9] The study of Rahman and Nizam[3] shows not only an unacceptably high incidence of optic neuritis but also irreversibility of damage in 35% of the effected patients. Poor monitoring, poor patient understanding, higher dosage without consideration for body weight, and prolonged therapy contributed to this tragic outcome.

Because of its specificity of action against *M. tuberculosis*, no unpleasantness to the patient, slower development of resistance to it, the higher effectiveness in combination with other antitubercular agents, and availability, ethambutol is a rightfully popular drug in Pakistan. It is almost non-toxic but therapeutically quite effective at a dose of 15 mg/kg/day. Since the drug is excreted in urine, its use in patients with renal insufficiency must be more carefully monitored. The proper dose calculations and monitoring of patients for adverse effects must be followed much more faithfully and aggressively in our countries. Simple tests for visual acuity and color vision before initiation of ethambutol therapy and then monthly should not be ignored at any cost, and the patients should be educated to immediately report any changes in their vision.

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Camera Clinicals

In this section of THE JOURNAL, photographic documentation of interesting and challenging observations are presented to the readers. They should make their diagnoses from the given information and compare these with the expositions given on pages 51-52.

-Editor

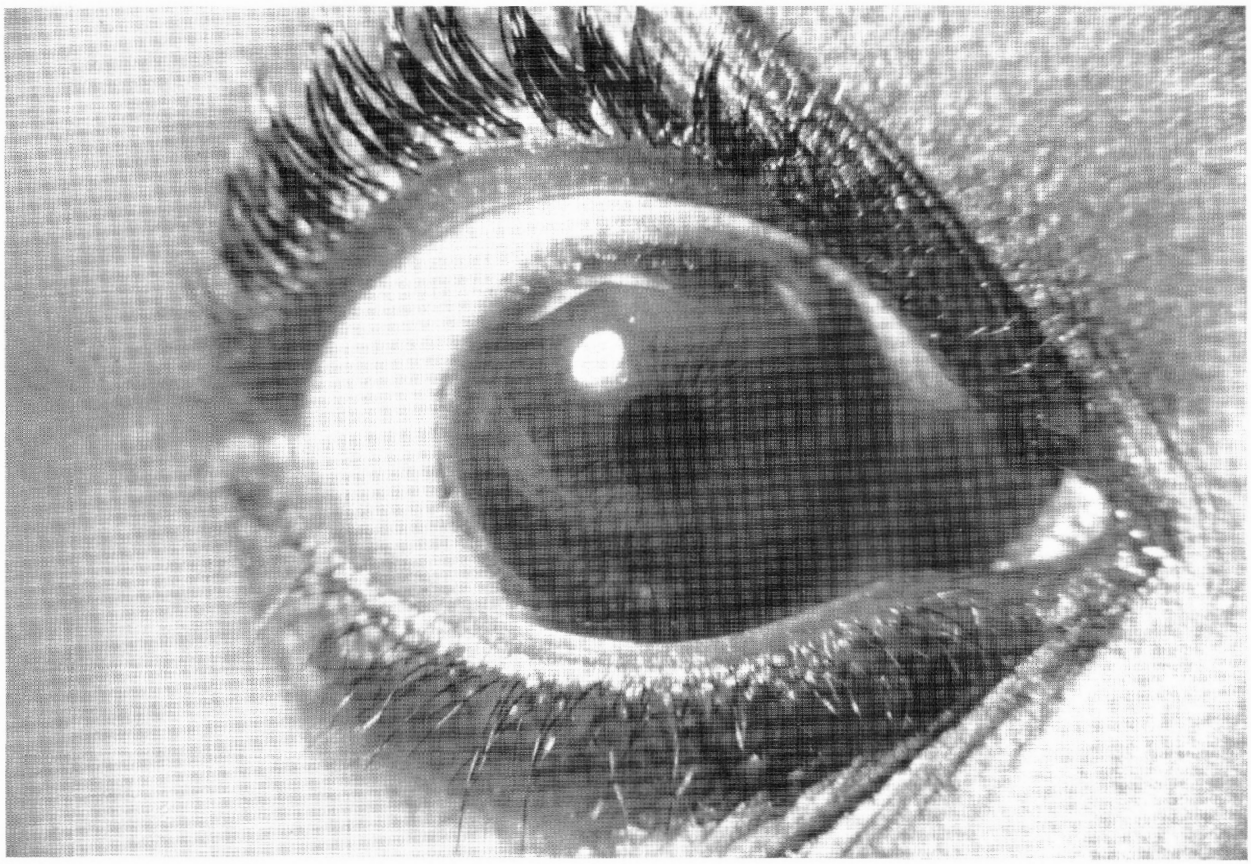

Figure 1

Figure 1: A 17-year-old Black boy came to have his glasses changed. He gave a history of wearing glasses since early childhood. He mentioned that his both eyes have always been larger than those of other people, the left eye being bigger than the right. Parents and three siblings had no eye disease, but parents wore glasses for presbyopia. The patient's mother privided a history of a few episodes of redness of the eyes only in the first year or two of patient's life. His parents had told that during his early childhood an eye doctor had told them the patient had an eye disease that could blind him. However, even after regular checkups for many years the doctor never advised any treatment. He had prescribed glasses for him, and these have been changed on several occasions during the past many years. The patient was of the opinion that though his sight was slightly hazy in the left eye, his vision had not deteriorated over the years. He gave no history of eye inflammation or pain. The eye examination showed that both eyes were clear of any inflammation. The striking external finding was the largeness of the corneas (14 mm, OD and 14.5 mm, OS), and the changes shown in the Figure 1, which were more marked in the left eye. This was probably the reason for haziness of vision in OS. With a correction of -350+175X110 in OD the visual acuity

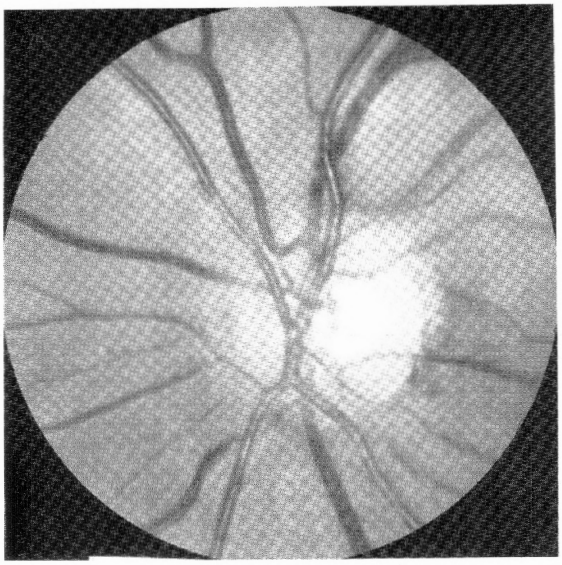

Figure 2

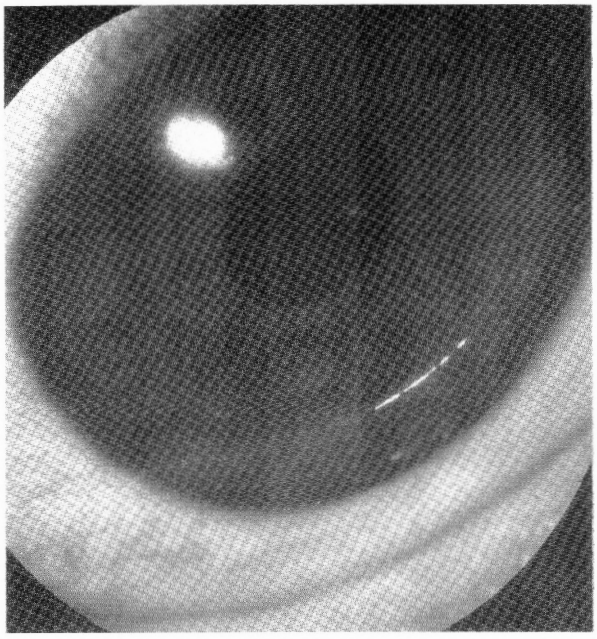

Figure 3

was 20/20, and with -475+225X50 it was 20/30 in OS. The intraocular pressure was 16 mm Hg in each eye. There were no anterior chamber anomalies on slit lamp examination. Ophthalmoscopy showed the cup/disc ratio to be 0.6, OD and 0.7, OS with healthy appearing rims. No defect was found on visual field examination, and the color vision was normal.

Figure 2: A 32-year-old wife of a physician was seen for a routine eye examination. Her visual acuity

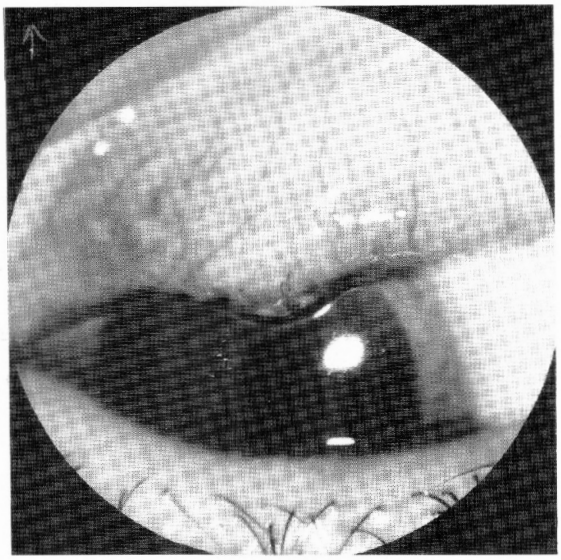

Figure 4

was 20/20 without correction in each eye, and the eyes were normal in all respects except for the findings which are present in the left ocular fundus as shown in Figure 2. These findings were, nonetheless, fully compatible with normal function. A followup of five years has not shown any change in the ocular fundi.

Figure 3: A 12-year-old boy's right eye was hit with a BB shot. He complained of pain and blurred vision in that eye. The eye examination showed visual acuity of 20/40, OD and 20/20, OS. Externally, the right eye was red and watery. On slit lamp examination traumatic anterior uveitis was confirmed. Although corneal epithelium was intact, the finding shown in Figure 3 was very unusual. The lens was intact. With treatment, the vision returned to normal in one week, but the finding shown in Figure 3 persisted for many weeks. One eye examination after one year, very faint sequelae were noted on slit lamp examination. The visual acuity was 20/20 at this followup.

Figure 4: A 28-year-old man complained of recurrent tearing and irritation of his right eye for six months. He gave a history of eye being red when the complaint first appeared, but has not been red since the initial episode was treated with antibiotic drops by his doctor. The eye examination was normal with 20/20 uncorrected visual acuity in each eye. However, on everting the right upper eyelid, the findings shown in Figure 4 were noted. Treatment under local anesthesia with a course of topical antibiotics cured the condition. Followup over a period of several months has not shown any recurrence.

An Exceptional Obit

Lieutenant General Wajid Ali Khan Burki

Lt. Gen. Wajid Ali Khan Burki, 1900-1989

Lieutenant General Wajid Ali Khan Burki, President of the College of Physicians and Surgeons of Pakistan passed away, at Rawalpindi, on January 17, 1989. He was 89.

General Burki was born on October 28, 1900 at Basti Babakhel, near Jallander (East Punjab). After preliminary studies at Jallander and Lahore, he went to the United Kingdom, and qualified M.B., C.h.B., (1924) and M.D. (1926) from St. Andrews University (Scotland). Further studies at the Moorfields Eye Hospital London enabled him to specialize in ophthalmology, and obtain D.O.M.S. He joined Indian Army Medical Service in 1927. In 1932, he attended the senior officers course at Milbank (U.K.). He was appointed eye surgeon Eastern Command (1933-39). During World War II, he saw active service in East Africa, Middle East, and Burma. He was mentioned in dispatches and earned the award of Commander in the Order of the British Empire. At the time of Independence in 1947, he opted for Pakistan and remained in the army. He was appointed Director General Armed Forces Medical Services in 1957, with the rank of Lt. General.

In 1958, General Burki was appointed a minister of the Government of Pakistan, and held the portfolios of health, labor, social welfare and village aid. From 1963 to 1966, he was Pakistan's Ambassador to Sweden and other Scandanavian countries.

In 1962, General Burki founded the College of Physicians and Surgeons of Pakistan, and was elected its first president. He remained its president, where he guided its destiny with skill, wisdom and sustained energy, for over 25 years till the time of his demise. During this period, he was always unanimously elected every four years to this high academic office.

General Burki was held in high esteem in academic circles abroad, where his opinions were always given weighty consideration. He was awarded Fellowships of the Royal Colleges of London, Edinburgh and Glasgow, as well as Doctors of Laws (Honoris Causa) from the Universities of the Punjab, St. Andrews, and Maryland (U.S.A.). In 1981, he was awarded the President of Pakistan's Ramzan Ali Syed Gold Medal for his outstanding services to postgraduate medical education and ophthalmology.

General Burki's hobbies included gardening, tennis and shooting. He was chairman of the Rawalpindi Race Club and Steward of the Jocky Club of Pakistan.

He had ideally happy married life. All his children, three sons and two daughters are well-settled in life. One of his sons is a physician and a professor of chest-diseases at an American university.

In General Burki's passing, the postgraduate medical education in Pakistan has lost an outstanding servant who contributed so lavishly to its growth, by his compelling and sustained energy. The College of Physicians and Surgeons of Pakistan (of which I am also a founder fellow) will sorely miss its father figure, the logical clarity of his decisions, and stimulating and magnetic influence of his personality; and his friends, his sedate humor and old world courtesy and grace.

Prof. Mahmud A. Shah
Retired Principal and Professor of Ophthalmology,
Dow Medical College, Karachi

Ethambutol Toxic Neuroretinopathy In Bangladesh*

Mustafizur Rahman, M.D.
Rashed Nizam, M.D.

ABSTRACT: Ethambutol is considered to have a relative lack of toxicity. In Bangladesh, out of a total of 350 patients receiving ethambutol (25 mg to 35 mg/kg daily) for tuberculosis, 20 (5.71%) developed neuroretinal toxicity. Ten (50%) of these patients had peripheral, four (20%) central, and six (30%) mixed visual field defects. Thirteen (65%) patients recovered, with or without additional treatment, after ethambutol was stopped, but seven (35%) had irreversible damage. In several of the patients who recovered, the visual improvement began only when hydroxycobalamin was administered following the discontinuation of ethambutol. One woman mistakenly received cyanocobalamin instead of hydroxycobalamin, leading to optic atrophy and an irreversible visual loss in her. We would like to warn against the use of cyanocobalamin in patients on ethambutol. (Pakistan Journal of Ophthalmology 5:37-40, April, 1989.)

Ethambutol hydrochloride (Myambutol), a chemotheraputic agent, is specifically effective against *Mycobactarium tuberculosis*.[1] Pulmonary and non-pulmonary tuberculosis (T.B.) is quite common in Bangladesh, where ethambutol, being a potent, cheaper and less prone to induce resistance, is widely prescribed. The drug is also well-tolerated and other than rarely causing optic neuritis almost non-toxic. Toxicity is dose related,[2] and the recommended dose is 25 mg/kg body weight/day for 2 months followed by 15 mg/kg body weight/day.[3]

Leibold[4] described two types of retrobulbar optic neuritis: The central type is characterized by decrease in visual acuity, presence of central scotoma, and the loss of green and red color vision. The peripheral type, exhibits no or little fall in visual acuity, but manifests constriction of peripheral field and loss of color vision. We conducted a study to find the incidence of ocular toxicity in the Bangali patients who were receiving ethambutol for the treatment of tuberculosis.

Materials and Methods

In a study at the Infectious Diseases and Chest Hospital, Dhaka, a random sample of 350 patients was selected. These patients were receiving ethambutol in a double or triple chemotherapeutic regimen for the treatment of tuberculosis.

Total number of patients who suffered ocular toxicity was 25. Five patients failed to report for followup, and are excluded from the study.

The observation period ranged from three to 30 months. Each patient received a general and an ocular examination.

