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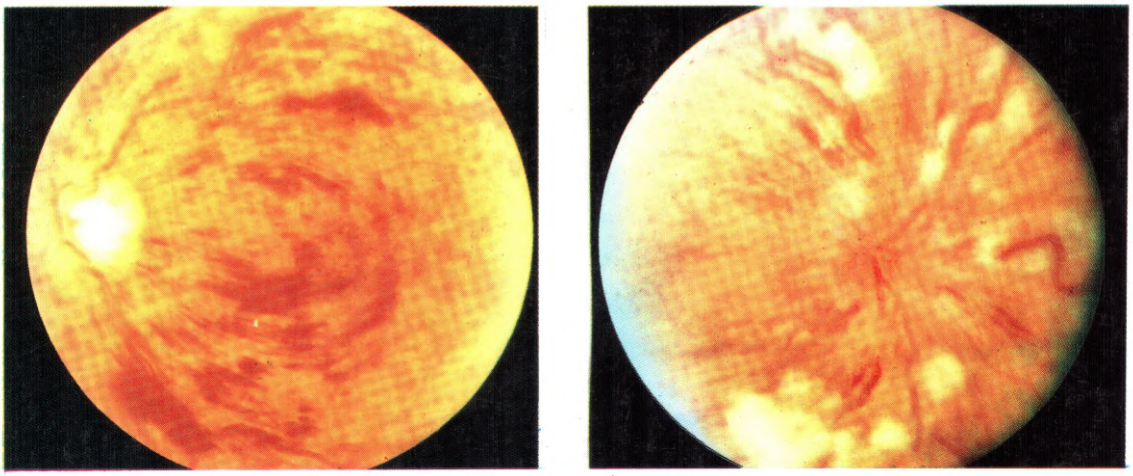

At Page 10 Figures 3 & 5 Non-ischaemic & Ischaemic CRVO

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Editorial

Fluorescein Angiography: The Concept That Flourished

New concepts and techniques are not generally accepted readily. Whatever runs against the grain of everything that's done normally, and even the ideas that wander too far off the beaten track, win more opponents than proponents, at least early on. And that is true as much of the modern history as it is of the old. Galileo Galilei (1564-1642) was the first man to use the telescope to study the skies. He amassed evidence, including the movement of the spots across the face of the Sun, which proved that the Earth revolves around the Sun and is not the center of the universe, as had been believed. This, Galileo maintained, proved that Copernicus was right and Ptolemy wrong. His position represented such radical departure from accepted thought that Galileo was tried by the Inquisition in Rome, ordered to recant, and forced to spend the last eight years of his life under house arrest[1]. Socrates (470 BC-399 BC), "the wisest of men", according to the oracle of Apollo at Delphi, was condemned to death by the court at Athens. The two counts in the accusation, for which he had to drink the poisonous potion of hemlock, were, "corruption of the young" and "neglect of the gods whom the city worships and the practice of religious novelties"[2].

Novotny and Alvis were a rather lucky pair indeed. After being spurned initially, their epochal discovery, in 1961, of a method of photographing fluorescence in circulating blood in the human retina was so readily and enthusiastically embraced that within a decade hundreds of research papers and scores of books had been written in various languages on fluorescein angiography of the eye. So much so that a book published in 1969 contained 14 full pages of related references and bibliography[3-5]. And what had these two medical students discovered? They again had highlighted the difference between the "observers" and the "discoverers". The difference being that an "observer" sees things that everybody else sees, but a "discoverer" sees what everybody else has failed to see. The property of fluorescence of various molecules had been known since 1871 when Von Bayer synthesized

See also pp.3-12

the fluorescein dye[6]. As a matter of fact, Maclean and Maumenee had used fluorescein in human fundus to help distinguish melanomas from hemangiomas[7]. The fundamental principle of fluorescence is that such molecules, for example sodium fluorescein, when exposed to light, have a maximum absorption spectrum at 490 nm, the spectrum of blue light. Thus, when exposed to blue light, these molecules are pushed from "ground state" to an "excited state", where they emit light of a longer wave length, i.e. 530 nm, which happens to be in the yellow-green band. By introducing an "exciting" blue filter between the retinal camera's flash and the eye, Novotony and Alvis let only blue light in to the eye while injecting, intravenously, a bolus of sodium fluorescein. This "excited" the fluorescein molecules in the retinal blood vessels to emit green light. As both green and blue lights emerged from the eye, they blocked the blue light and let only green light pass through a green "barrier" filter to reach the photographic film in the camera, returning the blue light to the eye for further "excitation" of fluorescein in the retinal vasculature[8].

Further research and the knowledge about the inner and outer blood-retinal barriers has led to the development of fluorescein angiography as an extremely useful method, not only to diagnose choroidal, retinal and vascular disorders of the eye, but also to gauge the progression of certain diseases, as well as their management by monitoring the response to therapy, both medical and surgical. Fluorescein angioscopy[9], cine-and video-fluorangiography[10], are offshoots of the original procedure and have also been put to good use.

Fluorescein angiography can be employed in demographic studies of the pattern of diseases of choroid, retina and their vasculature. In a related article in this issue of the Journal this has been demonstrated aptly and amply and important differences in the

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prevalence of such diseases between the southern part of Pakistan and the Western countries are highlighted. Similar studies from other centers around the country, where large numbers of fluorescein angiograms are currently performed, need to be published, so that a pattern for the whole country can be evolved. This can help in better utilization of the available resources in the management of potentially sight- threatening systemic and retinal diseases.

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Jehangir Durrani

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CORRIGENDUM

There has been a typographical error in the article entitled "Pars plana vitrectomy in complicated retinal detachment with proliferative vitreoretinopathy" by Adhi et al in the Journal's Vol.12, Number 4. On page 115, Table-3, the number of cases with initial rise of IOP should be read as 10 (ten), instead of 1 (one)

The editors regret the mistake.

Clinical Audit of Fundus Fluorescein Angiograms

Mohammed Idrees Adhi, Aijaz Ahmed Ansari, Misbah Ul Aziz, Khwaja Sharif Ul Hasan

Department of Ophthalmology Dow Medical College/Civil Hospital, Karachi

ABSTRACT

To study the spectrum of medical retinal problems, we analyzed the findings of 445 Fundus Fluorescein Angiograms (FFA) performed from 1990 to 1995. Vascular disorders were the most common, comprising 40.9% (182 patients). In this group, diabetic retinopathy was seen in 117 patients (26.29%), while 60 patients (13.48% had venous occlusion. Degenerative retinal disorders were diagnosed in 72 patients (16.18%). In this group Age-related Macular Degeneration (ARMD) was present in 60 patients (13.48%) Eight patients had angioid streaks, 4 out of which were diagnosed as pseudoxanthoma elasticum. In acquired macular disorders, central serous chorioretinopathy (CSCR) was the most common and was diagnosed in 25 patients (5.6%). Among the inflammatory retinal disorders, acute posterior multifocal placoid pigment epitheliopathy (APMPPE) was seen in 23 patients (5.17%). Optic disc pathology was noted in 35 patients (7.8%). Stargardt's disease and fundus flavimaculatus were common among the group of retinal dystrophy. In the miscellaneous group, 13 (2.92%) patients were identified with exudative retinal detachment. In 3 (0.67%) of these patients, retinal detachment was due to metastasis. Not a single case of primary choroidal tumor was identified. This series gives a general idea of medical retinal diseases in Pakistan. The pattern of retinal diseases in noted to be different as compared to what is seen in the West.

INTRODUCTION

A new method to study and permanently record the function and structure in the living eye became available in 1961, when two medical students, Novotny and Alvis, at Indiana University, U.S.A., published their first article on Photographic Fluorescein Angiography, in the journal "CIRCULATION". This article, first rejected by the American journal of Ophthalmology has become one of the major advances in Ophthalmology in the last two decades[1].

Fundus Fluorescein Angiography (FFA) includes the colored photography of the fundus, combined with serial stereographic recordings, using appropriate filters, of the transit of the dye through ocular fundus after sodium fluorescein dye is injected into a superficial forearm vein[2]. The procedure has been reported to be inexpensive and safe[3].

We report the analysis of findings in 445 patients who underwent FFA at our department during the years 1990 to 1995. The objective of the study has been to see the spectrum of medical retinal diseases at our center, so as to have a general idea about the prevalent medical retinal diseases in our population and compare this to the pattern of retinal diseases seen in the West.

PATIENTS AND METHODS

From January 1990 to December 1995, 445 patients underwent FFA at the Department of Ophthalmology, Civil Hospital and Dow Medical College, Karachi, Pakistan. Full ophthalmological assessment of anterior and posterior segments was carried out in all these patients. Visual acuity was noted, unaided and corrected, in all cases. Slit-lamp examinations included applanation tonometery, gonioscopy and 3-mirror examination. Presence of afferent pupillary defect was noted and both direct and indirect ophthalmoscopy were performed.

A detailed history included the history of visual impairment, family history and history of known allergies. Presence of diabetes mellitus, hypertension and ischemic heart disease along with the details of drugs were noted. Pregnant and lactating mothers, mentally retarded persons and patients with hepatic and renal failure were not included in the series.

The procedure was fully explained to all the patients, and parents in case of children, and written consent was obtained from each patient or parent. The pupils were dilated with tropicamide 1% and phenylephrine 10%, starting one hour prior to the procedure and repeating after thirty minutes. Initially, a

subcutaneous test dose of 0.2 ml sodium fluorescein was given to all the patients to evaluate sensitivity. Later in the study, 0.2ml injected intravenously was used to evaluate the sensitivity. All the patients were informed about the possibility of yellow discoloration of urine and skin during the first 24 hours after FFA. An emergency tray with essential medicines, including injection of antihistamines, steroids and adrenalin, was kept ready, along with the availability of oxygen. 5 ml of 10% or 2 ml of 25% (diluted in 3 ml saline) sodium fluorescein was injected in a superficial vein of forearm, maintaining the intravenous line with a butterfly cannula. Prior to the bolus injection of the dye, color fundus photography was performed using 400 ASA or 100 ASA Fujichrome or Kodachrome films. For recording of angiography we used 400 ASA Agfapan. In a few patients we also recorded angiography on colored films. Olympus camera was used for fundus photography and angiography.

RESULTS

Clinical findings in 445 patients were grouped under vascular disorders, degenerative retinal disorders, inflammatory disorders, acquired macular disorders, hereditary disorders, optic nerve disorders, and miscellaneous conditions (Figure-1). Table-1 gives the details of various clinical conditions.