The general examination included recording weight of the patient, routine blood, urine and stool tests, and X-ray of the chest. The ocular examination included external eye examination, visual acuity evaluation, color vision testing by pseudoisochromatic chart, field of vision plotting by Bjerrum screen for central field and by Lister/Goldman perimeter for peripheral field, applanation tonometry, and fundus examination. The patients were reexamined at monthly intervals. The dose of ethambutol varied from 25 mg to 35 mg/kg body weight per day. On the average, each patient received 1000 mg of ethambutol daily, irrespective of the patient's weight.

Results

Out of a total of 350 patients, 20 (5.71%) showed ocular ethambutol toxicity. The time of onset of toxicity varied from 60 to 600 days (Figure 1).

From the Islamia Eye Hospital, Dhaka, Bangladesh.
*Presented at the 12th Congress of the Ophthalmological Society of Pakistan, Karachi, February 22-25, 1989.
Reprint requests and inquiries to the authors at the Islamia Eye Hospital address.

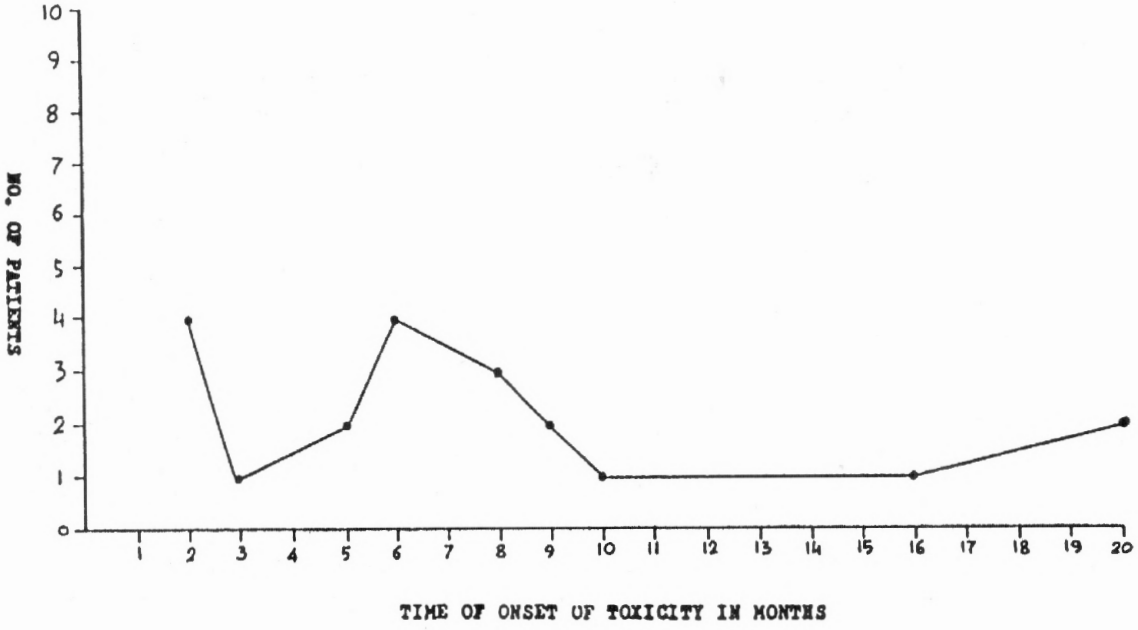

Figure 1 (Rahman & Nizam): The time of onset of ethambutol ocular toxicity in 20 patients.

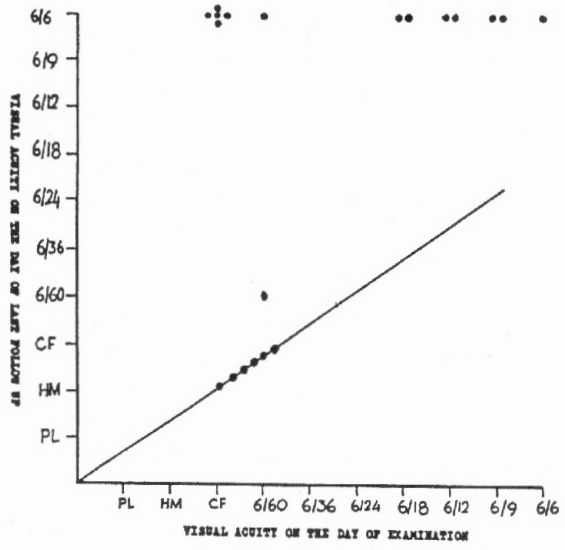

Figure 2 (Rahman & Nizam): Right eye. Scattergram showing the visual acuity on the days of examination and the last follow up.

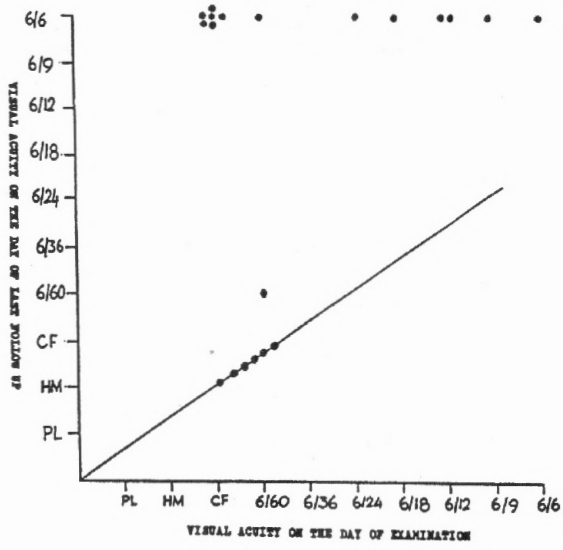

Figure 3 (Rehman & Nizam): Left eye. Scattergram showing the visual acuity on the days of examination and the last followup.

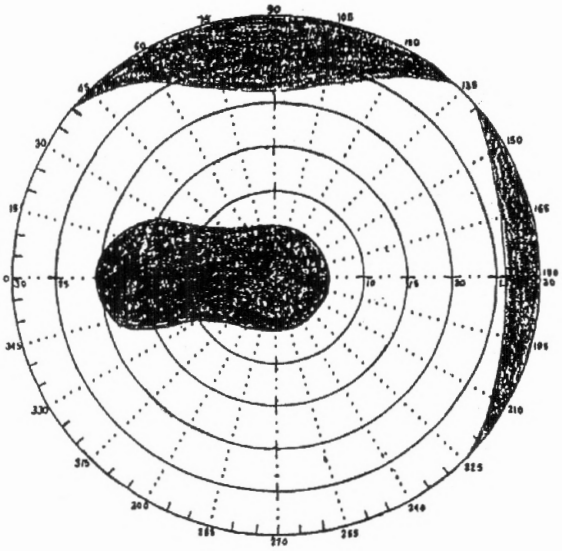

Figure 4 (Rahman & Nizam): Case A.A.: Left eye. Ethambutol toxicity. Visual field performed with 2 mm white object at one meter. Visual acuity, 20/200 (6/60).

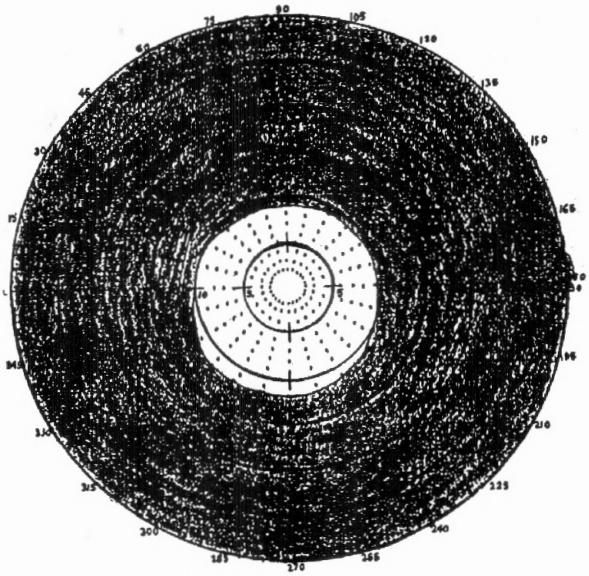

Figure 5 (Rahman & Nizan): Case I.M. Right eye. Visual acuity, 20/40. Visual field done with 2/1000 mm (white object).

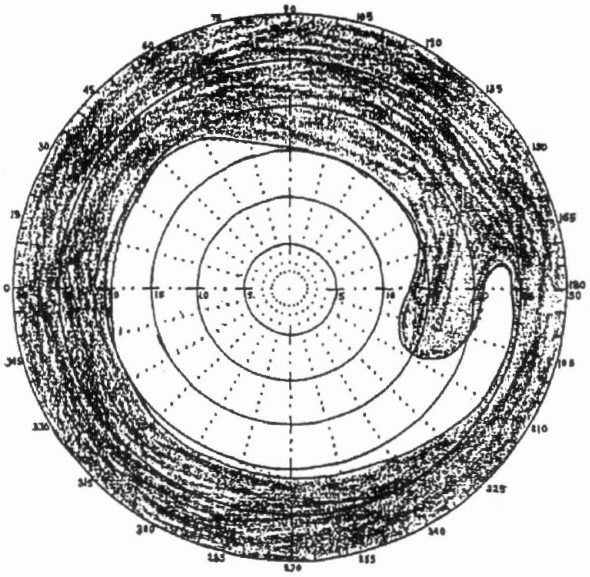

Figure 6 (Rahman & Nizam): Case M.A. H.: Right eye. Visual acuity, 20/60. Visual field done at 2/1000 mm (white object).

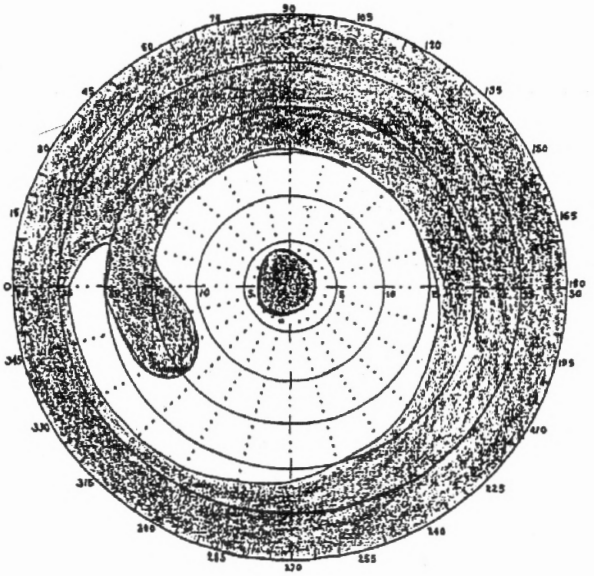

Figure 7 (Rahman & Nizan): Case M.A.H.: Left eye. Visual acuity, 20/200. The visual fields done similiar to Figure 6.

During the height of toxicity the visual acuity ranged from 6/9 (20/30) to finger count only (Figures 2 and 3). Five patients were in the 21-30 age group, four in the 31-40 age group, eight in the 41-50 age group, two in the 51-60 age group, and one in the 61-70 age group. Hence, the patients in 4th decade showed the greatest tendency to develop toxocity.

All the patients had one type or other of visual field defects shown in Figures 5-7 in one or both eyes.

Thirteen (65%) patients who developed ocular toxicity recovered in one to 10 months after the discontinuations of ethambutol, but the remaining seven (35%) showed no improvement. Other ocular changes are given in the Table.

Table
Ethambutol Ocular Toxicity (20 cases)

Findings	Number of patients	%
Peripheral field defect	10	50%
Central field defect	4	20%
Mixed field defect	6	30%
Color vision defect	8	40%
Optic atrophy	4	20%
Temporal disc pallor	3	15%
Papilledma (mild)	1	5%
Regained 6/6 V.A.	13	65%
Irreversible damage	7	35%

Discussion

In the present series 20 (5.71%) patients out of a total of 350 developed toxicity. These patients received a daily dose of 25 to 35 mg/kg of ethambutol. We noted that all the patients on average received 1000 mg of ethambutol daily, irrespective of the body weight, and some of them continued the drug upto two years with the same dose. The body weight was recorded before starting the therapy not to adjust the dosage but to observe the improvement of general health. Unfortunately, the recommended dose was not followed in the patients in this series.

In the present study, 10 (50%) out of 20 patients develop peripheral visual field defect, four (20%) had central field defect and 6 (30%) had mixed field defect.

Citron[5] observed that optic nerve toxicity usually developed after two months of therapy. In the present study, the patients who developed toxic neuroretinopathy also had taken the drug for more than two months. We found that patients in the 41 to 50 age group were more prone to develop toxicity.

Most of the authors advise no active treatment except discontinuation of the drug for the ocular toxicity of ethambutol. In one series, however, nine cases of ethambutol ocular toxicity were treated by stopping the drug and administering of hydroxycobalamin. This measure brought about cure in 62% of the involved eyes.[8] We also found that several patients in our series showed very little change in the visual acuity after stopping ethambutol, and the improvement began after the administration of hydroxycobalamin.

In one female patient hydroxycobalamin was advised, but her family physician mistakenly gave her cyanocobalamin instead. This caused irreversible damage to the optic nerve. Her vision further deteriorated and she developed optic atrophy. It is a known fact that cyanocobalamin is toxic to the optic nerve.

Conclusion

The awareness of the early ocular manifestations may prevent serious complications from ethambutol toxicity. The relationship between body weight and dose should be maintained. The patients should be forewarned about the ocular toxicity of the drug. The eye examinations should be done prior to and during the course of therapy. The patients with periaxial type of toxicity are more prone to develop irreversible changes. In any suspected case of ocular toxicity, ethambutol should be stopped and patient switched to other antitubercular therapy. Intramuscular injections of hydroxycobalamin (1000 microgram bi-weekly) enhance the recovery. Cyanocobalamin must not be prescribed in these patients as it is toxic to the optic nerve.

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Modern Methods

YAG Laser Iridotomy For Narrow Angle Glaucoma In Pakistani Patients

Shad Mohammad, F.R.C.S.
Mohammad Daud Khan, F.R.C.S.

ABSTRACT: We undertook a study to evaluate the efficacy and complications of neodymium:yttrium, aluminum, garnet (Nd:YAG) laser iridotomy in the Pakistani patients. Neodymium:YAG laser iridotomy was performed in 43 (98%) out of 44 eyes of 36 Pakistani patients, ten (26%) of whom were men and 28 (74%) were women. Iridotomy was performed for acute angle closure attack in four (9%) eyes, for prodromal attacks in 10 (28%) eyes and as a prophylaxis in 30 (68%) eyes. The brown irides needed much higher total energy (304 mJ) as compared to the blue irides (44 mJ). The immediate complications included small hyphema in 21 (48%) eyes, raised intraocular pressure in six (14%) eyes and iritis after 24 hours in one (2.3%) eye. We did not see corneal edema or cataract formation in any of the patients included in this preliminary report. (Pakistan Journal of Ophthalmology 5:41-42, April, 1989.)

In 1982, Frankhauser and van der Zypen[1] suggested a number of ocular ailments believed to be amenable to Q-switched neodymium: yttrium, aluminum, garnet (YAG) laser. Today, its usefulness for capsulotomy and iridotomy is well established.

Neodymium:YAG laser is used either as continuous wave (cw), producing thermal effect, or as a pulsed laser, producing mechanical disruption of the tissue. In pulsed Nd: YAG laser, the duration of pulses ranges from nanoseconds in the Q-switched to picoseconds in the mode locked lasers. The sufficiently high power densities focused to a small spot size cause vaporization of the tissue, creating shock waves which lead to the disruption of the tissues.

Neodymium:YAG laser is now extensively used for performing iridotomy and capsulotomy because of its advantages over conventional surgery for being non invasive, less traumatic, more convenient to the patient and cost effective.

After the commissioning of argon and Nd:YAG twin laser in our department, we decided to conduct a prospective study to evaluate the efficacy of Nd:YAG laser in producing iridotomy in Pakistani patients suffering from narrow angle glaucoma (NAG).