Retinal vascular disease was the most common. Out of 182 patients (40.9%) in this group, diabetic retinopathy was seen in 117 (26.29%). Sixty patients (13.48%) had background retinopathy, 30 (6.74%) had maculopathy, while 27 (6.07%) had proliferative retinopathy. In 60 (13.48%) patients with retinal vein occlusion, central retinal vein occlusion was noted in 22 patients, hemicentral vein occlusion in 2, major branch retinal vein occlusion in 31, and macular branch retinal vein occlusion was seen in 5 patients. Hypertension was a risk factor in 27, diabetes in 11, while both hypertension and diabetes were risk factors in 6 patients. Raised intraocular pressure was noted in only one patient. In the younger age group vasculitis was the cause in 4 (0.9%) patients. In 53 of these patients a risk factor was identified, while in the rest of the patients no cause was found. In the group of vascular disorders, arterial occlusion was seen in 2(0.45%), and hypertensive retinopathy in 3 patients (0.67%). Seventy-two patients (16.18%) had degenerative retinal disorders. Age-related macular degeneration (ARMD) was found in 60 (13.48%), angioid streaks in 8(1.8%) and myopic degeneration was noted in 4(0.9%) patients. In 60 patients with ARMD, 24 had drusens, 13 had dry type, while 23 patients had the wet type of ARMD. In 4 patients with angioid streaks the cause was identified as pseudoxanthoma elasticum, while in the remaining 4 no cause could be identified.

Acute posterior multifocal placoid pigment epitheliopathy (APMPPE) was noted in 23 out of 50 patients with chorioretinal inflammatory disorders. Eleven patients had the evidence of Eales' disease, while one patient was diagnosed as Behcet's disease.

Stargardt's disease and fundus flavimaculatus were the most common in the hereditary group and were seen in 13 (2.92%) patients. Thirty-five patients (7.86%) had optic nerve pathologies. Fifty-three patients had acquired maculopathies. In this group, central serous chorioretinopathy (CSCR) was noted in 25 (5.61%) patients. Twenty-nine (6.51%) patients had miscellaneous conditions. Thirteen patients in this group had exudative retinal detachment. In 6 (1.35%) patients no cause could be detected on FFA to explain the visual deficit.

DISCUSSION

The use of fluorescein in the study of vasculature of the human eye was first described in early 1960s by Novotny and Alvis[1]. In modern ophthalmic practice, FFA provides valuable information about retinal circulation, the integrity of blood-retinal barrier and the health of the retinal pigment epithelium. FFA is now as important to the ophthalmologist as the chest X-ray is to the physician[4]. Our present study analyzes the findings of FFA performed over a period of 6 years to see the spectrum of medical retinal diseases in our population, presenting at a tertiary centre.

As compared to the West, where degenerative retinal disorders are the most common[6], vascular disorders were on the top of the list in our series and were seen in 182 patients(40.9%).

Diabetic retinopathy is the commonest cause of legal blindness in individuals between age 20 and 65 years[7,8]. It was identified in 117 patients (26.30%). Fifty-seven out of 117 diabetic patients were advised either focal or scattered laser photocoagulation after identifying focal leaking spots or capillary nonperfusion on fluorescein angiography. Almost 50% of patients with diabetic retinopathy did not require laser photocoagulation.

Retinal vein occlusion is by far the most common retinal vascular disorder[9]. Sixty (13.48%) patients in our series had various types of venous occlusions.

Table-1: Clinical audit of 445 fundus fluorescein angiograms.

		No. of Patients	Percentage
I.	**Vascular Disorders**	**182**	**40.90**
	Diabetic retinopathy	117	26.29
	Venous occlusion	60	13.48
	Arterial occlusion	02	00.45
	Hypertensive retinopathy	03	00.67
II.	**Degenerative Disorders**	**72**	**16.18**
	Age-related macular degeneration	60	13.48
	Angioid streaks	08	1.80
	Myopic degeneration	04	0.90
III.	**Acquired Maculopathies**	**53**	**11.91**
	Central serous chorioretinopathy	25	5.61
	Cystoid macular edema	16	3.60
	Preretinal fibrosis	06	1.35
	Macular hole	02	0.45
	Subretinal hemorrhage	04	0.90
IV.	**Inflammatory Disorders**	**50**	**11.23**
	APMPPE	23	5.17
	Eales disease	11	2.47
	Posterior uveitis	04	0.90
	Vasculitis	05	1.12
	Bechet's disease	01	0.22
	Juxta papillary choroiditis	01	0.22
	Panuveitis	02	0.45
	Fungal endophthalmitis	01	0.22
	Toxoplasmosis	02	0.45
V.	**Optic Disc Pathologies**	**35**	**7.86**
	Optic neuritis	08	1.80
	Optic atrophy	06	1.35
	Anterior ischaemic optic neuropathy	06	1.35
	Colloid bodies	05	1.12
	Papilledema (Bilateral)	04	0.90
	Disc edema (Unilateral)	02	0.45
	Toxic neuropathy	02	0.45
	Optic nerve hypoplasia	02	0.45
VI.	**Hereditary Disroders**	**24**	**5.40**
	Stargardt's disease & fundus flavimaculatus	13	2.92
	Cone dystrophy	04	0.89
	Best's dystrophy	01	0.22
	Retinitis pigmentosa	03	0.67
	Leber's disease	02	0.45
	Familial drusen	01	0.22
VII.	**Miscellaneous Group**	**29**	**6.51**
	Exudative retinal detachment	13	2.92
	Traumatic retinal disorders	05	1.12
	Persistent hyaloid membrane	02	0.45
	Retinoschisis	01	0.22
	Normal	06	1.35
	Fluorescein sensitivity	01	0.22
	Choroidal naevus	01	0.22
	Total No. of patients	**445**	**100**

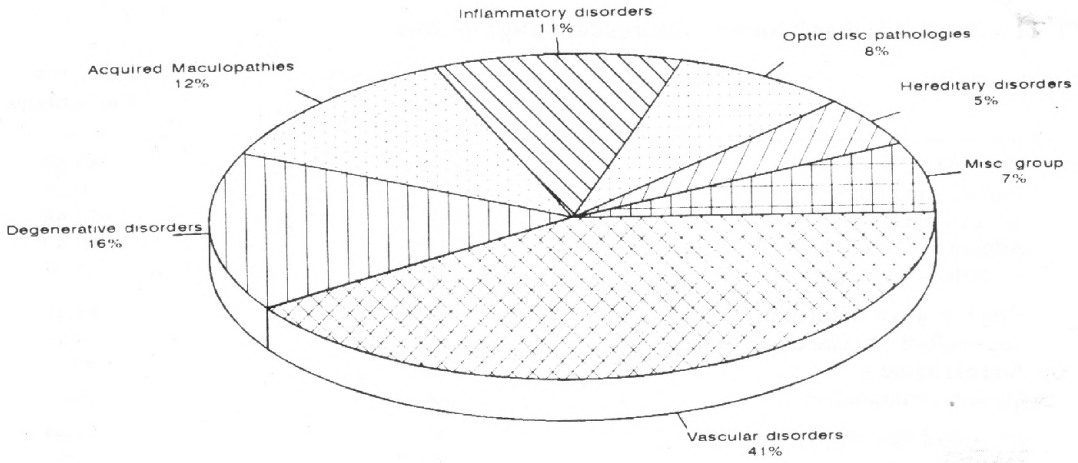

Fig-1: Clinical Audit of 445 FFAs

Twelve out of 60 patients with either branch or central retinal vein occlusion were selected for sector or scattered laser photocoagulation after identification of retinal ischemia or non-resolving macular edema on angiography, while 48 of these patients did not require laser treatment. This should be viewed with reference to the normal practice in our country, where most of the patients with venous occlusion are treated with laser straight away.

Degenerative retinal disorders were identified in 72 patients (16.18%). Age-related macular degeneration (ARMD) is the commonest cause of legal blindness in the elderly Caucasian population but is comparatively rare in other races[5]. This condition in the most common indication of FFA in the West[6]. In our series, 60 (13.48%) patients had the evidence of ARMD. This figure in our series is significant because there has been a feeling that this clinical condition is very uncommon in our population. We were able to document both dry and wet types. Our patients, tend to present at late stages, as shown by the cases with choroidal neovascular membranes identified on FFA, which were not amenable to laser photocoagulation in a majority of cases with the wet type of ARMD.

Out of 8 (1.8%) patients with angioid streaks, pseudoxanthoma elasticum was identified in 4 patients on clinical evaluation and on skin biopsy. In the other four patients we were not able to document any cause.

Fifty-three (11.91%) patients in our series had acquired maculopathies, This included 25 (5.61%) patients with CSCR, 16 (3.60%) patients with cystoid macular edema after cataract surgery and 6 (1.35%) patients with preretinal fibrosis.

Fifty patients (11.23%) were grouped under the inflammatory causes. This included 23 (5.17%) patients with acute posterior multifocal placoid pigment epitheliopathy (APMPPE) and 11 (2.47%) patients with Eales' disease.

APMPPE, the most common clinical condition in the group, is characterized by multiple yellow lesions of the retinal pigment epithelium which show early hypofluorescence and delayed hyperfluorescence on angiography[10]. Variable presentation of APMPPE in Pakistan has been reported[11],. Twenty-three patients with APMPPE will be the topic of a separate article. It is difficult to relate the Eales' disease with tuberculosis in our patients as none of the patients had past history or present evidence of tuberculosis.

Optic disc pathologies accounted for visual impairment in 35 (7.86%) patients as detailed in the results. It was interesting to note the cause as diabetes in 6 (1.35%) patients with anterior ischemic optic neuropathy. Two (0.45%) patients had evidence of ethambutol toxicity.

Stargardt's disease and fundus flavimaculatus were the most common in the group of retinal dystrophy. Other retinal dystrophies noted in this series were cone dystrophy, Best's disease, dominant drusen and retinitis pigmentosa. The number of patients with retinitis pigmentosa are certainly more in our clinical practice. We performed FFA in only three patients with retinitis pigmentosa to exclude the macular edema contributing to the visual loss.

The commonest condition in the miscellaneous group was exudative retinal detachment which was diagnosed in 13 out of 29 patients. Three were metastases, out of which 2 were from carcinoma of the breast in females and one form the lung in a male. Two were secondary to what clinically looked like granulomas, while in the rest of the cases the cause was thought to be inflammation of unknown origin. Five patients had traumatic maculopathy associated with

choroidal tears. This group also included 6 patients who did not show any angiographic evidence of retinal disease.

CONCLUSIONS

A significant difference in the pattern of retinal diseases was noted in our population as compared to the Caucasians.

1. ARMD is the most common cause of legal blindness in the Caucasians[5], and accounts for 50% of FFAs performed in patients with retinal disease[6]. The condition is not uncommon in Pakistan. It accounted for 16.18% of FFAs performed in our series. Most of the patients with the wet type presented at a stage where very little could be offered as regards the laser treatment.

2. Vascular disorders were the most common indications for FFA in our series as compared to being the second most common in the West[6].

3. Ocular tumors account for 6% of the FFAs performed in the West[6]. Malignant melanoma is the most common ocular tumor in adults. This tumor is very rare in our population, as is evident from our study. Not a single case of malignant melanoma was identified in this report.

4. APMPPE was identified as the most common in the inflammatory group of retinal disorders. Only future studies will prove whether this clinical condition is actually more common, or is being diagnosed more often than before.

5. In the group of retinal dystrophies, retinitis pigmentosa is seen more commonly in clinical practice, though the numbers appear small in our study. Patients with retinitis pigmentosa were only selected for FFA when clarification of some additional retinal problem was sought.

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Central Retinal Vein Occlusion

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ABSTRACT

Forty consecutive cases of central retinal vein occlusion (CRVO) who presented to the Eye OPD, Lady Reading Hospital, Peshawar, were studied. Their ages ranged between 25 and 90 years, with an average age of 52.6 years. There were 26(65%) males and 14 (35%) females. Right eye was affected in 28 (70%) patients and left eye in 12 (30%) patients. Twelve patients presented within a week of the beginning of episode, 9 patients within a month, 13 within 6 months and 3 within a year. 3 patients were diagnosed on routine ophthalmic examination.

At the time of presentation, 2 patients had 6/12 vision, 3 had 6/18, 2 had 6/24, 4 had 6/36, 9 had 6/60, 15 had CF, 4 had PL and one patient had no perception of light. Among these 40 patients, 6 were suffering from open-angle glaucoma, while one patient had CRVO in the contralateral eye. Six patients were suffering from diabetes mellitus, 14 from hypertension and 12 patients were suffering from ischaemic heart disease. Four patients had high serum cholesterol, while 13 patients had high serum triglycerides.

Ischaemic type of CRVO was seen in 10 (25%) patients, non-ischaemic type of CRVO in 27(67.5%) patients, while 3 (7.5%) patients were of undetermined type.

INTRODUCTION

Central retinal vein occlusion (CRVO) is not an uncommon disease in ophthalmology, especially in the elderly. CRVO was diagnosed clinically soon after the invention of ophthalmoscope. It was initially described by Liebreich as retinal apoplexy, and haemorrhagic retinitis by Leber[1,2]. Von Michael was the first to categorize CRVO as a separate disease entity[3]. Coats seems to have been the first to recognize the two forms of the disease, the severe form with poor visual prognosis, called complete or total occlusion and a mild form with good visual prognosis, called incomplete or impending occlusion[4].

Little progress was made thereafter, till Novotony and Alvis introduced fluorescein angiography which showed capillary nonperfusion in some cases of retinal vein occlusion[5]. Hayreh reclassified the condition into two forms based on experimental and clinical observations[6]. He called the more severe form as haemorrhagic retinopathy and the less severe form as venous stasis retinopathy.

Green, Hutchins and Terry suggested that all forms of the disease have a common pathologic mechanism, which is thrombus formation in the lumen of the central retinal vein[7]. The stage and completeness of thrombosis appear to determine the severity of the retinal findings and the variable course of the disease. Other experimental studies support this hypothesis but Hayreh considers these two forms to have different pathogenic mechanisms[8]. The disease has been extensively studied, but its aetiology, pathophysiology and treatment remain controversial.

MATERIALS AND METHODS

All patients presenting to the Department of Ophthalmology, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar, with CRVO were recruited in the study. A detailed history, general physical and ocular examination were carried out in all patients. Each patient had a complete blood count, ESR, urine analysis, blood sugar and lipid profile. Where required, fundus photography and fluorescein angiography were also carried out.

RESULTS

A total of 40 patients with CRVO were studied over a period of 18 months. Their ages varied between 25 and 90 years, with a mean age of 52.6 years. There were 26 male (65%) and 14 female (35%) patients (Figure-1). Twelve patients presented within a week of onset of CRVO, while 9 patients presented within a month, 13 patients within 56 months and 3 patients within a year. Three cases were detected on routine ocular examination. Right eye was affected in 28 (70%) and left eye in 12 (30%) patients.

Visual acuity at the time of presentation is given in Figure-2. The association of various ocular and systemic conditions is given in Table-1. There were 10 patients who had ischaemic type of CRVO, 27 patients had nonischaemic type and 3 patients could not be put in either group (Figs. 3-6).

Fig-1: Distribution of patients with CRVO according to age and sex.

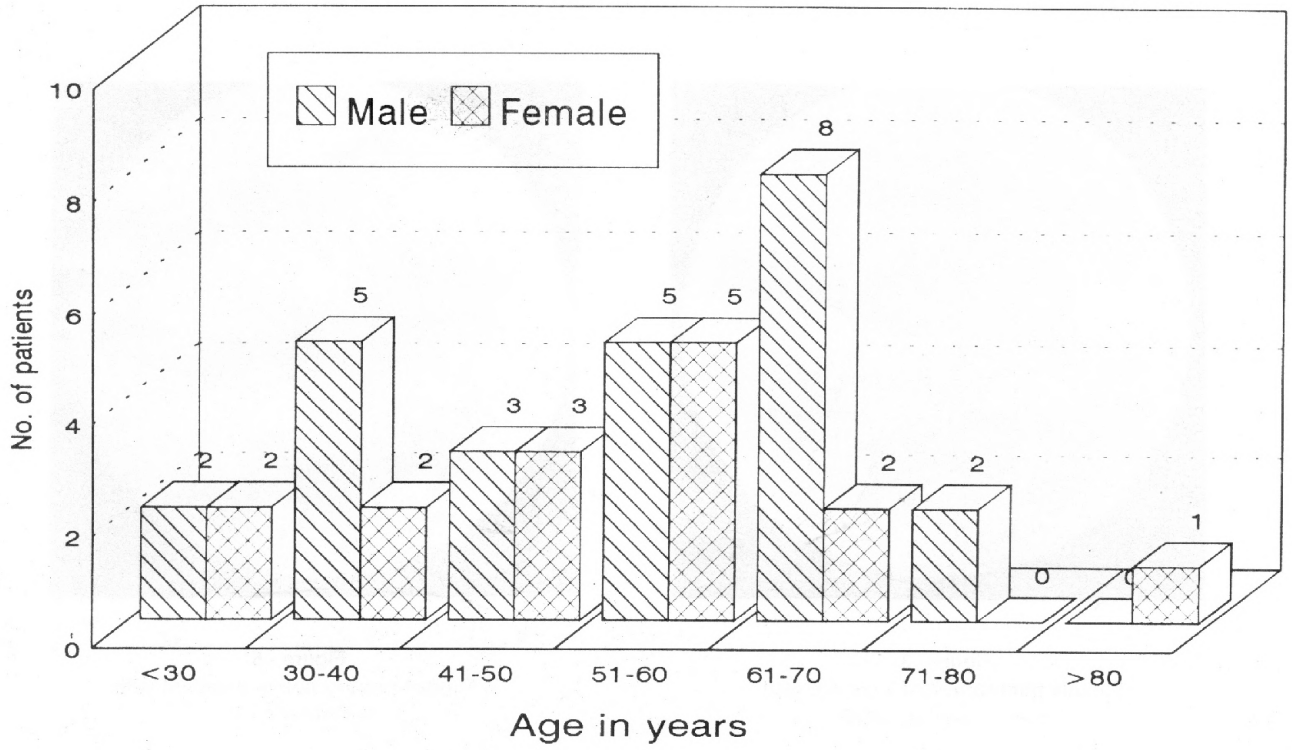
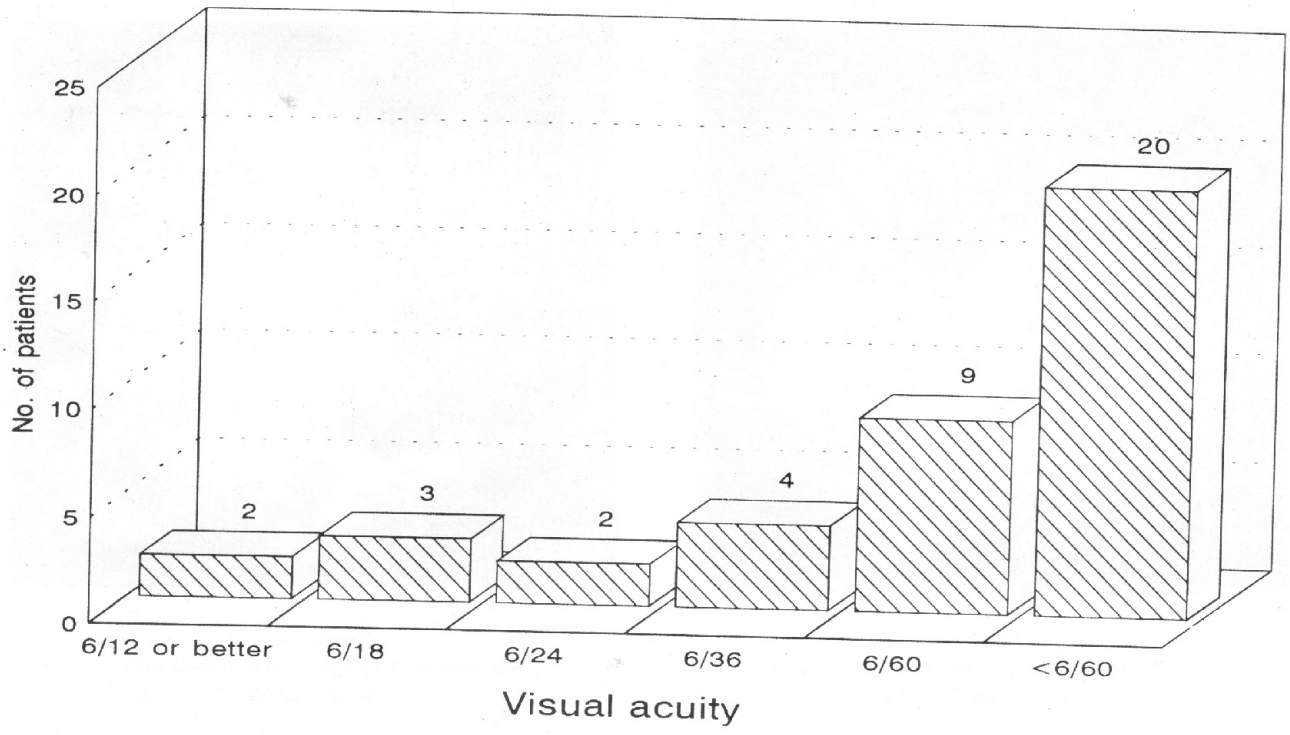


Fig-2: Visual Acuity on Presentation.