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MATERIAL AND METHODS

The patients with narrow angle glaucoma in whom a surgical iridectomy was indicated were included in this study. An informed consent was obtained. Each patient had a complete ophthalmological examination including visual acuity, tonometry, gonioscopy and fundoscopy. The acute attack was first controlled with medical treatment. Pupil was constricted with 2% pilocarpine before the procedure, if the patient was not already on miotics. A drop of local anesthetic was instilled just prior to the procedure. Abraham contact lens with eccentric magnifying button was used. The laser settings used for the procedure are given in Table 1. The site for iridotomy was selected as peripheral as possible on either side of 12 o'clock position. The base of a crypt, if present, was the preferred site.

Table I
Laser Specifications and Settings

Nd: YAG laser wave length	1060 nm
Aiming beam (He-Ne laser)	633 nm
Duration of pulse	6 nanosec
Spot size	20 micron
Energy per pulse	7-9 mJ
Mode	single shot

The flow of aqueous carrying pigment debris from

the posterior to the anterior chamber and the deepening of anterior chamber were the criteria for a successful iridotomy. Although we were able to see the red reflex through the iridotomy on retroillumination, we failed to see the anterior capsule of the lens as has been mentioned by some other authors.[2,3,4]

After the procedure, the intraocular pressure was measured an hour later and the patient was put on pilocarpine and floumethanalone drops. The patients were examined again after 24 hours, one week, one month and then after every three months for as long as it was felt necessary.

Thirty-eight patients (44 eyes) were included in the study. There were 10 (26%) men and 28 (74%) women. Their ages varied between 40 and 70 years (average 53 years). Table 2 shows the reasons for iridotomy and the number of eyes for each. Forty irides were brown and four irides were blue in color.

Table 2
Indications for Iridotomy

Reason	No. of eyes	%
Acute angle closure	4	9
Prodromal attacks	10	23
Prophylactic	30	68

A successful iridotomy was achieved in 39 (89%) eyes in the first session and in 4 (9%) eyes in the second session. Only in one eye we failed to achieve a successful iridotomy.

The total energy required for successful iridotomy varied between 16 and 1413 mJ (average 281 mJ) for all kinds of irides. The average energy level for the blue irides was 44 mJ, while the brown irides required an average of 304 mJ.

Twenty one (48%) eyes developed hyphema at the time of iridotomy. The hyphema was always very small and did not persist for more than 24 hours in any patient.

Raised intraocular pressure was noted in six eyes (13.6%) on the following day. In four eyes, the raised intraocular pressure was controlled with medical treatment and afterward remained normal even on stopping the medication. In two eyes, the intraocular pressure remained high and trabeculectomy had to be performed.

One eye showed signs of iritis on the following day. It was successfully controlled with topical corticosteroids.

So far we have not observed cataract formation and corneal endothelial damage in any of our patients.

DISCUSSION

This study was undertaken to evaluate the efficiency and complications of Nd:YAG laser to perform iridotomy in Pakistani patients, majority of whom have brown irides. Narrow angle glaucoma is five times more common than open angle glaucoma in Chinese and Mongoloid races.[5] In our experience, narrow angle glaucoma is also more common than open angle glaucoma in Pakistani population. We were able to produce a patent iridotomy in 98% of the eyes. As we had no previous experience of using Nd:YAG laser for iridotomy, we required higher energy levels to produce a successful iridotomy as compared to other reports.[2,3,4] As we gained experience, the number of shots and energy levels required to produce a successful iridotomy were reduced. In our study, there were only four blue irides and they required much less energy as compared to brown irides.

The elevation of intraocular pressure is a common occurrence following YAG laser iridotomy. It occurred in 14% of eyes in our study, which is lower than the figures reported by other authors.[2,3] However, in one study no rise of intraocular pressure was noted following Nd:YAG laser iridotomy in eyes with acute angle closure attacks, while a significant rise of intraocular pressure following it was seen in eyes with chronic narrow angle glaucoma.[4]

We have not noted cataract formation in our patients. This is most likely due to more peripheral placement of our iridotomy.

We believe that Nd:YAG laser iridotomy is a safe, quick and convenient procedure. Although there is high initial capital investment, in the long run it is highly cost effective, and will significantly reduce the inconvenience and risks associated with conventional surgery.

We experienced that a good number of patients who had undergone surgery for acute narrow angle glaucoma in one eye refused a prophylactic iridectomy in the other eye, only to have returned with acute angle closure attack sometime later. The simple procedure of laser iridotomy will no doubt save these patients from going blind from acute angle closure due to delay in surgery out of their fear of it.

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Junior Research

Nd: YAG Laser Posterior Capsulotomy in Eyes Without IOLs

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ABSTRACT: I studied 20 eyes of 18 Pakistani patients who had YAG laser capsulotomy for posterior capsule opacification following extracapsular cataract extraction without intraocular lens implantation. Fifteen (75%) eyes showed visual improvement by at least two Snellen lines, four (20%) had no change in visual acuity, and one (5%) further lost sight due to cystoid macular edema. Transient intraocular pressure elevation (4-15 mm Hg) following laser capsulotomy occurred in 12 (60%) of the eyes, anterior uveitis in 8 (40%), iris bleeding in 1 (5%), and ruptured anterior vitreous face in 9 (45%) eyes. The elevated intraocular pressure and uveitis permanently resolved either spontaneously or following a short course of appropriate treatment for each. (Pakistan Journal of Ophthalmology 5:43-44, April, 1989.)

Within the last decade, the extracapsular cataract extraction has gradually become more popular than the intracapsular procedure. In 1983, a review indicated that in 1979, 83% of the cataract extractions performed in the United States of America were done by an intracapsular technique, but by 1982, this figure had dropped to 56%.[1] Today in the USA, 95% of cataracts are being treated by extracapsular extraction with intraocular lens implantation.

One of the major problems with extracapsular cataract extraction is opacification of the posterior capsule a few months or years following surgery, making a second procedure of posterior capsulotomy necessary to improve the vision. Today, the invasive surgical posterior capsulotomy is rapidly being replaced by the non-invasive neodymium: yttrium, aluminum, garnet (Nd:YAG) laser capsulotomy.[2-5]

In 1980, Aron-Rosa,[6] first reported the use of Nd:YAG laser to perform posterior capsulotomy. The results of several other clinical and experimental studies have proven this technique to be safe and efficient.[3,4]

In Pakistan, extracapsular cataract extraction has followed the universal trend of increasing popularity. However, because of the limited availability of intraocular lenses (IOL), not all patients receive IOL implantation, and there is a significant population of patients with opacfication of posterior capsule without IOLs in their eyes. After the installation of a Nd:YAG laser unit in the Institute of Ophthalmology, Mayo Hospital, Lahore, I conducted a study on the YAG laser posterior capsulotomy in patients who had no IOL in their eyes.

Material and Methods

Twenty eyes of 18 patients with posterior capsular opacification 1-5 years after extracapsular cataract extraction were included in this study. The period of study was from February, 1988 to March 1989 (14 months). The age of patients varied from 16-70 years, and nine were men and nine were women. The eye examination included visual acuity recording, tonometry, slit-lamp examination, binocular indirect ophthalmoscopy, and B-mode ultrasonography to rule out any preexisting retinal detachment.

In each patient, a hole of four mm in diameter in the thickened posterior capsule was created with a minimum number of bursts of Nd:YAG laser. All of the patients were kept in the hospital for four to six hours. The eyes were examined at two-hourly intervals for anterior uveitis, corneal damage and any elevation of intraocular pressure. Those with increase of more than 10 mm Hg intraocular pressure by four hours were retained for overnight monitoring and treated with acetazolamide and timolol. Others were sent home on homatropine 2% drop stat and antibiotic-steroid drops t.i.d., and instructed to return

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on the following day, and then weekly, monthly, and quarterly.

Results

Fifteen (75%) eyes had their visual acuity improved by at least two Snellen lines, four (20%) eyes showed no change, and one (5%) eye went on to develop macular edema and degeneration with further deterioration of sight.

The complications included mild to moderate anterior uveitis in 8 (40%) of the eyes. However, all patients rapidly responded to treatment with homatropine 2% and antibiotic-steriod combination drops. The vitreous face became ruptured in 9 (45%) of the eyes, but no retinal detachment developed during the course of the study. One (5%) eye developed cystoid macular edema, and in it vision became more deteriorated as the time passed. Only one (5%) eye had transient, spontaneously resolving small hyphema.

Comments

The eyes which required higher energy to perform capsulotomy showed greater rise in intraocular pressure and more reaction in the anterior chamber. This has been also reported by some other investigators.[7] Anterior uveitis responded well to a single drop of homatropine 2% and antibiotic-steriod drops t.i.d. for seven days. The rise in intraocular pressure returned to normal with a short course of acetazolamide and timolol drops. The hyphema in one case cleared spontaneously without any sequelae.

The visual improvement after Nd:YAG laser capsulotomy is equal, if not better, after conventional surgical capsulotomy. However, the relative cost, the patient convience, and reduced incidence of complications are significant advantages of YAG capsulotomy. Judiciously applied, the YAG posterior capsulotomy is an excellent option available to ophthalmologists of Pakistan for treating patients with opacified posterior lens capsule.

Acknowledgement

Thanks are due to Prof. A.J. Daula, F.R.C.S., and Dr. Tahseen Sahi, F.C.P.S., for letting me study their cases, and Mr. Imtiaz Ali for typing the manuscript.

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Ophthalmic 'Pastpourri"

"The Noble" and "The Oldest"

The ancient Assyrians believed that the "eye diseases can be cured by a harlot's spittle."

From an inscription on a clay tablet from Nineveh
(Gifford, E, Jr.: The Evil Eye, New York, Macmillan-1958)

Designs, Devices

THE "SPIDER" INTRAOCULAR LENS*

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ABSTRACT: The "Spider" intraocular glass lens, designed by the author, comes in two sizes, 12.5 mm and 13.5 mm, and two powers, +19 and +21 diopters. It has been successfully implanted with good results after intracapsular or extracapsular cataract extraction in many Asian countries.(Pakistan Journal of Ophthalmology, 5:45-48, April, 1989.)

During the past decade of intraocular lens (IOL) development, various new IOLs made their debut with fanfare, but some of these were soon withdrawn from market and replaced by others due to the high incidence of complications associated with their use. For example, the iris-clip lenses, which were widely used 10 years ago, have now almost completely fallen into disuse, because of the complications which occurred in some of the eyes implanted with this lens type. Allegedly, the lens design itself was responsible for those complications. However, we must not forget how rapid and far-reaching have been the progress and change of ophthalmic technology in the same 10-year span of time. Ten years ago, the surgical technique of IOL implantation was quite primitive as compared to what it is today. We did not have many of the things that make today's IOL surgery safer and easier. Therefore, in many past complications associated with IOL implantation, the real cause was a lack of technology rather than a faulty lens design. In my own point of view, the iris-clip lenses are suitable for use in the majority of cases.

We were told recently that anterior chamber lenses (ACL) with closed loops have a relatively high incidence of complications in the anterior chamber angle, and even though this is not the case with open-loop anterior chamber lenses, all anterior chamber lenses have now come to be indiscriminately regarded in the same unfavorable light. In America some months ago, Food and Drug Administration (FDA) decided to place U.S.-made ACL's with closed loops in the "limited use" category, and one manufacturer issued a letter to users explaining its response to FDA's decision. For distribution to Japanese ophthalmologists, however, the letter was partially rewritten to make it appear as if the FDA's restriction applied to all flexible-loop anterior chamber lenses, and the upshot has been to further spur the current shift away from ACLs toward posterior chamber lenses (PCLs).

Following the advent of posterior chamber lenses, neodymium: yttrium, aluminum, garnet (YAG) laser was introduced for ophthalmic use, and many cataract patients are now made to undergo surgery twice because of late opacification of the posterior capsule. It seems as though the current PCL design concept leans more toward promoting the use of YAG laser in posterior capsulotomy than toward preventing after-cataract. Moreover, in the name of patient education, cataract patients are often given misleading information. Fox example, through mass media and at doctors' offices, they are told that posterior chamber lens and YAG laser represent the latest achievements in medicine and that the surgery should be performed in steps, namely, cataract extraction as a primary procedure and laser capsulotomy as a secondary procedure.

I think it is about time we took a long hard look at the crass commercialism that underlies this modern trend. An iris-clip lens was available for about U.S. $150 ten years ago, and an anterior chamber lens for about U.S. $250 as recently as five years ago. Today these lenses have been largely replaced by posterior

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chamber lenses which cost U.S. $350 to U.S. $450. Installing a YAG laser unit also means a huge capital outlay for the ophthalmologist.

The steady rise of medical expenditures is a worldwide problem today. In the U.S., almost all eye surgeries have been changed to ambulatory procedures in the last few years in order to cut the hospitalization costs. But as the saving still is not enough, the government is planning to eliminate assisting surgeons' fees altogether to further slash the cost of cataract surgery by 50%. In my country too, medical service is controlled by the governmental social insurance system, and the determination of medical fees by the government is developing into a knotty political issue.

In every country, the spiralling cost of medical equipment and devices is now a matter of major social concern. Particularly in the less developed parts of the world, high-priced medical devices are beyond the reach of the majority of patients. The sole beneficiary of this phenomenon is the profit-oriented medical industry. The real reason why the basic IOL design has been changed in recent years in favor of posterior chamber lenses is not because PCL is intrinsically superior to ACL, but because such a change means more business and bigger profits to the manufacturers of posterior chamber lenses and YAG laser units. The same holds true of Healon versus methylcellulose. Naturally, manufacturers want to see doctors use costlier Healon, rather than methylcelullose. To put a curb to overcommercialization of today's medicine, we must redouble our efforts to develop lower-priced alternative products of equal or higher efficacy. I have designed and introduced what I call the "spider" lens as such an effort, on my part.

Almost all intraocular lenses are made of polymethylmethacrylate (PMMA) today. The idea of using this acrylic polymer to make IOL probably started with Harold Ridley of London, who found a fragment of a Spitfire fighter plane's acrylic canopy innocuously lodged in an eye of a pilot wounded in World War II. PMMA also is used to make contact lenses, so it was contact lens manufacturers who first began to commercially produce PMMA intraocular lenses.

Polymethylmethacrylate is a relatively stable plastic but it is not without some drawbacks. It cannot be heat-sterilized, it absorbs the sterilizing ethylene oxide (EO) gas, and it may not be as long-lived as we wish it to be. Because of suspected long-term degradability, a PMMA lens implanted in a pediatric patient may have to be replaced within the life-time of the child. Evacuation of EO gas from PMMA is not easy. Many U.S.-made IOLs imported into Japan have been found to contain the gas in concentrations many times higher than the FDA-prescribed safety level, and there is a high risk of sterile uveitis in eyes implanted with such lenses.

Glass, besides being autoclavable, has better biocompatibility and a higher refractive index than PMMA, and a wetting angle of only 7 degrees. A glass lens therefore can be made as thin as 0.3 mm, compared with 0.5 to 0.9 mm for a PMMA lens. Also, the life of glass is longer than 2,000 years.

Glass lenses were first introduced by Lynell Medical Technology, Inc., of the United States. The company started with an iris-plane lens of the Maltese Cross type, and next came up with a Binkhorst-style iris-clip lens. These lenses had haptics or loops made of polyimide, a very sturdy thermo-stable plastic with wide applications in space technology, whose life in a natural environment is estimated to be at least several hundred years long. Polyimide, however, is a brown-colored plastic and therefore has a cosmetic problem in blue eyes. Lynell tried to overcome this problem by changing the lens design for posterior chamber placement so that the brown loops would be hidden behind the iris. But this idea was defeated by the advent of YAG laser, as the glass optic of the lens did not withstand YAG laser shots. In the end, the company was forced to withdraw from the U.S. market.

Despite Lynell's commercial misfortune, the fact remains unchanged that the glass-polyimide combination as an IOL material has several important advantages over PMMA. Glass is a natural ultra violet (UV) filter, in addition to being non-biodegradable and more biocompatible than PMMA. Also, owing to its low wetting angle of 7 degrees, a glass optic collects only a minimal amount of pigment cell dust deposit on its surface, thus reducing the incidences of postoperative uveitis and pupillary membrane formation. Polyimide is a thermo-stable plastic that withstands high temperatures of up to 450° C, and its high flexibility gives the lens implant excellent adjustability. A polyimide loop can be made as thin as 0.08 mm, compared with 0.17 mm for a polypropylene loop.

In my series of nearly 12,000 IOL implantations, over 3,500 glass lenses were implanted with excellent results. About half of these were iris-clip lenses and the rest were posterior chamber lenses. The iris-plane type lenses were implanted mostly in diabetics and in suspected cases of retinal lesions, such as branch retinal vein occlusion. Photocoagulation, retinal detachment surgery, and even vitrectomy were successfully performed through the large pupil allowed by the eyes implanted with this type of lens.

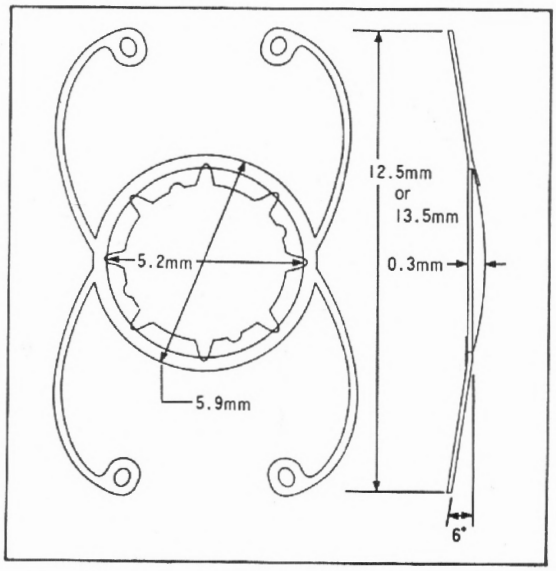


Figure 1 (Momose): Specifications

Materal
Optic = High index optical glass; Loops & lens
Rim = Polyimide

Dimensions
Optic diameter: Lens = 5.2 mm; Optic portion incl. rim = 5.9 mm
Optic thickness: 0.3 mm at center (plano-convex)
Overall length: 12.5 mm & 13.5 mm
Loop angulation: 6° towards the plano side

Refractive Power
Available in +19 & +21 diopters

Weight
In air = 11.7 mg; In normal saline = 9.5 mg (max tolerable weight in eye is 25 mg)

Based on this experience, and bearing the needs especially of Afro-Asian patients in mind, I have designed a glass and polyimide universal lens that can be mass-produced at very low costs. The lens resembles a spider in shape (Figure 1), and so I have named it "spider lens". The spider lens is completely inert in the eye, and its brown loops present no cosmetic problem in the dark Afro-Asian eyes. It has already been implanted in many eyes in India, Nepal, Sri Lanka, the Philippines, Korea and China, as well as Japan, achieving a very favorable acceptance in each country. The lens is not sterile as supplied. Prior to use, the user must autoclave it for 30 minutes at 1200° C (2500° F) in the sterilization pouch in which it is packed. For resterilization, the lens is placed back in the pouch and autoclaved again, or boiled alone in distilled water in a test tube for 30 minutes. The lens optic, made of very thin glass, must never be grasped with a forceps. It should always be grasped by the polyimide loop or rim of the optic. The lens may be cracked by YAG laser if the beam is focused on it. Yag laser capsulotomy can be performed without damage to a lens in

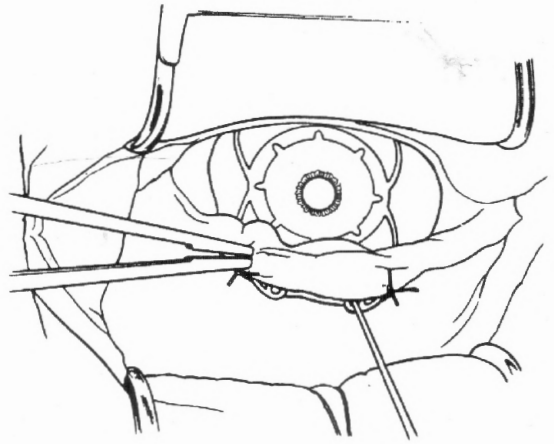


Figure 2 (Momose): Anterior chamber implantation of the "Spider" lens.

the anterior chamber provided the focus is on the posterior capsule, but when a lens is in the posterior chamber, capsulotomy, if indicated, must be performed surgically. (Argon laser will do no damage to the lens.) The rim notches are smaller on the plano side, which serves as an additional aid to distinguishing between the plano and the convex side.

At present, the spider lens is available in two sizes, 12.5 mm and 13.5 mm in overall length, and two powers, +19 and +21 diopters.With these parameters the lens can cover almost all cases in the Afro-Asian countries, since in these countries YAG laser is not in common use and power calculation is usually not done before implantation. Many Afro-Asian surgeons are still doing cataract extractions by the intracapsular method, and fortunately cystoid macular edema rarely occurs in the pigment-rich eyes of Afro-Asian patients. The spider lens has another important advantage that it can be autoclaved or even boiled in a test tube for easy sterilization. This lens meets Afro-Asian ophthalmologists' requirement for an inexpensive IOL of excellent quality.

Very recently, the price of posterior chamber lenses dropped very much, because of over production and the cut-down of medical fee in the USA. Those lenses which cost $350 are now sold for $70 and sometimes for $30 in bulk. However, quality of those lenses has also dropped. They are often scratched, cracked and dusted. The labelled and actual powers may also be different.

For anterior chamber implantation, a 12.5 mm lens is used in eyes with horizontal corneal diameters of 11.5 mm or less, and a 13.5 mm lens in eyes between 11.5 mm and 12.5 mm. However, even if the larger size lens is implanted in a small eye, it will cause no more than a slight vaulting of the lens in the anterior chamber, with no harmful effect. Cataract extraction may be performed by any technique favored

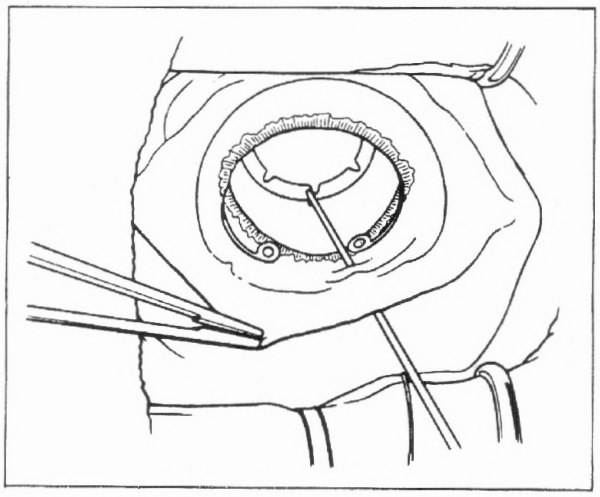


Figure 3 (Momose): Posterior chamber implantation of the "Spider" IOL.

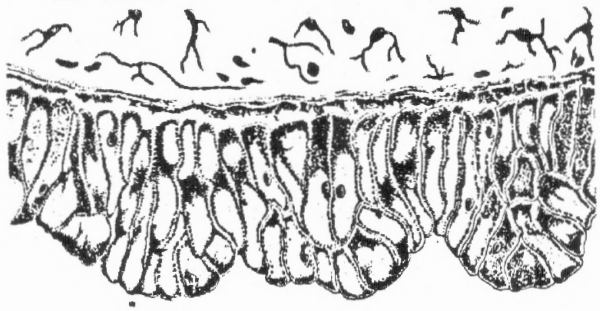
by the surgeon. The corneoscleral incision is extended or closed down, as needed, to fashion a 7.0 mm opening for lens insertion. The anterior chamber is formed with methylcellulose 2% or Healon. The loop or rim of the lens is grasped with the convex side facing forward, using an untoothed forceps, then slid into the anterior chamber (Figure 2). The glass portion of the optic should not be grasped. If a loop tucks the iris, the lens should be withdrawn a little to free the loop before reinsertion is attempted. The upper loops are introduced into the anterior chamber with a Sinskey or Lester hook. A peripheral iridectomy is made between the two upper loops after insertion. The viscous material is washed out and the wound is closed watertight.

For posterior chamber implantation procedure the lens size to use is 13.5 mm for out-of-the-bag placement and 12.5 mm for in-the-bag placement. Cataract must be extracted by planned ECCE or phacoemulsification. The corneoscleral incision is extended or closed down, as needed, to fashion a 7 mm opening for lens insertion. The anterior chamber is formed with methylcellulose (2%) or Healon. For in-the-bag placement, the viscous material is also injected into the capsular bag on the inferior side. First, using an untoothed forceps, the lower loops are directed inward to go in between the iris and the anterior lens capsule or into the capsular bag, with the convex side of the lens facing backward (Figure 3). Next, the upper rim of the optic is engaged by a Lester hook and the lens is pressed deep down posteriorly, which allows the upper loops to go into position. If the pupillary size is small, the upper loops are manipulated into position one by one by using Sinskey or Lester hook. The viscous material is washed out and the wound is closed watertight.

Ophthalmic "Pastpourri"

Lacy Vacuolation of the Pigment Epithleium in Diabetic Iridopathy

In 1887:



From **Kamocki, V:** Pathologisch-anatomische Untersuchungen von Augen diabetischer Individuen. Arch f Augenh 17:247, 1886-1887. (The first description of histopathology in diabetic eyes.)

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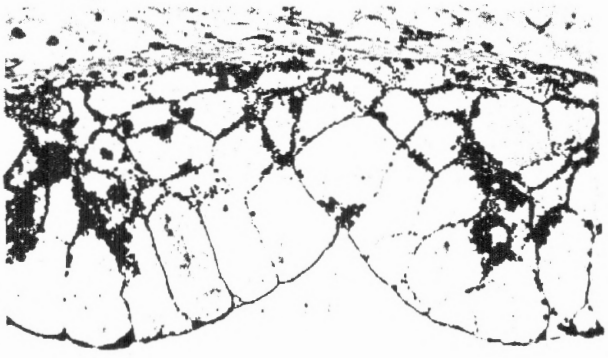
Today:



From **Yanoff, M, Fine, BS:** Diabetic lacy vacuolation of iris pigment epithelium. A histopathologic report. Am. J. Ophthalmol. 69:201, 1970. (Reproduced by permission of the author and the Ophthalmic Publishing Company.)

Ideas, Innovations

A Modified Frontalis Suspension for Ptosis

Muhammad Munir-ul-Haq, M.D., Asad Aslam, M.D., Tayyab Afghani, M.D., Ajmal Rahman, M.D., Muhammad Aftab, M.D., Suhail Sarwar, M.D.

ABSTRACT: A modified frontalis suspension for ptosis correction in eyes lacking sufficient levator function employs two mm wide autogenous fascia lata strip, sutured to the full length of tarsus. Out of a total of 100 patients, 25 (25%) of whom were bilateral, this method gave satisfactory results in 97. Both eyes were operated on in one sitting in bilateral cases. Undercorrection, which was cosmetically acceptable in most instances, was the only complication in less than 10% of the patients. (Pakistan Journal of Ophthalmology 5:49-50, April, 1989.)

The treatment of ptosis depends on the function of levator. Resection of levator is the procedure of choice when the lid can be lifted more than two millimeters.[1,2,3] If the levator function is poor or absent i.e. the lid is lifted less than four millimeters, the preferred treatment is the frontalis sling.[4] The frontalis suspension of the ptotic eyelid may be accomplished by fascia lata, sclera, or one of the synthetic materials.[1-4] We present results of a modified frontalis sling using autogenous fascia lata.

Material and Methods

One hundred patients, varying in age from three to 20, with ptosis and very poor levator function, less than four mm, were included. Each patient had complete general physical and ophthalmic examinations. The patients included in this study had ptosis of 4 mm or more, or had pupil covered by the upper eyelid. in 25 patients (25%), the ptosis was bilateral.

In the eye examination, the degree of ptosis and the levator function were assessed, in addition to a routine ophthalmic evaluation. To correct ptosis, an autogenous fascia lata sling from the frontalis muscle was used in a modified technique used by one (Professor Munir-ul-Haq) of us.

Procedure: The operation is performed under general anesthesia. In order to get fascia lata, the knee is flexed and the foot slightly internally rotated. A four to six cm incision is made above the knee joint on a line joining anterior iliac spine and the head of the fibula. After the dissection of subcutaneous tissue, two parallel and one cm apart incisions are made in the exposed fascia lata. An eight to nine cm strip of fascia lata is removed and kept in saline soaked gauze pads.

The lid is stretched on a lid spatula and steadied by a lid suture clamped to the drape. A horizontal through and through skin incision along the crease of the lid is made. The tarsal plate is exposed to its full length after cleaning the muscle and fascia, but without disturbing the levator insertion (Figure 1).

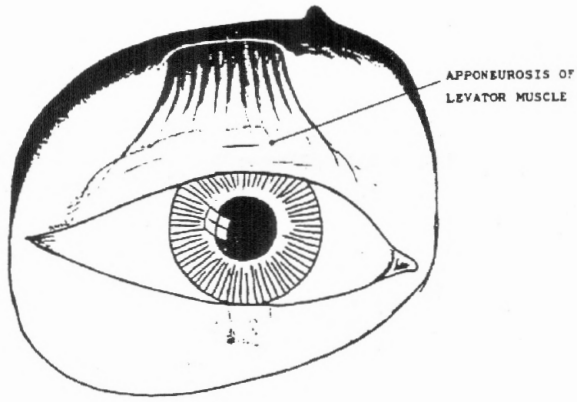


Figure 1 (Munir-ul-Haq & Associates): Full-length tarsus exposure without disturbing the levator attachments.

From the Institute of Ophthalmology, Mayo Hospital, King Edward Medical College, Lahore, Pakistan.
Reprint requests and inquiries to Professor Muhammad Munir-ul-Haq, Director, Institute of Ophthalmology, at the above address.

The central part of a two mm wide fascial strip is placed on the tarsal plate at the junction of lower one third with the middle one third of the tarsal plate, and stitched to it with 5-O braided silk. The two tail ends are carried up under the skin through subdermal tissue with a Savin's knife. To accomplish this, two incisions are made along the upper border of the eyebrow. Each incision is one centimeter long and lies slightly medial to the nasal and lateral to the temporal end of the horizontal lid incision. A needle with a 5-O silk is passed through each tail end of the fascial strip. Savin's knife which has a hole at its tip is passed through the incision at the superior orbital margin and passed down under the skin to reach the tarsal plate. The needle with the fascial strip is passed through the hole of the knife. The knife is pulled up to bring out the strip through the incision at the upper orbital margin. The same is repeated for the other end of the strip. Both ends of the fascial strip are pulled up so that the lid margin comes to lie at the level of superior limbus. The fascia is stitched to the frontalis muscle at the level of the upper border of the eyebrow. The excess fascia is excised. This is also done on the other end. (Figure 2). The skin is closed with interrupted sutures of fine silk. In bilateral cases, both eyes were operated on at the same sitting. The stitch through the upper lid is carried down to be pasted on the cheek. Another stitch is pasted through the lower lid and is carried to the forehead and is pasted there. An antibiotic ointment is put in the eye and a pressure dressing with vaseline gauze applied to reduces the chances of hematoma formation. The patient also receives a course of systemic antibiotics. The followup period extended from six months to two years.