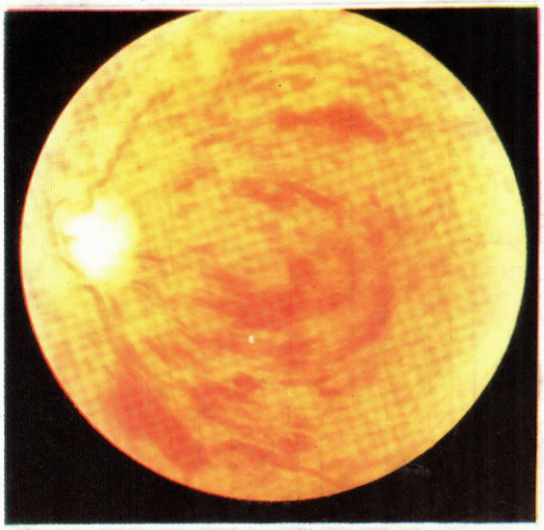


Figure - 3:
Fundus photograph of a patient with non-ischaemic CRVO

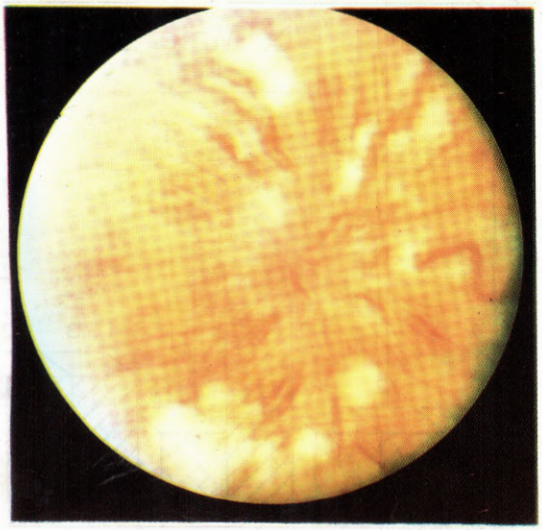


Figure - 5:
Fundus photograph of a patient with ischaemic CRVO

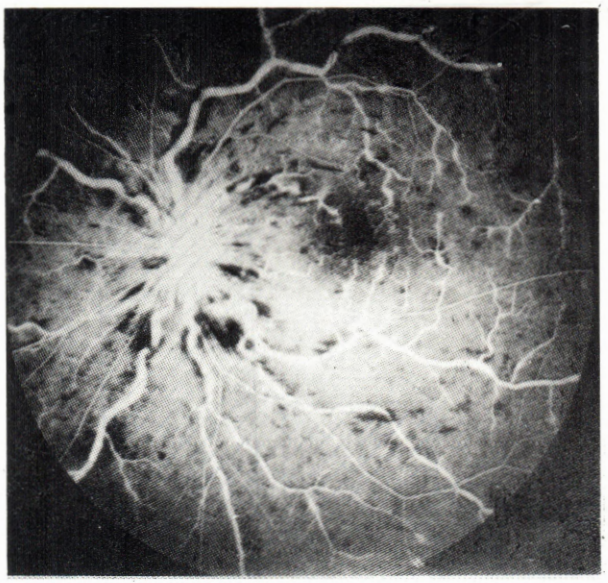


Figure - 4:
Fluorescein angiogram of a patient with non-ischaemic CRVO

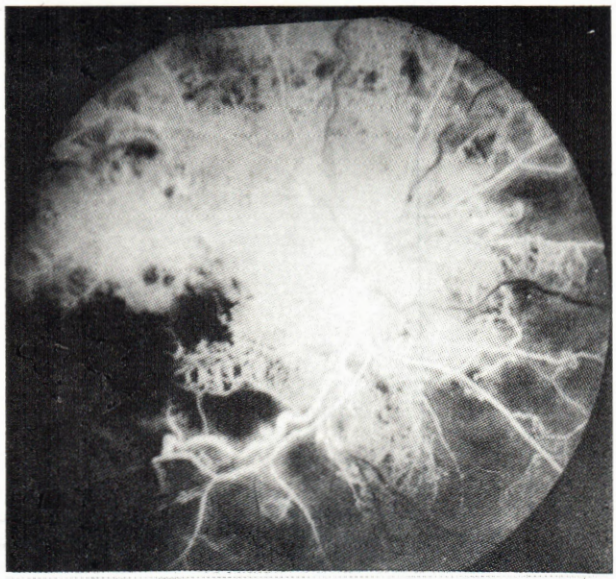


Figure - 6:
Fluorescein angiogram of a patient with ischaemic CRVO

Table 1: Association of various systemic and ocular diseases in patients with CRVO.

Disease	No. of Cases	Percentage
Hypertension	14	35
Hyperlipidaemia	14	35
Atherosclerosis	12	30
Diabetes mellitus	6	15
POAG	6	15
PACG	1	2.5
No association	11	27.5

CRVO = Central retinal vein occlusion.
POAG = primary open-angle glaucoma.
PACG = Primary angle-closure glaucoma.

DISCUSSION

Our study of 40 cases of CRVO confirms many aspects of the disease that have been published previously[9,10] However, initial VA was much more adversely affected.

The average age of 52.6 years was similar to the previously reported studies indicating that CRVO is a disease of the elderly[9,10]. The average ages for males and females were 53.5 years and 50.9 years, respectively. This is similar to the results of Rubinstein and Jones who reported mean age for men to be 56 years and for women to be 53 years[11]. Forty-two percent of our patients were aged 50 years or less and 27% were aged 40 years or less. This is a significantly increased prevalence rate as previous studies have shown that only 7.5% to 19.8% of CRVO occurred in persons younger than 50 years of age[12,13]. Sixty-five percent of our patients were male, which confirmed the male preponderance in this disease[14,15]. The right eye was involved in 70% of cases. In many previous studies the right eye was predominantly affected[16,18]. All these studies had a small number of patients. Other studies with a large number of patients have shown equal distribution between the two eyes[9,19]. In our study, ischaemic and nonischaemic CRVO were detected in 25% and 67.5% of the cases, respectively. 7.5% of cases could not be grouped in either category. Nonischaemic CRVO varied from 50% to 78%, while the ischaemic type varied from 22% to 31% of the total CRVO cases in other published studies[20,21]. The VA in our study ranged from 6/12 to just light perception. Twenty-nine (72.5%) of the 40 cases had VA equal to or less than 6/60. The VA in our study was much more adversely affected as compared to the other published data[20,21]. Magargal et al found that 82% of their nonishaemic CRVO patients had initial VA of 6/60 or better, while 43% of the ischaemic CRVO had initial VA of 6/60 or better[22]. In our study 17 of the 27 (63%) patients with nonischaemic CRVO had initial VA of 6/60 or better, while in the ischaemic group only 2 of the 10 (20%) had initial VA of 6/60 or better. However, in 4 of our patients a reduction in VA could be attributed to their advanced glaucoma and another 2 patients had significant lenticular opacities.

In over 72% of our patients, we were able to find an underlying cause. We found hypertension in 23% of younger and 43% of older patients. The results are somewhat similar to those previously reported[23]. Hyperlipidaemia was present in 35% of our cases and we confirmed the results of Dodsen and Kritzinger that hyperlipidaemia is the predominant underlying cause in younger CRVO patients[23]. The most common ocular abnormality associated with CRVO in our study was primary open-angle glaucoma (POAG). It was present in 15% of our patients. Previously published studies have shown the prevalence of POAG to vary from 5.7% to 66%[7,24]. We were unable to identify any underlying cause in 47% of the younger and 13% of the older patients. Quinlan et al also reported similar results[15].

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Ophthalmic "Pastpourri"

Rhazes and His Vision

Abu Bakr Al-Razi (865-925) --- Rhazes, as he was commonly known in the Western literature, was the court physician for the Caliph Al-Mansour of Baghdad. During his life-time Al-Razi was the most prolific writer and most widely known and honored physician. His most famous contribution to ophthalmology was his observations on the pupillary reaction to light. In recognition of his contribution to medicine, one of the windows in the Princeton University Chapel adorns his picture holding an unrolled parchment with the words Kitab-al-Hawi (the name of his most famous book) written on it. Despite his fame as a physician and ophthalmologist, he died totally blind and penniless.

Legend has it that he lost the vision in one of his eyes when in a fit of rage the Caliph Al-Mansour hit Al-Razi on the head, as the experiment Al-Razi was performing for the Caliph was not successful. The other eye of Al-Razi was afflicted with a cataract, but he would not agree to have an operation; since upon questioning the oculist, who was going to perform the surgery, about the anatomy of the eye, Al-Razi did not get a satisfactory answer. Sending the surgeon away Al-Razi added "in any case I have seen enough of the world and have no desire to see it further".

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Cyclodialysis In Aphakic glaucoma

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ABSTRACT

This prospective study was carried out between September 1993 and October 1995. During this period we came across 48 patients of pupil block aphakic glaucoma in our clinic. Most of these had a blind red eye with no light perception and were thus considered to be beyond help. In 20 of these patients, however, we attempted to lower the IOP by performing cyclodialysis, since a presenting visual acuity of at least PL +ve in these patients suggested the possibility of salvaging some vision. Following surgery, corneal haze cleared in 16 patients. The procedure was successful in lowering the IOP in all patients, although 14 (70%) patients had an IOP between 18-21 mm Hg when last seen. One patient improved to 6/60, while two improved to 4/60. The remainder eventually had varying degrees of "finger-counting" vision. Cyclodialysis can be performed with relatively simple instruments and we suggest that it should be attempted in selected cases of aphakic glaucoma.

INTRODUCTION

Intracapsular cataract extraction using the Graefe's section is still widely practised throughout Pakistan. This is particularly so in mass scale cataract surgery programmes (eye camps) which are organized by various charity organizations from time to time. Non-availability of modern microsurgical equipment in far flung and underdeveloped areas necessitates the use of outdated techniques by inexperienced surgeons. An iridectomy is either not performed at all, or occasionally a broad iridectomy is performed and the lens delivered by the tumbling method[1]. The incidence of vitreous loss is very high under these circumstances. Anterior vitrectomy is not done properly and 2-3 sutures are applied, if at all. Postoperative elevation of IOP due to blockage of the pupil, or rarely, of the drainage angle by vitreous is a well- recognized complication of cataract surgery when there has been vitreous loss. Corneal edema due to vitreous touch is a frequent accompanying complication. There is a large pool of patients in our villages who have landed with such complications after being operated upon in eye camps. Cases of aphakic glaucoma related to intracapsular cataract surgery are commonly enountered by ophthalmologists in Pakistan especially those practising in the districts. Unfortunately however, when first seen, the eye is usually blind and the chief compliant for which the patient seeks advice is the pain or headache which often accompanies the elevated IOP. Rarely do ophthalmologists resort to surgery at this stage and treatment is usually symptomatic. But in such situations the IOP rarely responds to medical therapy. Surgical decompression of the eyeball is imperative to lower the tension. Trabeculectomy and other limbal procedures may not always be successful when the anteriro chamber (AC) contains vitreous. Cyclodialysis consists of establishing a communication between the AC and the suprachoroidal space. In addition, a portion of the ciliary body is detached from the scleral spur which compromises its function. In this manner IOP is lowered by filtration as well as an element of cyclodestruction. This can be performed even without an operating microscope and by using basic instruments. Furthermore, if it fails to provide the desired results, it can be repeated in another quadrant of the eyeball. During a 2-year period from 1993 to 1995 we diagnosed 48 patients as cases of aphakic glaucoma due to postoperative pupillary block. 20 of them were considered for potential benefit from cyclodialysis. the procedure was performed in these patients and the results recorded.