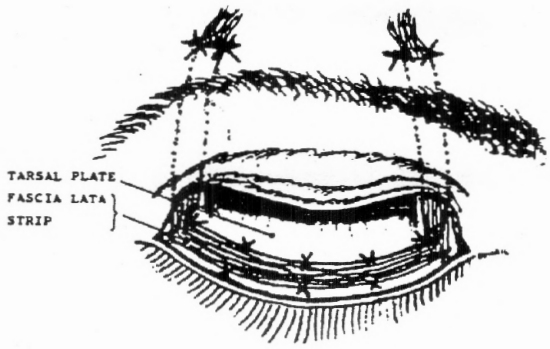


Figure 2 (Munir-ul-Haq and Associates): Two-millimeter strip of autogenous fascia lata is sutured to the tarsus with 5-O silk sutures at the junction of lower and middle thirds. Both limbs of the fascial strip are carried upwards under the skin and sutured to the frontal aponeurosis just underneath the upper border of the eyebrow.

Results and Comments

Out of a total of 100 cases, only three developed a degree of undercorrection that was functionally and cosmetically unacceptable. The most remarkable aspect of this technique is that no lid deformity or loss of skin fold developed even after six months to two years of followup. Also, the direct suturing throughout the length of the tarsus maintains the normal eyelid curve.

Our technique differs from the popular Crawford,[5] Johnson,[6] or Fox[7] fascial sling operations in not creating "U", "W", or "M" configurations of the fascial strip. Also, our technique creates a definite attachment of the sling to the entire length of the tarsus, safeguarding against any slippage, erosion, lid deformity, or curvature abnormality. We understand that a technique somewhat similar to ours is also gaining popularity in the United States.

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Please Note!

Due to the Holy Month of Ramadhan's coinciding with April this year, the April issue of the JOURNAL is appearing in May. The July and October issues will appear as ususal, *InshaAllah.*

-Editor

عید مبارک

Figure 1:

Spontaneous Remission of Congenital Glaucoma

ABSTRACT: A 17-year-old Black boy had large corneas (14 and 14.5 mm) with linear faint scars and breaks in Descemet's membrane presumed to be due to a spontaneous remission of congenital glaucoma. The correction of patient's moderate myopic astigmatism gave visual acuity of 20/20, OD and 20/30, OS. The intraocular pressure was normal. (Pakistan Journal of Ophthalmology 5:34,51, April, 1989.) Reprint requests to Khalid J. Awan, FPAMS, 238 Jinnah Colony, Faisalabad, Pakistan.

The cornea in Figure 1 shows scattered faint band-like opacities. These were accompanied by old ruptures in Descemet's membrane. This patient was a product of normal pregnancy and natural delivery without the use of obstetrical forceps. As there was no other history of trauma, the ruptures in Descemet's membrane and accompanying scarring were not regarded as traumatic. Moreover, the linear scars were not vertically orientated as is usually the case in birth trauma. In megalocornea, other signs of glaucoma and tears in Descemet's membrane are not present.[1] It is known that "occasionally a spontaneous remission or cure may occur in congenital glaucoma".[2] This remission or stabilization of congenital glaucoma in early youth may be explained by "a stretching process opening the trabeculae of the angle of the anterior chamber, or by the disappearance of abnormal embryonic tissue in this region."[3] This spontaneous remission of congenital glaucoma appears to have taken place in this patient.

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Figure 2:

Unique Combination Of Rare Venous Anomalies of the Retinal Veins

ABSTRACT: A 32-year-old woman had a unique combination of rare retinal anomalies of veno-venous crossing, venous bifurcation, triconfluence of veins, and venous ring in the same eye. These interesting retinal vascular anomalies in the left eye did not effect its visual function. (Pakistan Journal of Ophthalmology 5:35,51, April, 1989.) Reprint requests to Khalid J. Awan, FPAMS, 238 Jinnah Colony, Faisalabad, Pakistan.

The major vessels of the retina on the disc in Figure 2 show a bifurcation of the upper nasal retinal vein. One branch of this bifurcation is anastomosing with the upper temporal vein, and the other is running inferiorly to join a temporal vein and form a venous triconfluence, with another small temporal vein crossing the disc. The stem vein so formed continues to the center of the disc to form a venous ring by joining the upper temporal vein coming from behind the superior temporal artery. As I [1,2] proposed previously, such anomalies form due to an irregular absorption of the fetal vascular network and the connective tissue of Bergmeister's papilla. These anomalies are rare even individually, but a combination of all of them in the same eye is undoubtedly a unique phenomenon.

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FIGURE 3:

Traumatic Endothelial Corneal Pigment Ring

ABSTRACT: A 12-year-old boy developed an unusual annular deposit of iris pigment on the endothelial surface of the right cornea in the area of a BB shot impact. Interestingly, there was no other corneal injury or Vossius ring on the anterior lens capsule. Although accompanying iridocyclitis cleared with return of normal vision within a week, the pigment deposits on the corneal endothelium persisted for many weeks. (Pakistan Journal of Ophthalmology 5:35,52, April, 1989.) Reprint requests to Muhammad Humayun, FRCS, 176 Portland Street, Suite 306, Dartmouth, Nova Scotia B2y 1J3 Canada.

In Figure 3, there is a circular area in the mid-cornea located inferior to the pupil. Slit lamp examination confirmed this appearance to be due to annular pigmentary deposits on the posterior surface of the cornea. There was moderate inflammatory reaction in the anterior chamber, but no damage to the epithelium or stroma of the cornea, or a Vosius's ring on the lens capsule were present. The size and shape of the area involved was more compatible with the size and shape of the BB pallet than with those of the pupil, giving indication that the pigmentation was a result of a localized momentary indentation of the cornea against the iris by the BB shot, and not due to a forced apposition of the pupil against the cornea from the sudden loss of anterior chamber on impact. An absence of Vossius ring further verifies this. Such annualr pigment deposits on the corneal endothelium after concussion injury happen only occasionally, [1] and to see this happen from a direct impact of BB shot on the cornea is exceptionally unusual. Apparently, the distance of the eye from the BB gun diminished its projectile force enough as to prevent the perforation of the globe.

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Figure 4:

Secondary Cyst of the Superior Fornix

ABSTRACT: A 28-year-old man suffered repeated external ocular irritation from a conjunctival cyst at the upper border of the tarsus of the upper eyelid. The cyst appeared long time following a small foreign body of undetermined origin became lodged in the superior fornix. The removal of the cyst brought total relief. (Pakistan Journal of Ophthalmology 5:35,52, April, 1989.) Reprint requests to Ashfaq-ur-Rahman, M.D., 238 Jinnah Colony, Faisalabad, Pakistan.

The Figure 4 shows a multiloculated conjunctival cyst on the superior border of the tarsus after the eversion of the upper eyelid. The center of this cyst contained small amount of dark foreign material engulfed in granulation tissue.

The benign cysts of the conjunctiva may be traumatic due to epithelial cells implantation, or nontraumatic. The latter type may be glandular retention cysts, cysts due to epithelium in the case downgrowth, or those formed by a union of natural conjunctival folds.[1] These cysts are usually asymptomatic. The location and morbidity of the cyst presented here is interesting.

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Critiques

Book Reviews

THE GLAUCOMAS, Volumes 1 and 2: By Robert Ritch, M. Bruce Shields, and Theodore Krupin, Editors. St. Louis, The C.V. Mosby Company, 1989, Hardbound, full size, 1220 illustrations, 4 color plates, 30-page index, 1347 pages, U.S. $160.00.

This impressive publication is not the latest edition of the 1951 book of the same name by H. Saul Sugar and the same publisher. Although Sugar's *The Glaucomas* was recognized as "a concise and vivid presentation" of problems of glaucoma and a "reliable and competent guide in all matters pertaining to (their) management" in its time, it is outdated and out of print today. The remarkable advances in the understanding and medical and surgical management of glaucomas that have recently appeared on the scene, make **The Glaucomas** by Ritch, Shields, and Krupin one of the most desirable and well-timed publications in ophthalmology. The editors, all three recognized leaders in glaucoma, have brought together 94 other experts, one Australian, one Canadian, one English, two Finnish, one Japanese, two West Germans, but mostly Americans to shed the most up-to-date light on 74 topics, ranging from anatomicophysiological to diagnosticotherapeutic aspects of glaucoma. The publisher, in the excellent tradition of Mosby, has produced a highly impressive printing on a top quality paper. The book is divided into eight parts, Anatomy and Pathophysiology, Determination of Functional Status in Glaucoma, Pharmacology, Laser Surgery, Glaucoma Surgery, Classifications and Mechanisms, The Primary Glaucomas, and the Secondary Glaucomas. Each part is further subdivided, depending on the number of topics in it, into a varying number of chapters. The longest Part One has 12 chapters and the shortest Part Six only one chapter in it, the first five parts constitute the Volume 1 and the remaining three parts the Volume 2. The eight pages of color illustrations are placed at the end of the Volume 1, before a 30-page index, which is also included in the Volume 2.

One of the very informative and enjoyable aspect of this book is that most chapters have introductory historical notes. Also where appropriate and possible, the chapters end with concise commentary on the future exciting developments in the field of glaucoma. The text is the most comprehensive one is likely to find anywhere on glaucomas. The exhaustive references are so current that the book is undoubtedly a most reliable reference work for students and researchers alike. The diagnostic and therapeutic aspects of each glaucoma are dealt with so clearly and completely that no clinician will feel discontented. The inclusion of a discussion on topics like angle-closure glaucoma in acquired immune deficiency syndrome (AIDS), the measurement of aqueous flow by fluorophotometry, Nd:YAG laser transcleral cyclophotocoagulation, etc. confirms the up-to-datedness of this impressive text. Most of the chapters have a high quality of content and writing. I was most impressed by the chapters on the blood supply of the anterior optic nerve, aqueous humor formation, uveoscleral outflow, automated perimetry, laser surgery, angle-closure glaucoma, glaucoma in the phakomatoses, neovascular glaucoma, and secondary glaucoma in aphakia.

At the conclusion of the excellent chapter on neovascular glaucoma, the author makes a statement that holds true for all knowledge and is worth repeating here. He ends the chapter with a note that "despite what we are capable of now doing to prevent and treat glaucoma, this knowledge is not being disseminated (and) we cannot use what we have not learned." He further cites the examples of the deplorable lack of knowledge about implications of Diabetic Retinopathy Study to make this point. It is the desire and ability of an author to include such thought provoking reflections that gives a heart to a scientific writing.

I found a few minor biases and oversights in some parts of the book. The author of Chapter 5 makes a categorical statement that the capillaries in the optic nervehead "do not establish collateral circulation in the event of occlusion of their afferent arterioles." The permanent loss of sight following the ischemic death of nerve fibers due to an arteriolar occlusion does appear to support the author's point of view, however, in rare instances collaterals following arteriolar occlusion do develop, and I recently observed such a case. Although Nd:YAG laser trabeculopuncture is mentioned on page 615, the author on congenital glaucoma does not mention, even for historical reasons, the goniopuncture that was devised many years ago by the founder of the institute of one of the editors of the book. I strongly disagree with the author's view that posterior sclerotomies to evacuate blood in expulsive choroidal hemorrhage are "rarely needed". It is also not advisable to immediately administer intravenous acetazolamide and mannitol after the closure of wound. It will lower the intraocular pressure and allow the bleeding not only to continue but also cause further splitting of the ocular coats, resulting in a greater damage to vision. Since the closure of wound is the most important and urgent step, I find it unnecessary to attempt to reposition the prolapsed iris as the author suggests. The repositioning

of the iris can be successfully achieved weeks later after the eye has been saved, as I reported in a recent publication. This reviewer also felt that a few figures (on pages 723 and 724) were anatomically inaccurate. These are all very minor points, and do not affect the great usefulness of this book.

The reviewer of the first edition of Sugar's *The Glaucomas* wrote that it was "well rounded, clearly organized, and eminently practical." In addition to all of that, **The Glaucomas** by Ritch, Shields, and Krupin is also infinitely more comprehensive and lucid. No ophthalmologists or medical library should be without it.

DISEASES OF THE ORBIT: A Multidisciplinary Approach. By Jack Rootman. Philadelphia, J.B. Lippincott Company, 1988. Hardback, profusely illustrated with black and white figures, 14-page color atlas of orbital anatomy, 628 full-sized pages, indexed. U.S. &116.00.

The author is a professor of ophthalmology and pathology with special interest in the orbital diseases. In fact, he is the Chairman of Ocular and Orbital Pathology Group, Cancer Control Agency of British Columbia in Canada. In addition to his own tremendous knowledge and experience in disorders of the orbit, he has utilized the expertise of 17 other renowned colleagues in the fields of ophthalmology, pathology, radiology, and oncology to produce this impressive work. The printer has used the highest quality of paper, printing, and illustration reproduction to make it an outstanding publication.

The diseases of the orbit is one of the youngest ophthalmic subspecialties, having only a small percentage of practicing ophthalmologists showing interest in it. Fortunately, there are a few highly capable individuals in our field whose greatest interest lies in the orbit. Dr. Rootman is one of the most distinguished among them, and his dual expertise in pathology and ophthalmology make him the likliest choice to write a text on the orbital diseases.

The contents are divided into four parts: Anatomy of the Orbit; Pathophysiologic and Anatomic principles of Classification, Diagnosis, and Investigation of Orbital Disease; Diseases of the Orbit; and management of Diseases of the Orbit. The first part contains perhaps the best published presentation of the anatomical details of the orbit and included an exquisite color mini-atlas. The second part of the book is a genuine confirmation of the author's view that "a good analytical approach is the best tool for patient care." The third part contains discussion of inflammatory diseases, lymphoproliferative and leukemic lesions, Graves' orbitopathy, tumors, structural lesions, vascular lesions and degenerations and depositions. The part four deals with indications and procedures for surgical management of orbital disorders. One drawback of the book is that instead of citing references in the text and listing them at the end of each chapter, the author provides only a bibliography. The text appears to be based mainly on the author's own experience and opinions. This well-written text will be very useful to those who treat orbital disorders.

OPHTHALMIC SURGICAL PROCEDURES. By Peter S. Hersh, M.D. Boston, Little, Brown and Company, 1988. Hardcover, full-sized, 416 pages, index. U.S. $65.00.

This book follows the typical style of a how-to-do atlas, each page of text is accompanied by a facing page of line drawing. The author is an Instructor in Ophthalmology at the Harvard Medical School, and an Assistant at the Massachusetts Eye and Ear Infirmary in Boston (USA). He apparently has based this "teaching tool" for the beginning ophthalmic surgeon on his own practical needs during his training. The result is a rather "useful adjunct to the reader's day-to-day learning."

The book is divided into nine parts: Introduction, General Ophthalmic Procedures, Strabismus, Cataract and Intraocular Lens Surgery, Glaucoma Surgery, Corneal Surgery, Vitreoretinal Surgery, Oculoplastic Surgery, and Laser Procedures. After a concise description of instrumentation, preoperative and postoperative care of the patients and anesthesia techniques in the introductory section, the book embarks upon simple and step-by-step description of various surgical procedures. The illustrations are line drawings of excellent quality, both in execution and explanation. The book is not all inclusive and gives only one technique for each procedure with the idea to give a feeling and foundation for the basic surgical operations to the trainee, leaving further improvements and innovations to his own technical and literary aggressiveness.

In all, the book describes in an easy to understand text and illustrations 54 procedures ranging from the simplest corneal foreign body removal, to the complex and exoteric pars plana lentectomy, to the sophisticated laser treatment of choroidal neovascularization. The chapter on general ophthalmic procedures also includes the technique for temporal artery biopsy. The chapter on strabismus surgery gives operations only on the horizontal muscles and the inferior oblique, whereas the section on cataract surgery contains even the pars plana lentectomy. This, of course, is a result of author's own milieu and biases. Nevertheless, all sections of the book are well-balanced.

The book has one drawback in that it merely enumerates the complications of each surgical

procedure, and does not give any direction as how to combat them. The author might have thought this to be out of the scope of this book, but how can any surgical procedure be considered successful and a surgeon capable of performing it on a patient without a successful handling of unwanted aspect of the operation. Nevertheless, the book is a very valuable tool for learning ophthalmic surgery for students, trainees, and those who assist surgeons in executing the ocular operations safely.