PATIENTS AND METHODS

The 20 patients ranged in age from 55 to 82 years with an average age of 70 years (Table 1). There were 12 men and 8 women. None of the patients had an IOL implant. All of them had been operated upon in various eye camps between 5 to 16 months prior to reporting in our clinic.

Presenting Complaints

All patients presented with a red eye which was either irritated or painful. This was accompanied by a gradual blurring of vision between 1-6 months after cataract surgery.

Visual Acuity

Only 2 patients had a corrected visual acuity of "finger counting". The remainder were PL + ve.

Table-1: Patient Information.

Age	Sex	Time since Cataract Surgery (Months)	Initial IOP	V/A Before Cyclodialysis	V/A in Fellow Eye
55	Male	8½	32	PL +ve	PL -ve
74	Male	7	46	PL +ve	PL -ve
68	Female	5	52	FC	2/60
63	Male	7½	28	PL +ve	PL -ve
75	Male	11	42	PL +ve	PL -ve
82	Female	6	36	PL +ve	PL -ve
58	Male	10	40	PL +ve	PL -ve
77	Male	5	17	FC	PL -ve
69	Male	9½	44	PL +ve	4/60
63	Female	16	64	PL +ve	6/60
74	Female	11	58	PL +ve	5/60
59	Male	6	24	PL +ve	PL -ve
62	Female	8	24	PL +ve	6/60
80	Male	10½	22	PL +ve	PL -ve
79	Male	14	60	PL +ve	PL -ve
61	Female	5	44	PL +ve	6/60
60	Female	5	19	PL +ve	PL -ve
75	Male	9	36	PL +ve	6/60
67	Male	7	42	PL +ve	PL -ve
57	Female	13	56	PL +ve	PL -ve

Examination

In 14 patients the surgical technique had included a Graefe's section and no sutures. In the remainder, 3-4 sutures had been applied after a Graefe's section. In 2 cases there was a wound leak which was confirmed by a positive Seidel's test. The cornea appeared dull and steamy in all cases, with variable degrees of visibility of AC details. 17 eyes showed iris bombe and there appeared to be vitreous present in the AC in all cases. Peripheral iridectomy had been performed in 2 eyes, but the vitreous appeared to block the iridectomy also. Gonioscopy was done in all cases. Although the whole angle was not visible in any case due to the corneal edema, peripheral anterior synechiae were seen to be present in 12 cases. The fundus was not visible in any case.

IOP was measured either by applanation or by Schiotz tonometer and ranged from 17 to 64mm Hg, averaging 40mm Hg.

The selection of these 20 patients for surgery out of a total of 48 was based on the following criteria:

a. Complaint of persistent pain in the eye or headache
b. Only these 20 patients had a V/A of at least PL +ve as compared to the remainder who were all PL -ve. Thus there existed the possibility of salvaging some vision.
c. In 12 of the patients the fellow eye was blind already, while the remainder had a V/A of 6/60 or less in the fellow eye due to various pathologies.
d. Failure to lower the IOP using medical measures.

Why Cyclodialysis?

Trabeculectomy combined with anterior vitectomy is a currently favoured surgical procedure in such situations. However, due to non-availability of an automated vitreous cutter in our clinic at that time, our decision to perform cyclodialysis in these cases was based on the following clinical observations:

a. Presence of vitreous in the AC was bound to block the trabeculectomy drainage channel, and

b. Peripheral anterior syechiae had formed in most of the cases which would have decreased the usefulness of a peripheral iridectomy.

METHODS

All patients were treated as day cases. At the initial presentation, visual acuity was recorded and a complete examination carried out. Oral acetazolamide 250 mg tds along with analgesics for pain relief were prescribed and the patients were asked to report on the day of the next available list, usually within 48 hours. Two hours prior to surgery a 250ml I/V infusion of 20% mannitol was given. All cases were carried out under local anaesthesia by giving a retrobulbar injection of a mixture of xylocaine and bupivacaine.

Technique

The same surgical technique was employed in all cases. A 4-0 silk bridle suture was passed through the inferior rectus muscle to expose the inferotemporal quadrant of the globe. This quadrant was chosen because the upper quadrants were already hyperemic and inflamed due to the cataract surgery. A limbus-based conjunctival flap was made and the sclera exposed. Cautery was applied to minimize bleeding. A 4mm incision was made in the sclera 5mm posterior and concentric to the limbus. It was deepened till brownish uvea became visible. Now the tip of a curved iris repositor was inserted beneath the anterior lip of the scleral incision and tilted towards the sclera. In this manner it was pushed between the scleral spur and the ciliary body and became visible in the AC in front of the iris. The iris repositor was now swept first superiorly and then inferiorly in an arc for a whole qauadrant to break the peripheral anterior synechiae and detach the ciliary body. When possible, any posterior synechiae were also broken by pushing the iris repositor forwards behind the iris after which it was withdrawn. A cannula was introduced through the same incision and air injected into the AC. The conjunctival flap was sutured over the scleral incision. A drop each of antibiotic and pilocarpine was instilled and a dressing applied. Topical steroids were started from the first postoperative day.

RESULTS

Gonioscopy was performed during the first postoperative week and a cleft was seen to be present in all cases.

COMPLICATIONS

Hyphaema

Postoperative hyphaema was present in 6 cases but it had cleared uneventfully at the time of Ist postoperative visit (Table 2).

Uveitis

Severe anterior uveitis appeared in 13 cases but responded to intensive local steroids.

Table-2: Complications of Cyclodialysis.

Complication	No. of cases	Percentage
Hyphaema	6	30
Anterior Uveitis	13	65
Hypotony	1	5

Corneal Edema

In 4 patients edema never cleared, presumably due to permanent endothelial damage because of vitreous touch or long standing elevated IOP. In the remaining 16 patients edema cleared sufficiently to allow adequate visualization of the fundus. In 3 cases the clearing of edema had become evident on the operating table.

Intraocular Pressure

In all cases the IOP was at normal levels when examined on the Ist postoperative day. It remained normal as long as the patients came for follow-up. In one case the IOP was 3mm Hg a month after surgery, presumably due to over drainage through the cleft (Table 3).

Table-3: Postoperative IOP and visual outcome.

Postoperative Visual Acuity	INTRAOCULAR PRESSURE (mm Hg)			
	1st Postoperative day	1st visit	2nd visit	3rd visit
FC	11	21	21	-
FC	13	12	20	20
6/60	13	11	14	15
FC	12	17	-	-
FC	11	19	18	-
FC	14	14	12	14
FC	17	18	-	-
4/60	12	20	21	21
FC	14	19	20	20
FC	12	15	14	16
FC	12	17	-	-
FC	10	20	19	19
FC	11	19	20	19
PL +ve	8	3	-	-
FC	16	18	18	18
FC	11	16	16	18
4/60	10	21	-	-
FC	14	14	19	20
FC	14	12	14	15
FC	12	19	20	-

Visual Acuity

Aphakic spectacle correction was tried in all patients with clear corneas. Best-corrected V/A obtained was 6/60 in I patient and 4/60 in 2 patients. The remainder had varying degrees of "finger counting" vision but could manage to move around their homes without much help.

DISCUSSION

This article may well have been entitled "Cyclodialysis Revisited". Once considered to be the operation of choice in glaucoma complicating aphakia[2], cyclodialysis has now been relegated to the status of an obsolete procedure, performed only occasionally when other IOP lowering measures have failed. In Pakistan, by the time a patient with pupillary block glaucoma reaches an ophthalmologist, the chances for recovery of useful vision are slim. The eye is red and sometimes painful, and the cornea is hazy. IOP is usually well above normal, although it may be lower if there is a wound leak. Since it is difficult to predict the extent of nerve fibre damage in these patient as well as the benefit they will derive from surgery, surgery is rarely

undertaken in these cases and symptomatic treatment is given. Conversely, a blind, hard and painful eye is occasionally subjected to enucleation. Even if surgical intervention is considered, the average Pakistani eye surgeon does not have a broad range of measures to choose from. An AC full of vitreous combined with peripheral anterior synechiae decreases the chances of success of trabeculectomy/iridectomty unless an adequate anterior vitrectomy is simultaneously performed using an automated viteous cutter. Such instruments are at present not widely available in the district hospitals of Pakistan. Under these circumstances, cyclodialysis is the conventional procedure most likely to produce favourable results. An important purpose of this study was to demonstrate that all available resources should be put to good use in order to achieve the best for our patients. After all, cyclodialysis has remained a frontline procedure in the past and hence dozens of patients must have benefitted from it.

The surgical technique which we adopted was not strictly in accordance with the classical description of Heine's operation[2] and Allen's modification[2,3] although it resembled the former to a greater extent. The choice of the inferotemportal quadrant for the sclerotomy site as opposed to the suggested superotemporal quadrant[4] did not result in any significant peroperative bleeding problem, although some degree of hyphaema was seen in 6 (30%) of the cases postoperatively. However, these resolved uneventfully and did not lead to cleft closure in any case. The other major breakaway from tradition was the use of a curved iris repositor in place of a cyclodialysis spatula. It served the purpose well, although the incidence of damage to the canal of Schlemm or any other long-term disadvantage could not be ascertained.

Although the final visual acuities obtained in our patients were not very encouraging, patient education and motivation is an important responsible factor. Most of our rural patients fail to seek medical advice unless a problem starts to become crippling. Thus patients with postoperative pupil block glaucoma reach an ophthalmologist either when pain or local symptoms become unbearable, or else when vision in the aphakic eye starts failing in the presence of an already blind fellow eye. (The latter was an important consideration for us while selecting patients for surgery). By that time significant nerve fibre loss had already taken place and the prognosis for visual recovery following surgery was poor. We believe that if operated earlier, better vision could have been achieved in these patients.

The IOP in all cases when measured on the first postoperative day was found to be in the lower teens. All 20 patients came for Ist follow-up about a month after surgery. One patient showed hypotony with an IOP of 3mm Hg and a V/A of PL +ve. Gonioscopy showed an open functioning cleft. Probably the ciliary body function had been over-compromised. He did not return for further follow-up. 12 (60%) patients had IOP between 17 and 21mm Hg, while the remaining 7 (35%) had IOP between 11 and 16mm Hg. 15 patients reported for 2nd follow-up visit about 2 months after surgery. Those with an IOP in the upper teens previously showed no significant change in the pressure. All 7 patients with IOP previously between 11 and 16mm Hg came for 2nd follow-up and 2 of these now had an IOP above 18mm Hg, while the remainder were more or less the same as before. 12 patients reported for 3rd follow-up visit approximately 3 months after operation and their IOPs were nearly the same as the last measurements. None of the patients reported subsequently. Thus 14 (70%) of the 20 patients eventually had an IOP between 18 and 21mm Hg. There was no way of comparing this IOP level with the IOP which these patients had before the cataract extraction. But it does faintly support the postulation that when more aqueous starts draining through an extra-trabecular route, the permeability of the trabeculum to aqueous decreases[5]. Hence the acute rise in IOP which follows closure of a cyslodialysis cleft. We did not encounter such a rise.

Obviously, there are many shortcoming in this study. An assessment of visual fields and the effect of cyclodialysis on their progression was not included, due in part to the poor visual acuities obtained. The postoperative follow-up was too short and hence only shot-term effects on visual acuity, IOP and cleft patency could be documented. A longer follow-up would have probably shown a reappearance of the glaucoma in at least some of these cases, since about 30% of patients undergoing cyclodialysis have been reported to meet failure[6]. The role of long-term miotic therapy in maintaining the patency of the cleft would have been a useful observation in those eyes in which sector iridectomy had not been done. Nevertheless, we have tried to prove that until instruments such as automated vitreous cutters and operating microscopes become more commonplace in Pakistani eye departments, it is worthwhile to attempt the time-tested procedure of cyclodialysis using available simple equipment, in selected cases of aphakic glaucoma. If in the process, even finger-counting vision can be restored, this will greatly improve the quality of life for the patients.

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Ophthalmic "Pastpourri"

Peribulbar Anesthesia a Century Ago

Contributed by Khalid J. Awan, F.P.A.M.S.

A HUNDRED YEARS AGO:

In 1884, in his extensive paper on the use of cocaine in ophthalmic and other types of surgery, Herman Knapp[1] included the following, perhaps the first, description of peribulbar anesthesia:

> "In performing an *enucleation*.... (Dr. D.C. Cocks of New York) first anaethetized (*sic*) the cornea and conjunctiva on the temporal side, separated the subconjunctival tissue as far back as possible, and with an Anel's syringe injected a few drops of a 4% solution (of cocaine) over the tendon of the external rectus. He then divided this tendon, and introducing the point of the syringe as far back as possible, keeping its point near the globe, he injected a few more drops. This was done with each of the recti. The globe was then dislocated forward, the nerve severed, the obliques cut, and the conjunctival wound loosely drawn together with a stich (*sic*). The patient occasionally felt some pain, but not enough to interfere with the operation".

TODAY:

In 1994, British authors, Simock, Raymond, Lavin, and Whitley[2] credited Mein and Woodcock with introduction in 1990 of the peribulbar anesthesia by "direct sub-Tenon's infiltration of local anesthetic using a blunt irrigation cannula..."They cited the above mentioned paper by Herman Knapp to credit him with the first introduction of retrobulbar anesthesia, but made no mention of its portion describing the first use of peribulbar anesthesia by D.C.Cocks.

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2. Simock PR, Raymond GL, Lavin MJ, and Whitely CL: Combined peribulbar injection and blunt cannula infiltration for vitreoretinal surgery. Ophth Surgery 1994; 25:232-5.

Topical Anesthesia for Cataract Surgery

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ABSTRACT

General overview, advantages and techniques of topical anesthesia for cataract surgery are presented. Author's technique of topical anesthesia is described in detail. This may serve as a guideline for developing one's own variation on the technique of topical anesthesia.

INTRODUCTION

The first successful use of topical anesthesia (5% cocaine drops) for cataract extraction surgery was reported by Knapp[1] in 1884. Shuler[2] in a letter to the 1993 Archives of Ophthalmology reported the use of topical anesthesia without any intravenous sedation for phacoemulsification cataract extraction with intraocular lens implantation in a patient with a history of retrobulbar hemorrhage. Kershner[3] in 1993 reported prospectively on the use of topical anesthesia in one hundred cases of small incision cataract surgery. More recently, numerous other authors have shown that topical anesthesia for cataract extraction has advantages over other forms of anesthesia[4]. Topical anesthesia for cataract surgery is not a single technique, rather an evolving technique carrying different connotations for different surgeons.

The topical anesthesia technique works the best only if one has already mastered the art of clear cornea incision, phacoemulsification and use of foldable intraocular lens implants; although on occasion, different surgeons have used scleral tunnel incisions and 5mm PMMA implants using topical anesthesia. Topical anesthesia is not recommended for procedures combining trabeculectomy with cataract extraction and intraocular lens implantation. Hard cataracts and small pupils are no contraindications, depending on the surgeon's comfort level with these kinds of cases. As in any new technique, the first few cases should be carefully selected[5].

Preoperative Evaluation

Since the success of the topical anesthesia depends on the cooperation of the patients, it is very important to screen one's early patients very carefully till one's learning curve plateau has been achieved. Patients with nervous disposition, narrow palpebral aperture, strong squeeze reflex, hearing impairment or language barrier, small pupil or hard nuclei, should be avoided. As the surgeon's experience with topical anesthesia increases, more challenging cases can be tackled with the topical technique. In the first few cases it is not prudent to change any other aspect of your surgical technique. If one is used to a completely immobile eye during surgery it is wise first to go to peribulbar anesthesia, then to subtenon or limbal injection and then to topical. If at any time during surgery one feels that things are going out of control, it is advisable to give either more sedation or narcotic and to convert to a technique one is comfortable with. Do not force the issue; rather let the technique come to you.

Preoperative Topical Medication

Most common preoperative topical medications given are gentamycin drops for conjunctival sterility, 2% cyclopentolate and 2 1/2% neosynephrine drops for pupillary dilation, non-steroidals like Voltaren drops to reduce intraoperative miosis and postoperative macular edema. Use of cyclopentolate is important in topical anesthesia since it immobilises the ciliary body and enhances patient comfort during surgery. To the above drops are added topical anesthetic drops, like tetracaine, bupivacaine (Marcaine) or proparacaine, three to four times before the patient is taken to the operating room.

Preoperative intraocular pressure reducers, like Super pinky or Honan-cuff on the eye, are rarely necessary as there is no increase in intraorbital volume that one gets with retrobulbar and peribulbar anesthesia.

Intraoperative Sedation

In cooperative patients there is no need for any preoperative sedatives or narcotics but it may help one's transition to topical anesthesia by using these in the initial few cases. If one routinely gives these preoperative medications it is wise to give more of

them for the first few cases. Same medications can be given intravenously during the course of surgery, should the need arise. The most common intraoperative medications given are Midazolam (Versed - Roche), Propofol (Diprivan - Zeneca Pharmaceutical), or Fentenyl, or a combination of these. As with any intravenous medication, these should be titrated.

Intraoperative Topical Anesthetic

After draping the patient and before starting the surgery, instillation of about 1/4 cc of either 4% Lidocaine or 0.75% of Bupivacaine is done in the conjunctival sac. Some surgeons use, in addition, silicone limbal sponge ring or fornix-placed Weck cell or Ultra cell soaked in the same topical anesthetic for added comfort. At this point, the patient is told of the impending start of surgery and instructed to look at the microscope light all the time, unless told otherwise. The patient is also made aware of the fact that he or she will feel some pressure occasionally. If the patient continuously complains of pain, it is necessary to either instill intracamerally 1/8 cc of 1% preservative free Lidocaine or inject Lidocaine or Marcaine perilimbally or peribulbarly. If the surgery lasts longer than fifteen minutes, consider another instillation of topical anesthetic in the conjunctival sac. A fair number of surgeons recommend continuous dialogue with the patient, for what they call Vocal Anesthesia. However, most surgeons prefer to converse with the patient on a need-to basis. Having soft background music creates an all round relaxing atmosphere.

Author's Technique

Whenever a decision is made by a patient to have cataract surgery, the subject of topical anesthesia is brought up at the time of scheduling. If the patient is young, apprehensive, has hypermature cataract, strong lid reflexes and narrow palpebral aperture a case can be made about not using topical anesthesia. In author's practice it is rare to exclude patients from having topical anesthesia because of the above reasons.

The patient is asked to use gentamycin or similar antibiotic drops four times a day for three days prior to surgery and to wash his or her face with an antiseptic soap on the morning of surgery. The patient is instructed not to eat solids for about six hours prior to surgery and to take his or her regular oral medicines with a sip of water as prescribed by the family physician. Coumadin or other medicines that prolong bleeding or clotting time are not stopped prior to surgery. If the patient is on insulin, he or she is instructed not to use the morning dose but to bring the insulin along to the surgery center.

Upon arrival at the surgery center on the day of surgery, the patient is undressed from waist up and given a loosely fitting gown to wear. Routine stat laboratory tests for blood sugar and electrlytes are done. If indicated, other blood tests like BUN, digoxin levels etc. may also be done. Electrocardiogram and general physical examination by an Internist are done. Keratometric readings, axial length and calculations for intraocular lens power are done.

The patient is then brought to the preoperative holding area, placed on a cart and hooked on to the monitors (EKG, blood pressure and pulse oximeter). Two sets of 2% cyclopentolate, 2 1/2 % neosynephrine, profenol (NSAID), gentamycin and tetracaine are administered about one minute apart to the eye to be operated on and an intravenous heparin lock is secured to a vein at the back of the hand. No intraocular pressure reducing device is used.

The patient is unhooked from the monitors and wheeled into the operating room, where the patient is hooked back to the monitors and some more tetracaine drops are instilled in both eyes. Rationale in putting tetracaine in both eyes is that it decreases tearing and the blink reflex. The eye is washed with phisohex and betadine solution. Intravenous fentanyl 1 cc is administered through the previously secured heparin lock. Clear plastic drape is placed over the face with the sticky part around the eye and a horizontal slit is made in it, corresponding to the palpebral aperture. Wire speculum is placed in the eye and the microscope focused. Except in cases of poor exposure, the clear corneal incision is made at 12'O clock position. Half a cc of non- preserved 4% lidocaine is drawn up in a 2 cc syringe and squirted on to the eye and in the fornices. Before starting surgery the patient is instructed to look either at the microscope light or just below it and is made aware of the fact that he or she will feel occasional pressure and cold water flowing over the eye. At first a clear cornea paracentesis is done about 90 degrees from the cataract incision for traction or manipulation in a two-handed technique or for irrigation purposes. A clear corneal cataract incision is made with a 3.2 mm keratome. The incision is in a single plane without any steps and is about three millimeters in length. Once the anterior chamber is entered, it is filled with viscoat (Alcon). Continuous tear capsulorrhexis and subsequent hydrodissection are done. One-handed phaco technique is utilized using Legacy 20000 (Alcon) phacoemulsifier. The irrigating solution used is balanced salt solution 500 cc, to which is added 40 mgm. of gentamycin and 1 cc of 1:10,000 epinephrine. If the patient cooperation is poor and the eye movements more than one's comfort level, one could use the paracentesis incision as a way to stabilize the eye by inserting a Sinskey hook or McPherson

forceps in the incision or by grasping the anterior or posterior lip of the incision by a fine toothed forceps.