CONN'S CURRENT THERAPY-1989. By Robert E. Rakel, M.D. (Editor). Philadelphia, W.B. Saunders Company, 1989. Hardback, full-sized, 1114 pages, indexed U.S. $

This is the 41st edition of this time-honored and highly meritable publication which first made its appearance in 1949 under the editorship of Howard F. Conn. That edition had 12 consulting editors and 200 leading American contributors. Although the majority of the 361 contributors to the 1989 (41st) edition are still Americans, many are from other parts of the world, dealing with entities they have greater expertise about due to prevalence of those diseases in their countries and rarity in the United States.

The usefulness and need of the *Current Therapy* was fully established with the publication of the first edition. Wrote Adler in his review of the first edition: "It is a thoroughly practical book and is highly recommended for its concise and specific directions." A few years later, Vail commented about the fourth edition: Those "who are not familiar (with the *Current Therapy*) have missed a valuable tool in the understanding of modern medical treatment."

Despite tremendous expansion of therapeutic knowledge and options, I feel totally amazed that the *Current Therapy-1989* remains worthy of the above comments and evaluation of earlier editions by those giants of modern ophthalmology. To keep each yearly edition up-to-date without sacrificing its quality is a herculean task, and Dr. Rakel thoroughly deserves our praise for this.

The format of the book is that each expert details his own "method of" management of an entity in which he is most experienced. No reviews of literature are attempted and each author simply presents the latest available management of each disorder. At the end of the book a section of very useful appendices on laboratory values of clinical importance are added. There is also a very significant note at the opening of the book that alerts the reader about double checking "the manufacturer's recommendations for dosage" for the infrequently used drugs.

It is important that every ophthalmologist is familiar with at least one current and popular method of treatment for the systemic conditions in which eye involvement make occur. *The Current Therapy-1989* is the authentic source of finding such information with the least expenditure of energy and time. Every physician should own a copy of this most valuable reference work, regardless of his field of interest. I most highly recommend *The Current Therapy-1989* to our readers.

THE CORNEA: Transactions of the World Congress on Cornea III. By H. Dwight Cavanagh (ed.). New York, Raven Press. Hardbound, full size, 625 text pages, 16-page index, profusely illustrated with a few in color. U.S. $125.00.

This handsomely produced volume is actually a collection of 108 papers that were presented at the Third International Congress on the Cornea, held in Washington, D.C., from April 27 to May 1, 1987. The contents of these papers are the result of ideas and innovations of nearly 400 invited international authorities from 28 countries.

The presentations range from basic science research to hard clinical experiences and opinions. The 108 papers are arranged into 10 sections on The Tear Film and Ocular Surface, Corneal Hydration and Clarity, Cornea and Systemic Disease, Biophysical Aspects of the Cornea: New Technologies, Contact Lenses and the Cornea, Surgery of the Cornea, Corneal Immunology, Dystrophies and Degenerations, Infectious Diseases of the Cornea, and Refractive Corneal Surgery. The first section contains several topics of clinical interest including tear film, corneal epithelial healing and it modification by growth factor, and recurrent erosion. In the second section, corneal preservation, endothelial cell response to irrigation solutions and endothelial function are discussed in very concise and practical fashion. The papers on corneal keratopathy in diabetes, immunodeficiency, and Vitamin A deficiency are the best in the section on systemic diseases. The contact lens practitioners will be most delighted to find state-of-the-art papers on such esoteric topics as contact lens fitting in aphakic infants and after radial keratotomy. Keratoplasty in bullous keratopathy and cataract management in eyes with corneal transplants are very rewarding in the sixth section. The section on corneal degenerations and infectious disorders of the cornea are also splendid.

This text presents up-to-date and state-of-the-art clinical and basic material on most aspects of corneal disease in a concise, clear and beautifully illustrated fashion. It is recommended to all who are interested in research on cornea or those who manage corneal problems from day to day in their clinics.

-KJA

Scholarship Schedules

Pakistan Academy of Medical Sciences

Convocation '89 and Conference on
"Biomedical Research
Publication in Pakistan"
December 23, 1989 at Rawalpindi

The Pakistan Academy of Medical Sciences will hold its Convocation '89 on December 23, 1989 at 10 a.m. at the **Army Medical College in Rawalpindi. President of the Islamic Republic of Pakistan, Mr. Ghulam Ishaq Khan** is expected to deliver the Convocation '89 Address.

The **PAMS Convocation '89** will be followed by a **Conference on Problems of "Biomedical Research Publication in Pakistan."** There will be a reading of the **Pakistan Academy of Medical Sciences Oration** by a very eminent scientist before the discussions. The **PAMS Oration** carries the distinction of the title of **PAMS Professor** for the lecturer. There will be no reading or presentation of papers during the **Conference** discussions. However, all the participants will be given copies of all the written papers that are received by the PAMS Vice President (Pakistan). All interested scholars are invited to send their papers before **November 15, 1989**, to the addresses given below.

Pakistan Academy of Medical Sciences' Junior Award and Gold Medal is given annually to a Pakistani professional holding the position of Assistant Professor or under in any of the medical and biomedical fields for publishing the most outstanding original research paper during the years 1988-89. The PAMS Junior Award and Gold Medal are intended to stimulate interest in research and writing. In addition to a Gold Medal, the recipient is awarded a bursary of Rs. 10,000.00. A committee of experts appointed by The Academy evaluates the entries and decides on the most deserving paper. All interested authors are invited to submit their entries before **September 30, 1989** to:

Professor Najib Khan, FPAMS, Vice President, PAMS, Said Clinic, I.I. Chundrigar Road, Karachi, Pakistan Tel: 214841

OPHTHALMOLOGICAL SOCIETY OF PAKISTAN

XIII Congress at Quetta
May 4-6, 1990

The XIII Congress of the Ophthalmological Soceity of Pakistan will be held on **May 4-6, 1990 at Hotel Serena, Quetta.** Speakers and participants are cordially invited from all parts of the world. Anyone interested in making a presentation should send the abstract(s) of his paper(s) to the **Chairman, Organizing Committee, Dr. Muhammad Naseem Panezai.**

In addition to various symposia and workshops, free papers on surgical and medical aspects of ophthalmology will be included in the program. The closing Pre-Registrations date is December 31, 1989. For further details contact: **Dr. Muhammad Naseem Panezai, Secretary, Organizing Committee, XIII Congress of the Ophthalmological Society of Pakistan, Helpers Eye Hospital, Quetta, Pakistan.**

XXVI International Congress of Ophthalmology March 18-24, 1990

The XXVI International Congress of Ophthalmology is scheduled for March 18-24, 1990, in Singapore. Arthur S.M. Lim, Singapore, is President of the Congress. For further information, write The Congress Secretariat, XXVI International Congress of Ophthalmology, c/o Department of Ophthalmology, National University Hospital, Lower Kent Ridge Rd., Singapore 0511.

University Of Bristol Course In Ophthalmology Starting October 1989

A detailed course in Ophthalmology including lectures, demonstrations and clinical attachments in Bristol Eye Hospital is offered for One Academic Year to a select group of postgraduate ophthalmologists preparing for the D.O. or F.R.C.S. Suitable candidates may apply to convert to an M. Sc. degree (University of Bristol). Further details may be obtained from: Mrs. A. Williams, Department of Ophthalmology, Bristol Eye Hospital, Lower Maudlin Street, Bristol BS1 2LX, England.

Abstracts from Elsewhere

Edited by Khalid J. Awan, M.D. F.P.A.M.S.

AMA Archives of Ophthalmology

ANGIOGRAPHIC CYSTOID MACULAR EDEMA AFTER POSTERIOR CHAMBER LENS IMPLANTATION. PL Wright, CP Wilkinson, HD Balyeat, J Popham, M Reinke. The authors performed a prospective study evaluating the incidence of angiographic cystoid macular edema (CME) following extracapsular cataract extraction and posterior chamber intraocular lens implantation. Of the 162 eyes in the study, 141 were randomized into either a primary capsulotomy or a capsule intact group. The remaining eyes were not randomized due to intraoperative surgical complications, but they were included in the follow-up studies. Six weeks after surgery, angiographic CME was documented in 24% of the capsulotomy group and in 16% of the capsule intact group. The differences were not statistically significant. Including nonrandomized cases reduced the overall incidence of angiographic CME and the difference between the two groups. Angiographic CME was usually not extensive, and it was associated with a visual acuity less than 20/40 in 2.5% of eyes six weeks postoperatively. A subgroup of 120 eyes was followed up for approximately six months, when angiographic CME was present in 4% of the capsulotomy and capsule intact groups. *(Arch Ophthalmol 106:740-744, June, 1988.) Reprint requests to Black Hills Regional Eye Institute, 2800 Third St, Rapid City, SD 57701 (Dr. Wright).*

PROGRESSION OF NONPROLIFERATIVE DIABETIC RETINOPATHY FOLLOWING CATARACT EXTRACTION. GJ Jaffe, C Burton. The authors found progression of nonproliferative diabetic retinopathy following cataract extraction in eight patients. Six patients underwent an uncomplicated extracapsular cataract extraction with placement of a posterior chamber intraocular lens, and in two patients, surgery was complicated by vitreous loss. In each case the retinopathy progressed to a severe exudative form of diabetic macular edema, characterized by diffuse retinal thickening and fluorescein leakage with increased dot and blot hemorrhages and lipid deposition. In all patients, clinically significant macular edema developed in the eye that had been operated on, and six patients received laser photocoagulation for this condition. Final visual acuity was worse than preoperative visual acuity in six of eight patients, and it was unchanged in two of six patients. No patient achieved a visual acuity better than 20/50. The fellow eyes, which were not operated on, remained stable during the follow-up period. *(Arch Ophthalmol 106: 745-749, June, 1988.) Reprint requests to The Eye Institute, Medical College of Wisconsin, 8700 W Wisconsin Ave, Milwaukee, WI 53226 (Dr. Burton).*

COMPARISON OF THE TONO-PEN TO THE GOLDMANN APPLANATION TONOMETER. REP Frenkel, YJ Hong, KH Shin. The authors compared Oculab Tono-Pen tonometry with Goldmann applanation tonometry in 142 eyes of 71 patients without corneal problems. They conclude that the Tono-Pen measures intraocular pressure in a manner that corresponds well to the Goldmann tonometer in the 11 to 20 mm Hg interval, and fairly well in the 4 to 10 mm Hg and 21 to 30 mm Hg intervals. It lacks good correspondence in the 31 to 45 mm Hg interval. *(Arch Ophthalmol 106: 750-753, June, 1988.) Reprint requests to the Kresge Eye Institute, 3994 John R, Detroit, MI 48201 (Dr. Shin).*

PREVENTION OF THE RISE IN INTRAOCULAR PRESSURE FOLLOWING NEODYMIUM - YAG POSTERIOR CAPSULOTOMY USING TOPICAL 1% APRACLONIDINE. IP Pollack, RH Brown, AS Crandall, AL Robin, RH Stewart, GL White. The authors studied apraclonidine hydrochloride (aplonidine hydrochloride or ALO 2145), an a-agonist, for its effect on intraocular pressure (IOP) rise following neodymium-YAG posterior capsulotomy (YPC). In a prospective multicentered double-masked study, 63 eyes were pretreated with one drop of either 1% apraclonidine hydrochloride or placebo one hour before performing YPC and again following the laser treatment. There were five times as many eyes that had an IOP rise greater than 10mm Hg in the placebo-treated group compared with those treated with apraclonidine. Apraclonidine proved to be highly effective in preventing the rise in IOP following YPC. *(Arch Ophthalmol 106: 754-757, June, 1988.) Reprint requests to Department of Ophthalmology, Sinai*

Hospital of Baltimore, Belvedere at Greenspring, Baltimore, MD 21215 (Dr. Pollack).

SURGICAL MANAGEMENT OF PREMACULAR FIBROPLASIA. LS Poliner, RJ Olk, MG Grand, RF Escoffery, E Okun, I Boniuk. The authors reviewed the results of pars plana vitrectomy and membrane peeling for premacular fibroplasia was idiopathic in 61 eyes (69%) and postdetachment in 27 eyes (31%). All patients had a minimum follow-up of 12 months. Visual symptoms of blurring and metamorphopsia were reduced in 75 (85%) study eyes at the end of the follow-up period. Poor visual outcome was significantly related to preoperative cystoid macular edema and prolonged duration of visual blurring. Posterior retinal breaks occurred in three eyes (5%)with idiopathic PMF and five eyes (19%) with postdetachment PMF. Cataract progression was demonstrated in 35 eyes (48%) at 12 months of follow-up and 49 eyes (68%) at 24 months of follow-up. *(Arch Ophthalmol 106: 761-764, June, 1988.) Reprint requests to Retina Consultants Ltd, Suite 17413 East Pavilion, 4949 Barnes Hospital Plaza, St. Louis, MO 63110 (Dr. Olk).*

CORRELATION OF ASYMMETRIC DAMAGE WITH ASYMMETRIC INTRAOCULAR PRESSURE IN NORMAL-TENSION GLAUCOMA (LOW-TENSION GLAUCOMA). MJ Cartwright, DR Anderson. To see whether pressure plays a role in the production of damage, the authors studied 14 cases of normal-tension glaucoma with asymmetric intraocular pressure (1- to 6-mm Hg interocular difference in pressure). In 12 of these 14 cases, they found that glaucomatous cupping and field loss (damage) was greater in the eye with higher pressure. This statistically significant correspondence of the higher pressure with the greater visual damage suggests that the level of pressure is a factor in producing optic nerve damage. Other factors also must contribute to account for the few instances in which damage asymmetry did not reflect interocular pressure-difference and for the occurrence of injury at such low levels of pressure in the first place. Although benefit may be expected from therapeutic lowering of pressure in this condition, the degree of benefit, as well as the side effects from treatment required for successful lowering of pressure, remains to be documented by a future clinical trial. *(Arch Ophthalmol 106: 898-900, July, 1988.) Reprint requests to Bascom Palmer Eye Institute, PO Box 016880, Miami, FL 33101 (Dr. Anderson).*

A COMBINATION OF LEVOBUNOLOL AND DIPIVEFRIN FOR THE TREATMENT OF GLAUCOMA. RC Allen, A L Robin, D Long, GD Novack, JC Lue, G Kaplan. The authors did a double-masked prospective study to compare the ocular hypotensive efficacy and the safety of 0.5% and 1% levobunolol hydrochloride with 0.5% timolol maleate when each was administered topically twice daily in combination with 0.1% dipivefrin hydrochloride in 43 patients. The authors concluded that concomitant treatment with levobunolol and dipivefrin is equal in both efficacy and safety to concomitant treatment with timolol and dipivefrin. *(Arch Ophthalmol 106: 904-907, July 1988.) Reprint requests to PO Box 475, Department of Ophthalmology, University of Virginia School of Medicine, Charlottesville, VA 22908 (Dr. Allen).*

TOPICAL B-BLOCKER THERAPY AND CENTRAL NERVOUS SYSTEM SIDE EFFECTS. A PRELIMINARY STUDY COMPARING BETAXOLOL AND TIMOLOL. MG Lynch, JT Whitson, RH Brown, H Nguyen, MM Drake. Topical B-blocking agents have been associated with adverse central nervous system (CNS) effects, including depression, emotional lability, and sexual dysfunction. Two studies were done to determine if patients who develop CNS effects while using timolol maleate would improve with betaxolol hydrochloride. In one study, 18 patients with CNS symptoms during timolol therapy were switched to betaxolol. Sixteen of the 18 patients noted symptomatic improvement with betaxolol. The second study involved seven patients with CNS symptoms during timolol therapy who were entered into a double-masked cross-over study. In two patients CNS symptoms resolved with betaxolol; in three patients symptoms improved; and in one patient symptoms worsened with betaxolol. Although factors influencing B-blocker activity in the CNS are not well understood, there may be some advantage to a selective agent. *(Arch Ophthalmol 106: 908-911, July 1988.) Reprint requests to the Department of Ophthalmology, Emory University School of medicine, 1327 Clifton Rd NE, Atlanta, GA 30322 (Dr. Lynch).*

TREATMENT OF POSTVITRECTOMY FIBRIN FORMATION WITH INTRAOCULAR TISSUE PLASMINOGEN ACTIVATOR. GA Williams, FH Lambrou, GA Jaffe, RW Snyder, GJ Green, RG Devenyi, GW Abrams. The authors injected 25 micrograms of human recombinant tissue plasminogen activator (tG=PA) intracamerally into the eyes of three aphakic patients who developed

severe intraocular fibrin formation with 24 hours after vitrectomy surgery. In each of the three patients, complete fibrin resolution occurred within four hours after the tPA injection. There were no complications associated with the intraocular tPA injections. Intraocular tPA is an effective means of treating postvitrectomy fibrin formation in selected aphakic patients. *(Arch Ophthalmol 106:1055-1058, August, 1988.) Reprint requests to Eye Institute, Medical College of Wisconsin, 8700 W Wisconsin Ave, Milwaukee, WI 53226 (Dr. Williams).*

PSEUDORETRACTION OF THE EYELID IN THYROID-ASSOCIATED ORBITOPATHY. RS Gonnering. Two patients with previously stable thyroid-associated orbitopathy presented with the fairly sudden onset of apparent upper eyelid retraction in their nondominant eye, accompanied by asymmetry of the eyebrows, with elevation on the side without the eyelid retraction. No other signs of worsening of the orbitopathy were present, and instillation of 2.5% phenylephrine hydrochloride in the contralateral, dominant eye relieved the eyelid retraction and normalized the eyebrow position. At surgery, both patients were found to have levator aponeurogenic ptosis in the eyelid that appeared to be "normal." This occurrence is explained by Hering's law and should be considered in planning surgery to reestablish palpebral fissure symmetry in such patients. *(Arch Ophthalmol 106: 1078-1080, August, 1988.) Reprint requests to 2600 N Mayfair Rd, Milwaukee, WI 53226 (Dr. Gonnering).*

TREATMENT OF CHRONIC MACULAR EDEMA WITH ACETAZOLAMIDE. S Cox, E Hay, AC Bird. In a prospective study, 41 patients with documented chronic macular edema of various causes had a therapeutic trial of acetazolamide sodium. Each patient received a five-cycle cross-over regimen of treatment/no treatment with a further two cycles of cross-over with another diuretic, cyclopenthiazide, which does not inhibit carbonic anhydrase. At each cross-over patients were examined for evidence of macular edema. Sixteen of 41 patients showed a reproducible response to acetazolamide with partial of complete resolution of edema and improvement of visual acuity. The therapeutic effect occurred in more than half of the patients with inherited outer retinal disease or uveitis, but in none with primary retinal vascular disorders. There was no correlation between the response to treatment and the extent or duration of the edema. No influence of cyclopenthiazide on macula edema was detected. *(Arch Ophthalmol 106:1190-1195, September, 1988.) Reprint requests to Professorial Unit, Moorfields Eye Hospital, City Road, London EC1, United Kingdon (Dr. Cox).*

***ACANTHAMOEBA* KERATITIS. POTENTIAL ROLE FOR TOPICAL CLOTRIMAZOLE IN COMBINATION CHEMOTHERAPY. WT Driebe,, Jr, GA Stern, RJ Epstein, GS Visvesvara, M Adi, T Komadina.** Clotrimazole is an antifungal agent that has been shown to have excellent in vitro activity against most strains of *Acanthamoeba*. We encountered four patients who developed *Acanthamoeba* keratitis while wearing contact lenses that had been stored in homemade saline. Their medical treatment regimens included the use of topical 1% clotrimazole. In two patients in whom conventional therapy failed, clotrimazole was successful in controlling recurrent infection following penetrating keratoplasty. Two other patients were treated with clotrimazole as well as propamidine isethionate and neomycin sulfate-polymyxin B sulfate-gramicidin from the outset, and had an excellent response to medical therapy. in those patients who found the commercially available cream uncomfortable, a 1% clotrimazole suspension formulated in artificial tears was used and found to be well tolerated. *(Arch Ophthalmol 106:1196-1201, September, 1988.) Reprint requests to Department of Ophthalmology, University of Florida College of Medicine, Box J-284, JHMHC, Gainesville, FL 32610-0284 (Dr. Driebe).*

MANAGEMENT OF TRAUMATIC HYPHEMA IN CHILDREN. AN ANALYSIS OF 340 CASES. RJ Uusitalo, L Ranta-Kemppainen, A Tarkkanen. The authors examined 340 children with nonperforating traumatic hyphema to verify or refute the possible protective action of the antifibrinolytic agent, tranexamic acid, against rebleeding. In the retrospective study group, 219 children were treated with strict bed rest, binocular patching, and sedation but did not receive antifibrinolytic agents. In the prospective study group, 121 children received systemically administered tranexamic acid; some of these children were confined to bed rest (26 cases and some were allowed free ambulation within their rooms (95 cases). In the children who were treated with bed rest but who did not receive the antifibrinolytic agent, the frequency of secondary hemorrhage was 9.6%. Tranexamic acid reduced the incidence of secondary hemorrhage significantly: none of 26 eyes of patients who received systemically administered tranexamic acid and were confined to bed rest rebled, and only one (1.1%) of 95 eyes of children who received tranexamic acid and were allowed free

ambulation in the hospital rebled. *(Arch Ophthalmol 106:1207-1209, September, 1988.) Reprint requests to Department of Ophthalmology, Helsinki University Central Hospital, Haartmanink 4C, 00290 Helsinki, Finland (Dr. Uusitalo).*

THE FINDINGS OF STANDARDIZED ECHOGRAPHY FOR CHOROIDAL FOLDS. HR Atta, SF Byrne. The authors evaluated 24 patients (31 eyes) with choroidal folds unassociated with orbital tumors with standardize echography. Hypermetropia was the most commonly associated finding (eight eyes); in ten eyes, no consistent abnormal findings could be established. Among the less common causes were swelling of the optic nerve proper of the perineural sheaths and thickened extraocular muscles. Standardized echography demonstrated ocular changes, orbital changes, or both, in all but two patients (two eyes) with idiopathic folds. The most frequent findings were flattening of the posterior ocular wall (18 eyes), thickening of the retinochoroid layer (12 eyes), and distention of the optic nerve sheaths (eight eyes). While fluorescein angiography is well established as the preferred method of demonstrating choroidal folds, standardized echography may now be used to delineate the often subtle associated ocular and orbital findings. *(Arch Ophthalmol 106: 1234-1241, September, 1988.) Reprint requests to Adjunct Instructor in Ophthalmology, Director of Echography, Bascom Palmer Eye Institute, Box 016880, Miami, FL 33101 (Ms. Byrne).*

THE RESPONSE OF DIABETIC RETINOPATHY TO 41 MONTHS OF MULTIPLE INSULIN INJECTIONS, INSULIN PUMPS, AND CONVENTIONAL INSULIN THERAPY. O Brinchmann-Hansen, K Dahl-Jorgensen, KF Hanssen, L Sandvik. The authors randomly treated 45 diabetic patients with continuous subcutaneous insulin infusion (CSII), multiple insulin injections (MI), or conventional insulin treatment (CIT) for 41 months. Near-normoglycemia was obtained with CSII and MI but not with CIT. A transient increase in microaneurysms and hemorrhages was seen at three months in CSII-treated patients. After 41 months, a moderate progression in microaneurysms and hemorrhages was registered, as assessed from fundus photographs, in all treatment groups. Fluorescein angiograms indicated a tendence (not statistically significant) to retarded progression of retinopathy in MI- and CSII-treated patients compared with CIT-treated patients. Soft exudates developed after three to six months of rapid tightening of metabolic control in 50% of patients on CSII and MI regimens. Those patients who had soft exudates had a slower progression of retinopathy three years later than those who did not develop soft exudates. Transient progression of retinopathy may be related to fluctuations in blood glucose levels, although a favorable effect of long-term improved metabolic control was not documented. *(Arch Ophthalmol 106: 1242-1246, September, 1988.) Reprint requests to Department of Ophthalmology, Ulleval University Hospital, Kirkeveien 166, 0407 Oslo 4, Norway (Dr. Brinchmann-Hansen).*

RELIABILITY INDEXES OF AUTOMATED PERIMETRIC TESTS. J Katz, A Sommer. The "reliability" of a subject's automated perimetric test result is generally assessed by three measures: fixation loss and false-positive and false-negative rates. The authors examined there reliability criteria for 76 glaucomatous and 248 normal subjects who underwent visual field testing (C-30-2 program; Humphrey Visual Field Analyzer, Allergan Humphrey, San Leandro, Calif). Of the examination results, 45% in glaucomatous subjects and 30% in normal controls were considered unreliable with the use of the manufacturer's reliability criteria. Most test results were unreliable because they failed to meet the criterion for fixation loss. The greater rejection rate among glaucomatous subjects was entirely due to their higher rate of false-negative responses. Factors such as age, pupil diameter, and visual acuity did not explain the difference between the false-negative rates of glaucomatous patients and normal subjects. *(Arch Ophthalmol 106:1252-1254, September, 1988.) Reprint requests to Wilmer Institute, Room 120, Johns Hopkins Hospital, 600 N Wolfe St, Baltimore, MD 21205 (Ms. Katz).*

OPTIC NERVE SHEATH DECOMPRESSION FOR PSEUDOTUMOR CEREBRI. ND Brourman, TC Spoor, JM Ramocki. The authors studied optic nerve sheath decompressions for pseudotumor cerebri in 10 eyes of six patients. Visual function improved in all ten eyes. A decision to operate was based on progressive loss of visual acuity of visual field unresponsive to medicaltherapy, accompanied by echographic evidence of a distended optic nerve sheath (positive 30^0 test). Follow-up ranged fro four to 11 months. Four patients underwent subarachnoid iopamidol (Isovue) contrast injection followed by orbital computed tomography. The subarachnoid space totally filled in all patients. No evidence of fibrosis or obstruction of the optic nerve sheath existed; however, leakage of dye from the optic nerve sheath could not be demonstrated. Postoperative complications included

transient diplopia and transient atonic pupil (one patient each). The results indicate that optic nerve sheath decompression improves and protects visual function in patients with pseudotumor cerebri who demonstrate progressive visual field loss and fluid in the optic nerve sheath. *(Arch Ophthalmol 106: 1378-1383, October, 1988.) Reprint requests to Kresge Eye Institute, 3994 John R, Detroit, MI 48201 (Dr. Spoor).*

MODIFIED OPTIC NERVE SHEATH DECOMPRESSION PROVIDES LONG-TERM VISUAL IMPROVEMENT FOR PSEUDOTUMOR CEREBRI. RC Sergott, PJ Savino, TM Bosley. The authors studied 23 patients with chronic papilledema associated with pseudotumor cerebri who underwent "modified" optic nerve sheath decompression for treatment of visual acuity and visual field loss. Instead of removing a single, rectangular section of optic nerve meninges, the operation was modified by making at least three longitudinal incisions in the sheath and then lysing arachnoid adhesions with a tenotomy hook. Twenty-one of the 23 patients demonstrated improved visual function after the initial surgery for a mean (+SD) follow-up of 21.5+ 12.3 months (median, 25 months; range, three to 45 months) without reoperation or reinstitution or oral corticosteroid and diuretic therapies. The two patients failing to improve after the first surgical procedure initially had a single meningeal window created and subsequently improved following reoperation with the modified procedure. Twelve of 21 patients with bilateral visual loss had improved visual function bilaterally after unilateral surgery. Six of the 21 patients needed bilateral surgery, and the other three had minor visual field defects in the second eye not severe enough to warrant surgery. Preoperative optic dis pallor did not predict a poor postoperative result. Optic nerve surgery improved the visual function in six patients who had failed to recover vision after one or more lumbarperitoneal shunts. *(Arch Ophthalmol 106:1384-1390, October, 1988.) Reprint requests to Neuro-Ophthalmology Service, Wills Eye Hospital, 9th and Walnut Streets, Philadelphia, PA 19107 (Dr. Sergott).*

HEMANGIOMALIKE MASSES OF THE RETINA. A Campochiaro, BP Conway. The authors followed five patients, each of whom had a solitary unilateral vascular mass of the sensory retina. The lesions were white or pink and ofter had hemorrhage and exudate on their surface of surrounding area. They appeared to be acquired, as three of the five patients were specifically noted to have normal fundi at some time before presentation. Fluorescein angiography and angioscopy demonstrated the masses to be composed of numerous vessels supplied by the retinal circulation. Slow growth was documented in one patient. Visual loss was variable and was due to leakage related complications, including exudative detachment, recurrent vitreous hemorrhage, and cystoid macular edema. Four patients were treated with cryopexy, and in all four, this successfully caused involution of the lesions. Two patients had improvement in vision after treatment: one had stabilization, and one had deterioration. This report provided support for the existence of a distinct entity that we have called hemangiomalike mass of the retina, since no histopatholigic evidence is yet available (to our knowledge). It also supports the use of judicious cryopexy to lesions associated with visual loss. *(Arch Ophthalmol 106: 1409-1413, October, 1988.) Reprint requests to Department of Ophthalmology, University of Virginia School of Medicine, Charlottesville, VA 22908 (Dr. Campochiaro).*

RETINAL REVASCULARIZATION FOLLOWING LASER PHOTOCOAGULATION TREATMENT FOR CHOROIDAL NEOVASCULAR MEMBRANES. PJ Caskey, JC Folk. The authors found retinal revascularization within the treatment scar in 7% of patients who had laser photocoagulation treatment for a choroidal neovascular membrane. This revascularization could be mistaken for recurrent choroidal neovascularization because it initially proliferated into a glomerularlike structure and showed dye leakage on angiography. Unlike choroidal neovascularization, these vessels, however, filled entirely from the retinal circulation and stereoscopic angiograms showed them to be located in the inner retina. In 20 patients who were followed up, the retinal revascularization first appeared approximately four weeks after treatment and persisted for an average of ten weeks. It was associated with dense laser scarring, retinal capillary obliteration, and internal limiting membrane wrinkling, suggesting that heavy initial laser treatment was a predisposing factor for its development. It is important to differentiate retinal revascularization, which has an excellent prognosis and does not require re-treatment, from recurrent choroidal neovascularization, which usually must be treated promptly to avoid loss in visual acuity. *(Arch Ophthalmol 106:1528-1532, November, 1988.) Reprint requests to C. S. O'Brien Library, Department of Ophthalmology, Iowa City IA 52242 (Dr. Folk).*

NATURAL COURSE OF POORLY DEFINED CHOROIDAL NEOVASCULARIZATION ASSOCIATED WITH MACULAR DEGENERATION. M Bressler, LA Frost, SB Bressler, RP Murphy, SL Fine. The authors obtained follow-up data on 84 eyes with age-related macular degeneration in which a poorly defined neovascular membrane was presumed to be present when subsensory retinal fluid was present in association with choroidal leakage on fluorescein angiography and in which the extent of leakage was not well defined. There was a statistically significant difference in the percentage of eyes that developed moderate or severe visual loss among eyes that progressed to disciform scarring compared with eyes that continued to manifest poorly defined leakage without evidence of scarring. The authors support the possibility that poorly defined neovascular membranes represent a major cause of severe visual loss among the elderly in the United States. *(Arch Ophthalmol 106:1537-1542, November, 1988.) Reprint requests to The Wilmer Ophthalmological Institute, Ninth Floor, 550 N Broadway, Baltimore, MD 21205 (Dr. N. M. Bressler).*

EFFECTS OF ROUTINE PUPILLARY DILATION ON FUNCTIONAL DAYLIGHT VISION. PS O'Connor, TJ Tredici, J Pickett, B Byrne, DR Peters. The authors measured the visual acuity of 100 patients between the ages of 16 and 66 years, seen for routine ophthalmologic examination, before and after dilation. All patients had a predilation visual acuity of 20/40 or better. Postdilation binocular visual acuity using the patients' usual correction was measured first in the office and then outdoors, both with the patient's back to and the patient facing the sun, with and without the aid of postmydriatic sunglasses. Twelve percent experienced disabling photophobia even with the use of postmydriatic sunglasses, with 3% having significant objective visual loss defined as 20/50 or worse. No objective visual loss was found in 30 controls examined outdoors before dilation, without sunglasses. The authors recommend that patients who have experienced significant photophobia with dilation in the past, or who have never before undergone dilation, make arrangements for transportation after a dilated examination. *(Arch Ophthalmol 106:1567-1569, November, 1988.) Reprint requests to USAFSAM/NGO, Brooks Air Force Base, TX 78235-5301 (Dr. Tredici).*