Once the nucleus and cortex are aspirated, the posterior capsule is polished and the capsular bag filled with viscoat. Folded Acrysoff (Alcon) intraocular lens is inserted in the bag and the excess viscoat is aspirated and anterior chamber inflated with balanced salt solution, if necessary, through the paracentesis incision. The wound is tested for leakage by pressing gently with a Weck cell sponge at the limbus. The lid speculum is removed and a combination steroid and antibiotic drops are instilled in the eye and the patient is wheeled back to the recovery room without a patch. The patient is ambulated and fed a light snack. In most cases, the patient is discharged home within an hour after the end of the surgery, with instructions for home care. Total average stay of a patient in the surgery center, from the time the patient walks in the front door to the time he or she walks out, is about 2½ hours.

CONCLUSION

Advent of topical anesthesia is a normal extension of the revolution that is taking place in cataract surgery starting with phacoemulsification and more recently with the introduction of foldable intraocular lens implants and clear cornea incisions. Topical anesthesia obviates the need for retrobulbar or peribulbar injection with the possible complications of globe perforation, orbital hemorrhage and ptosis; or the need to discontinue anticoagulants with the possible risk of a cerebrovascular accident or stroke. Topical anesthesia also means quicker ambulation and speedier healing and visual rehabilitation. Eyes operated on under topical anesthesia are generally much quieter and less inflamed.

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Percentage Occurrence And Pattern of Degenerative Calcification of Lenses in Human Senile Cataract

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ABSTRACT

A combined study was carried out at Dow Medical College and Jinnah Postgraduate Medical Centre, Karachi, to find out the percentage occurrence and pattern of degenerative calcium deposition in 34 cases of human senile cataracts.

Calcium deposition was found in 23.5% of cases, which was of mild type in 9%, moderate in 12% and marked in 3% of cases at cortical and cortico-nuclear junction of senile cataractous lenses. Ages of these cases ranged between 65 and 75 years.

INTRODUCTION

Cataract is an opacification or loss of transparency in the crystalline lens of the eye and is a major cause of blindness in the world, being 400 times more common in Asia than in Europe[1]. Human lens opacification is related to the precipitation, denaturation and coagulation of soluble lens proteins[2]. Opacification of senile cataract can be explained by conformational changes in lens protein structure[3,4], fluctuation in the orientational order of proteins[5] and by being related with age[6]. Senile degenerative tissues show calcification which occurs normally in the costal cartilages of elderly people and is not uncommon in the pineal gland after middle age. Degeneration and calcification in the supraspinatus tendon is possibly also a senile change[7].

The present study was designed to observe the calcium deposition along with other degenerative changes in human lens in senile cataract because it is so very common in Pakistan.

MATERIALS AND METHODS

Out of 300 cases of mature senile cataracts admitted and operated on for extraction of lens at the eye department of Jinnah Postgraduate Medical Centre, Karachi, from January 1992 to December 1993, only 34 cases were for intracapsular cataract extraction. These cases did not have any history of trauma, glaucoma or steroid therapy. These patients were clinically examined by distant direct ophthalmoscopy and slit-lamp examination to find out morphological pattern of cataract and any calcium deposition. Normal lenses were similarly examined in cases scheduled for enucleation of eye and were used as controls.

Cataractous or normal lens was processed similarly, fixed in 10% buffered neutral formalin, then dehydrated in ascending grades of alcohol from 70% to absolute alcohol. Lenses were cleared in xylene and embedded in paraffin after paraffin infiltration. Three-micron thick section were stained with haematoxylene and eosin to observe the morphological changes and with von Kossa stain to demonstrate any calcium deposition, which was confirmed by Alizarin Stain. During this staining for von Kossa, the tissue slides were exposed to direct sunlight while immersed in silver nitrate solution for one hour to get better results.

RESULTS

Normal lenses did not show any abnormality on gross examination. These were almost transparent, nonvascular, soft in consistency and elastic in nature.

Almost in all the cataractous cases red fundal glow was obstructed on distant direct ophthalmoscopy. Slit-lamp examination revealed the opacities, in cortical, nuclear, equatorial and posterior subcapsular areas. Five cases showed chalky white spots, indicating calcification along with opacities, by diffuse illumination. The cataractous lenses were opaque and showed yellow to brown colour, hard consistency and

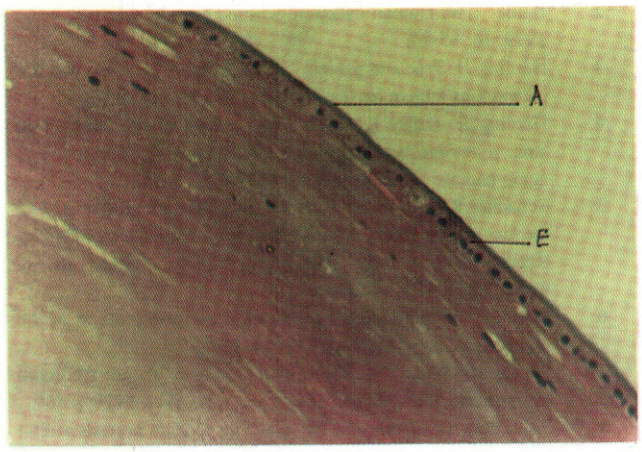

Figure - 1:
Photomicrograph of 3-UM-thick paraffin section showing anterior part of normal human lens stained with H and E indicating the anterior cuboidal epithelium (E) and anterior lens capsule(A). The cellular nature of lens substance is prone to artifactual distortion during histological preparation. Oval nuclei of lens fibers in the anterior cortex of lens are visible. X410.

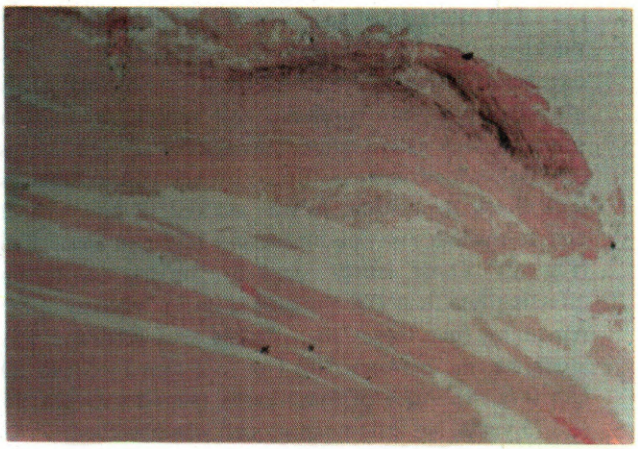

Figure - 3:
Photomicrograph of 3-Um-thick paraffin section of mild calcareous cataract stained with von Kossa stain showing dystrophic calcium (black) deposition at anterior cortex of lens. X 104.

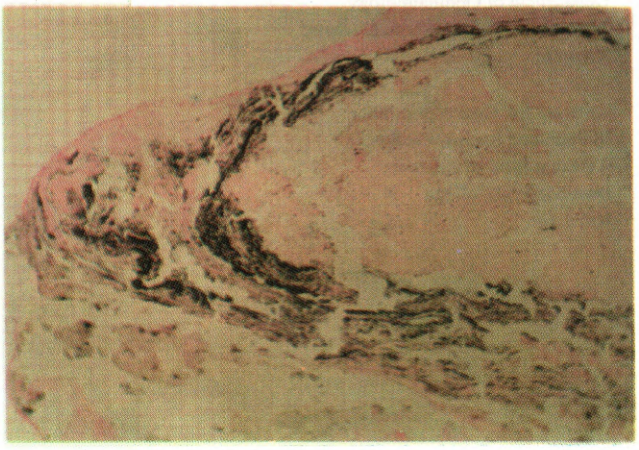

Figure - 2:
Photomicrograph of 3-Um-thick paraffin section of marked calcareous cataract stained with von Kossa stain showing dystrophic calcium (black) deposition at cortico-nuclear junction and counter-stained with nuclear fast red. X104.

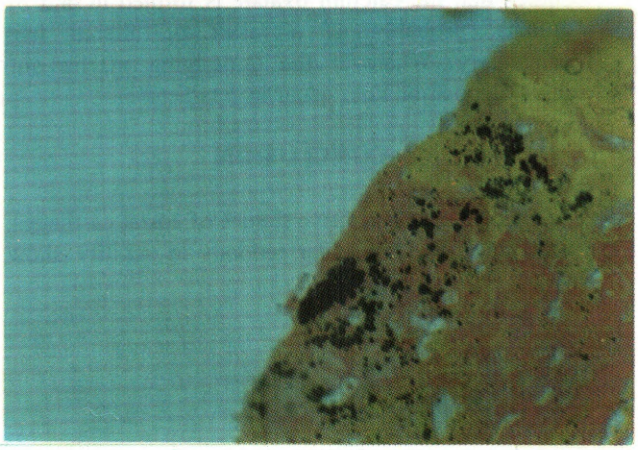

Figure - 4:
Photomicrograph of 3-Um-thick paraffin section of moderate calcareous cataract stained with von Kossa stain showing dystrophic calcium (black) deposition at equatorial plane of lens cortex. X421.

uneven surfaces. Microscopically, the transverse sections of control lenses looked biconvex, enveloped by a capsule, with lens nucleus in the centre. Their cortex was composed of parallel meridionally arranged lamellae of lens cells or fibers whose nuclei defined the bent arrangement known as the "bow" configuration. Subcapsular epithelial monolayered sheet was present anteriorly and at equator (Fig. 1).

The cataractous lenses showed decrease in capsule thickness and in diameter of epithelial cells. The degenerative changes observed were, swollen cells, tiny globules, posterior epithelial cell migration, nuclear sclerosis and calcification suspected in eight lenses (23/5%), which was confirmed by von Kossa stain as dark black deposition. It was marked in one lens at cortico-nuclear junction measuring 2.28 mm by 65 Um (Fig. 2). Three lenses showed mild calcification affecting less than 100 Um area (Fig. 3), whereas in the remaining four lenses the affected area recorded was moderate, i.e. between 300 Um to 1 mm by 30 to 50 Um (Fig. 4). Ages of these cases ranged between 65 and 75 years. No inflammatory cell was observed.