CORNEAL DECOMPENSATION AFTER ARGON LASER IRIDECTOMY. AL Schwartz, NF Martin, PA Weber. The authors observed eyes of three patients which developed generalized corneal decompensation after undergoing argon laser iridectomy for angle closure glaucoma. Factors possible associated with corneal decompensation included episodes of angle closure glaucoma with pressure elevations and inflammation, corneal guttata, diabetes, and the need for multiple treatments requiring a high-laser energy. It is important for ophthalmologists to inform their patients of the rare risk of developing bullous keratopathy after argon laser iridectomy and to consider obtaining prelaser specular microscopy to document the corneal status in high-risk patients. *(Arch Ophthalmol 106:1572-1574, November 1988.) Reprint requests to 5454 Wisconsin Ave, Suite 950, Chevy Chase, MD 20815 (Dr. Schwartz).*

MANAGEMENT OF MONOCULAR CONGENITAL CATARACTS. GT Drummond, WE Scott, RV Keech. The authors made a diagnosis of monocular congential cataract was made in 14 consecutive patients from 1971 through 1985. All patients had a visually significant cataract that was documented at birth or within 2 months of age. All patients were followed up long enough to report distance linear recognition acuity. Excellent visual acuity (V/A) correlated with earlier surgery, earlier contact lens fit, and excellent amblyopia therapy compliance. The oldest age for attainment of excellent or good V/A was 17 weeks. Patching therapy was based on the binocular fixation pattern. The patching program consisted of 50% occlusion until the age of 2 months and gradually increased to 100% occlusion after the age of 7 months. Six patients (43%) attained excellent V/A (>20/50), with three patients (21%) attaining good V.A ((20/60 to 20/100) and five patients attaining poor V/A (<20/100). *(Arch Ophthalmol 107:45-51, January 1989.) Reprint requests to Room 2-133 Clinical Sciences Bldg, The University of Alberta, Edmonton, Alberta, Canada T6G 2G3 (Dr. Drummond).*

MINOCYCLINE LEVELS IN TEARS OF PATIENTS WITH ACTIVE TRACHOMA. KF Tabbara, H Cooper. The authors determined minocycline levels in human tears and plasma samples using high-performance liquid chromatography. In the first study, we determined the trough tear and plasma levels of minocycline in patients with active trachoma 24 hours after an oral dose. After a single dose of minocycline, the mean concentration of the drug in tear samples was 189 + 58 ng/mL and corresponding plasma levels were 578 + 290 mg/mL. Tear and plasma samples were collected at 1 through 6, 12, 24, 48, 72, and 96

hours. The pharmacokinetics study revealed that 48 hours following a single 200-mg dose of minocycline, the mean tear level of minocycline was 68 ng/mL, which is above the in vitro minimal inhibitory concentration required for Chlamydia trachomatis and other susceptible organisms. *(Arch Ophthalmol 107: 93-95, January, 1989.) Reprint requests to King Khaled Eye Specialist Hospital, PO Box 7191, Riyada 11462, Saudi Arabia (Dr. Tabbara).*

A COMPARISON OF RETROBULBAR AND PERIOCULAR ANESTHESIA FOR CATARACT SURGERY. JL Weiss, CB Deichman. The authors did a prospective, randomized, masked study of 79 consecutive cataract extractions with intraocular lens implantations, 40 patients received retrobulbar injections and 39 patients received periocular injections. In every instance, the volume of the injection 5 mL. No significant difference in surgeon's assessment of akinesia and anesthesia was found. Supplemental anesthesia was required in eight (21%) of the patients who received retrobulbar injections and in 11 (28%) of the patients who received periocular injections. A significant increase in chemosis was found with periocular injections. There was one complication with retrobulbar anesthesia and none with periocular anesthesia. No significant difference in patient assessment of comfort was found. The efficacy of periocular anesthesia appears to be comparable to that of retrobulbar anesthesia. *(Arch Ophthalmol 107:96-98, January, 1989.) Reprint requests to 2850 Sixth Ave, San Diego, CA 92103 (Dr. Weiss).*

THE WISCONSIN EPIDEMIOLOGIC STUDY OF DIABETIC RETINOPATHY. IX. FOUR-YEAR INCIDENCE AND PROGRESSION OF DIABETIC RETINOPATHY WHEN AGE AT DIAGNOSIS IS LESS THAN 30 YEARS. R Klein, BEK Klein, SE Moss, MD Davis, DL DeMets. Population-based epidemiologic data on the incidence and progression of diabetic retinopathy are important in medical counseling and rehabilitative services and for developing approaches to preventing diabetic retinopathy. The authors performed a population-based study in southern Wisconsin of insulin-taking diabetic persons diagnosed before 30 years of age. Of the 271 who had no retinopathy at the first visit, 160 (59%) developed it by the time they were reexamined four years later, and 75 (11%) of the 713 free of proliferative diabetic retinopathy developed it. Overall, worsening of retinopathy occurred in 41% of the population, whereas improvement occurred in only 7%. The incidence of proliferative retinopathy rose with increasing duration until 13 to 14 years of diabetes, thereafter remaining between 14% and 17%. These incidence data underscore the need for careful ophthalmologic follow-up of these people. *(Arch Ophthalmol 107:237-243, February, 1989.) Reprint requests to Department of Ophthalmology, Clinical Science Center, 600 Highland Ave, Madison, WI 53792 (Dr. R. Klein).*

THE WISCONSIN EPIDEMIOLOGIC STUDY OF DIABETIC RETINOPATHY. X. FOUR-YEAR INCIDENCE AND PROGRESSION OF DIABETIC RETINOPATHY WHEN AGE AT DIAGNOSIS IS 30 YEARS OR MORE. R Klein, BEK Klein, SE Moss, D Davis, L DeMets. The authors investigated the four-year incidence and progression of retinopathy in a population-based sample of people with diabetes diagnosed at 30 years of age or older. For insulin users, 73 (47%) of the 154 who did not have any retinopathy at the first visit developed it in the four-year interval, and 31 (7%) of the the 418 free of proliferative retinopathy developed it. Worsening of retinopathy occurred in a total of 34% (142/418). For nonusers of insulin, corresponding rates were 34% (110/320) for incidence of any retinopathy, 2% (11/486) for developing proliferative retinopathy, and 25% (121/486) for worsening. These population-based data clearly indicate the risk of retinopathy worsening in a short interval (four years) in a large proportion of people with older-onset diabetes, a group previously thought to be relatively protected from retinopathy. Such patients who make up the largest proportion of diabetic patients in the United States need examination when diabetes is first diagnosed and regular follow-up. *(Arch Ophthalmol 107:244-249, February, 1989.) Reprint requests to Department of Ophthalmology, Clinical Science Center, 600 Highland Ave, Madison, WI 53792 (Dr. R. Klein).*

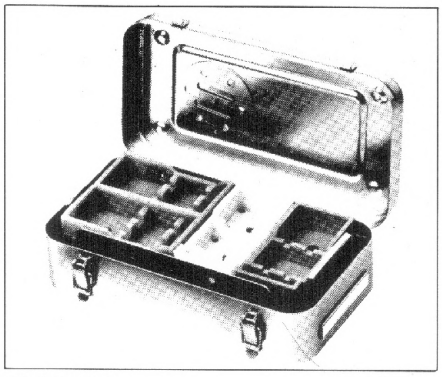
PERSISTENT AND RECURRENT NEOVASCULARIZATION AFTER KRYPTON LASER PHOTOCOAGULATION FOR NEOVASCULAR LESIONS OF OCULAR HISTOPLASMOSIS. MACULAR PHOTOCOAGULATION STUDY GROUP. Persistence and recurrence of choroidal neovascularization after initial treatment with laser photocoagulation have been shown to be major contributors to loss of visual acuity. The 144 eyes assigned to krypton red laser photocoagulation in the Ocular Histoplasmosis Study-Krypton Laser were examined to describe persistence and recurrence in

these patients. Persistent neovascularization was observed among 23% of treated patients and recurrent neovascularization was observed among an additional 8%. Both persistence and recurrence were accompanied by an increased frequency of severe visual loss. Patients with high blood pressure were more than 2.5 times as likely to have persistent neovascularization as patients without high blood pressure (95% confidence interval = 1.5, 4.8). Eyes in which the neovascular component of the complex was within 200 microns of the center of the foveal avascular zone were twice as likely to have persistent neovascularization (95% confidence interval = 1.2, 4.6). Eyes in which the treatment did not cover the neovascularization completely or did not meet the required level of intensity on the foveal side had a persistence rate approximately three times that of eyes in which the neovascularization was completely by intense, confluent burns (95% confidence interval = 1.7, 6.5). This last finding is of particular importance for ophthalmologists who treat similar patients. *(Arch Ophthalmol 107:344-352, March 1989.) Reprint requests to Macular Photocoagulation Study Coordinating Center, 550 N Broadway, Ninth Floor, Baltimore, MD 21205 (Barbara S. Hawkins, MS).*

LONG-TERM EVOLUTION OF ASTIGMATISM FOLLOWING PLANNED EXTRACAPSULAR CATARACT EXTRACTION. WT Parker, GS Clorfeine. The authors followed 66 eyes of 66 patients undergoing planned extracapsular cataract extraction with interrupted 10-0 nylon suture wound closure for three years following surgery to evaluate the long-term evolution of postoperative astigmatism. The study examined the period beginning three months postoperatively, well after all suture cutting was completed, a point often considered to represent "final postoperative astigmatism." For the group as a whole, the induced astigmatism measured at three months was not stable, but gradually shifted 0.69 diopter toward against-the-rule astigmatism. Three specific patterns of evolution of postoperative astigmatism were identified, depending on the amount of induced astigmatism found at three months. The data revealed that it was not possible to consistently induce with-the-rule astigmatism, although permanent against-the-rule induced astigmatism could be produced. The long-term evolution of postoperative cataract wounds toward more against-the-rule astigmatism seen in this study was not affected by the number of intact nylon sutures. Proper evaluation of any technique to modify postoperative astigmatism must consider the long-term evolution of the cataract wound. *(Arch Ophthalmol 107:353-357, March, 1989.) Reprint requests to Southern California Permanente Medical Group, 4647 Zion Ave, San Diego, CA 92120 (Dr. Parker).*

VISUAL, REFRACTIVE, AND KERATOMETRIC RESULTS OF EPIKERATOPHAKIA IN CHILDREN. A TWO-YEAR FOLLOW-UP. RJ Uusitalo, J Lehtosalo. The authors studied 52 patients under the age of 16 years (68 eyes) who received epikeratophakia grafts for the correction of aphakia. In 27 eyes, epikeratophakia was a primary procedure combined with lensectomy. Fifteen children underwent bilateral surgery. Overall, the success rate was 91%, and with repeated surgery it was 94%. The average change in refractive error was 15.9 diopters (D) and the average spectacle overcorrection was +0.3 D. Sixty-one percent (35/57)of the eyes were within 1 D of emmetropia and 97% (55/57) were within 3 D of emmetropia. Overall, thr refraction was stable in the follow-up between six months and 1 1/2 years following surgery. However, a myopic shift of 2.0 D occurred between six months and 1 1/2 years in very young children following refractive surgery. The corneal curvature was measured only in older children and showed an average increase of 10.7 D. Visual acuity results in verbal patients were comparable to those in patients with contact lenses. The majority of smaller children demonstrated improvement in visual acuity with a combination of epikeratophakia and amblyopia therapy. *(Arch Gphthalmol 107:358-363, March, 1989.) Reprint requests to Department of Ophthamology, Helsinki University Central Hospital, Haartmanink 4C, 00290 Helsinki, Finland (Dr. Uusitalo).*

PHOTIC RETINOPATHY FROM THE OPERATING ROOM MICROSCOPE. STUDY WITH FILTERS. DM Robertson, JW McLaren. The authors exposed a patient's blind phakic eye with clear media, the subject of previous light exposure studies, for 60 minutes to light from a standard operating room microscope (Zeiss OpMi-6) filtered through an infrared filter. A typical acute photic retinopathy lesion was produced. Two and a half months later, the eye was exposed for 60 minutes to light filtered simultaneously through an ultraviolet filter and an infrared filter. Despite blocking both the the ultraviolet and infrared light, and despite reducing the overall light energy by approximately one fourth because of the combination of filters, a typical acute photic retinopathy lesion was produced by the transmitted light, the energy of which was essentially all within the visible spectrum. *(Arch Ophthalmol 107:373-375, March, 1989.) Reprint requests to Mayo Clinic, Rochester, MN 55905 (Dr. Robertson).*



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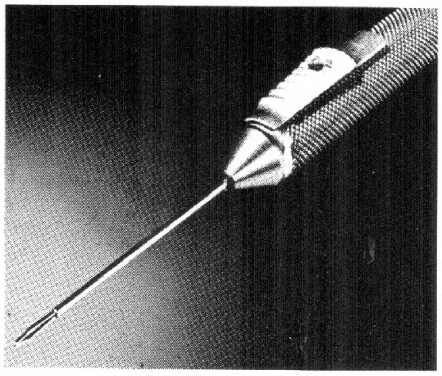

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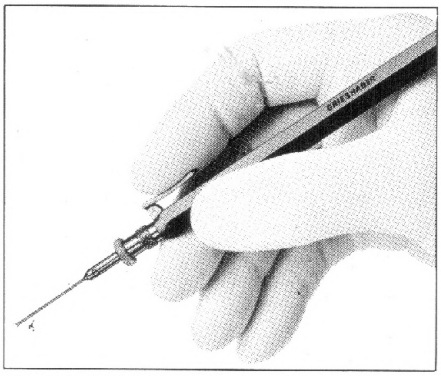

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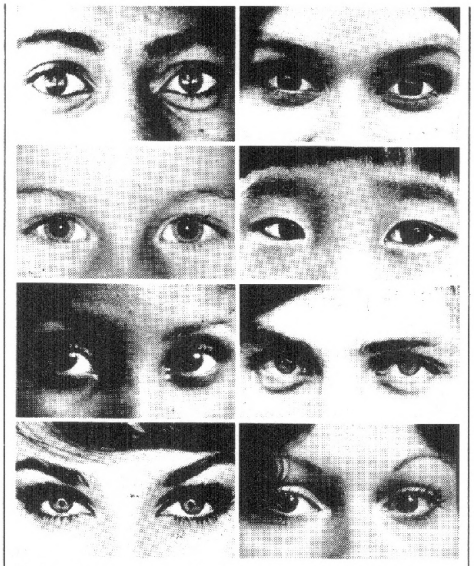

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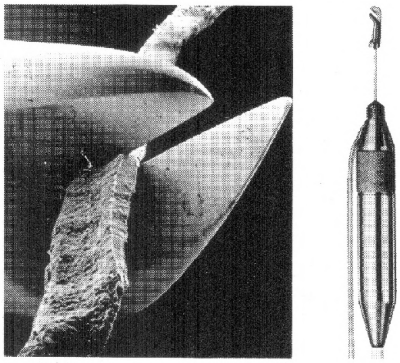

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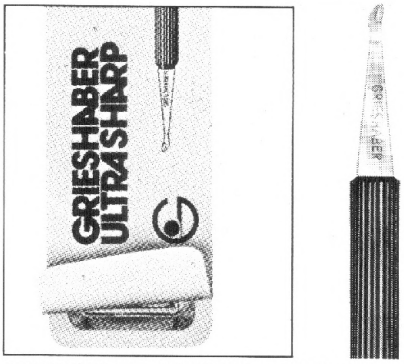

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