DISCUSSION

Calcification was recorded in eight cases with mild, moderate and marked deposition of calcium at cortical, equatorial and cortico-nuclear areas in the cataractous lenses. Since no inflammatory cell was found in the lens substance, calcium deposition on the damaged fibers might be due to altered permeability of the lens resulting from decreased metabolism because of old age. Lenticular deposition of calcium oxalate has also been observed by Zimmerman and Johnson[8], who assumed that the calcium oxalate is formed in and by the lens, probably as a result of altered lens biochemistry. Whatever the underlying mechanism, calcium deposition does occur in cataracts[9].

CONCLUSION

Since the degenerative tissues of costal cartilages, pineal gland and muscular tendons in senility show calcification, the lens of the eye might also be one of the tissues that form calcium deposits on its degenerating cell fibers.

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Abstracts

Edited by Tahir Mahmood

Ocular Perforation During Peribulbar Anaesthesia

Gillow JT, Aggarwal RK, Kirkby GR
Eye 1996; 10: 533-6

The classic peribulbar technique as described by Davis and Mandel requires two injections: one at the lateral third of the lower orbital rim and the second at the medial third of the upper orbital rim. It was introduced as an attempt to reduce the complications associated with retrobulbar anaesthesia, including ocular perforation.

Many of the reported cases of ocular perforation occurring after local anaesthesia have occurred with retrobulbar anaesthesia, and perforation, although reported, appears to be less common with the peribulbar technique.

Davis and Mandel emphasised the safety of peribulbar anaesthesia in skilled hands, and in their series of 16224 consecutive peribulbar blocks reported a single globe perforation (0.006% incidence).
The authors present a series of six patients referred from other hospitals.

Six cases of ocular perforation after peribulbar anaesthesia are reported. They were referred to their vitreoretinal unit from other hospitals over a 6- week period. Some recent reports of ocular perforation with peribulbar anaesthesia suggest a good prognosis. In this series all six required surgical intervention and most cases associated with a retinal detachment had a poor outcome. This study highlights the dangers of ocular perforation and emphasises the need for supervised training of peribulbar anaesthesia and for early referral, should ocular perforation occur.

In conclusion, it is evident that those performing peribulbar anaesthesia must have proper training and supervision during early clinical experience. A high complication rate may occur if this is deficient. Ocular perforation should be suspected when fresh vitreous haemorrhage is noted on the first post-operative day. Close follow-up and early appropriate intervention for associated complications is recommended in order to achieve the best visual outcome.

A Survey of Ocular Perforation During Ophthalmic Local Anaesthesia in the United Kingdom.

Gillow JT, Aggarwal RK, Kirkby GR
Eye 1996; 10: 537-8

A survey of local anaesthetic-related ocular perforation in the United Kingdom is reported. A total of 531 consultant ophthalmologists were sent a postal questionnaire and there was a 71% response rate. Thirty respondents reported 39 perforations occurring under their care during the previous year. Details of the cases are presented. The rate of local anaesthetic-related ocular perforation is higher than in previous reported series. Efforts to reduce the incidence will require consideration of alternative techniques, audit, and training.

Phacoemulsification Versus Endocapsular Cataract Extraction in a Unique Cohort of Patients.

Potamitis T, Beatty S, Pereira AM, Pearce JL
Eye 1996; 10: 551-4

Phacoemulsification (PE) is rapidly becoming the preferred technique of cataract extraction for many ophthalmic surgeons. The speed of visual rehabilitation and the reduced postoperative astigmatism associated with this technique are the main factors contributing to the transition from conventional extracapsular cataract extraction (ECCE).

The visual recovery and refractive results of 33 consecutive patients (66 eyes) undergoing standard endocapsular cataract extraction in one eye and simultaneous phacoemulsification in the fellow eye are reported. One surgeon performed all the operations. Surgically induced astigmatism was evaluated for the two techniques in terms of: (1) the proportion of eyes with a refractive cylinder of 1.5 dioptres (D) or less; (2) the interocular difference in post-operative astigmatism. Eyes undergoing phacoemulsification had a significantly lower mean induced cylinder (Paired Student's t-test: $t=3.729$; $p<0.001$) and were more likely to exhibit a cylinder of 1.5 D or less (chi-squared test with Yates' correction: $X2=7.88$; $p<0.01$) than the nuclear expression group. For paired eyes less postoperative astigmatism (Wilcoxon's signed rank test: $T=92$; $p<0.01$) was seen in the phacoemulsification eye. At the time of the last postoperative assessment a significantly higher proportion of phacoemulsified eyes achieved a corrected Snellen visual acuity of 6/6 or better than their fellow eyes (McNemar's test: $p<0.01$). The results of this unique cohort of patients confirm the beneficial effects of phacoemulsification on astigmatism and visual outcome in the early postoperative period.

Warming Lignocaine Reduces the Pain of Injection During Local Anaesthetic Eyelid Surgery

Bell RWD, Butt ZA, Gardner RFM

Eye 1996; 10: 558-60

The injection of local anaesthetic solutions is frequently a painful and unpleasant experience for patients. A double-masked randomised controlled trial was performed to study the potential benefit of warming lignocaine during local anaesthetic minor surgical procedures on the eyelids. The pain of subcutaneous injection of 1.5 ml of 2% lignocaine at room temperature (cold) and body temperature (warm) was compared in 60 patients during the surgical incision of solitary meibomian cysts of one eyelid. Patients were randomly allocated to receive either warm or cold lignocaine. Pain was assessed subjectively by the use of a linear analogue pain scale ranging from 0 to 100. The median pain score for the group receiving cold anaesthetic (19.5) was found to be greater than that for the warm group (10.0;p=0.02). In conclusion, the simple process of warming lignocaine to 37 C was found to reduce the pain associated with its injection, significantly. It is recommended that this technique be more widely adopted in order to minimise patients' discomfort.

Phototherapeutic Keratectomy in Recurrent Corneal Erosions Refractory to Other Forms of Treatment

Bernauer W, De Cock R, Dart JKG

Eye 1996; 10: 561-4

Recurrent corneal erosion is a common clinical disorder characterised by repeated episodes of ocular pain typically on waking in the morning or at night. Symptoms are related to breakdown of the corneal epithelium, possibly due to movements of the lid on waking or of the eye during rapid eye movement sleep. Thinning of the tear film overnight may allow adhesion of the lids to the corneal surface resulting in a shearing force on the epithelium as the eye and the lids move relative to each other. Physiological oedema of the corneal epithelium may also play a role.

Recurrent corneal erosions can occur as a sequel of trauma, of dystrophies or spontaneously. Therapeutic options include topical lubricating and desiccating agents, therapeutic contact lenses, anterior stromal puncture and, most recently, phototherapeutic keratectomy. At present there are no studies available assessing the value of these different therapeutic options.

Fifteen eyes of 12 patients underwent therapeutic excimer photoablation after failure of other forms of treatment (lubricating agents in all cases, therapeutic contact lenses in 8, anterior stromal puncture in 2). Ablation depth was 5um, except in patients with stromal dystrophy or myopia (6 eyes), who had a deeper ablation.

After a first photokeratectomy, 9 eyes remained asymptomatic (mean follow-up 12.8 months), 2 eyes had persistent symptoms and 4 had recurrent corneal erosions after 1-24 months. The chance of success after one treatment was 60% after 12 months as calculated by the Kaplan-Meier method.

The authors concluded that the method of photoablation as applied in this study had a similar chance of success to other surgical methods such as anterior surgical stromal puncture. Patients included in this study, however, were highly selected and were refractory to other forms of treatment.

ERG and EOG Abnormalities in Carriers of X-Linked Retinitis Pigmentosa

Stavrou P, Good PA, Broadhurst EJ, Bundey S, Fielder AR, Crews SJ

Eye 1996; 10: 581-9

The diagnosis of X-linked retinitis pigmentosa (XL-RP) relies on the identification of the female carriers, in whom fundal abnormalities are often minimal and variable. The electroretinogram (ERG) has been reported as abnormal in 54-96% of heterozygote females. This study examines the combined use of electro-oculogram (EOG) and standardised ERG in 31 obligate and 33 non-obligate carriers of XL-RP. In the obligate carrier group, the EOG was abnormal in 13 carriers (41%), the ERG abnormal in 21 carriers (68%) and a combined EOG and ERG abnormality occurred in 24 carriers (77%). An EOG abnormality alone occurred in 2 carriers (6.5%). Fourteen obligate carriers (45%) showed a peak to peak delay of the ERG scotopic b wave; this being a previously unreported phenomenon. Similarly, in the non-obligate carrier group, the EOG was abnormal in 11 carriers (44%) and the ERG abnormal in 19 carriers (73%). The results of this study suggest that the use of both tests, including measurement of the scotopic b wave latency, may increase the carrier detection rate.

Magnetic Resonance Imaging in Thyroid Eye Disease

Bailey CC, Kabala J, Laitt R, Goddard P, Hoh HB, Potts MJ, Harrad RA

Eye 1996; 10: 617-9

Significant thyroid eye disease occurs in 2-7% of cases of Graves' disease. There appear to be two stages

in the disease process: an active phase characterised by inflammation with a lymphocytic infiltrate of retro-orbital tissues, and a quiescent (burnt-out) phase. In the latter, fibrosis has occurred, but there is no active inflammation.

Magnetic resonance imaging (MRI) has several advantages over computed tomography (CT) in the assessment of thyroid eye disease. There is excellent soft tissue differentiation; no ionising radiation is used, so multiple sequences are possible and no patient repositioning is required to take scans in different planes.

Those features characteristic of thyroid eye disease seen on CT scan such as muscle enlargement with relative sparing of tendon, bowing of the medial wall of the orbit, and muscular compression at the orbital apex in cases of optic neuropathy, will also be seen on MRI, but with better tissue contrast.

The authors examined 25 patients with thyroid eye disease, using both the STIR (Short tau Inversion Recovery) Sequence and cine MRI techniques. A number of characteristic features can be seen on the cine MRI. There is muscle enlargement with restriction of movement and, in the burnt-out phase of the disease, reduced elasticity of the muscles is manifest as their failure to stretch on eye movement. This is in contrast to the active phase of the disease, where although the muscles are enlarged, muscle stretching is clearly visible. The STIR sequence gives an assessment of muscle water content, and hence a high signal is seen in active disease. Combining these techniques is useful in assessing the level of disease activity in thyroid eye disease, and helps in planning further management.

Improving the Sensitivity of the OKP Visual Field Screening Test with a Blue Stimulus on a Dark Background

Wessels IF, Randhawa RS
Eye 1996; 10: 620-5

Glaucoma is a major public health problem. Early detection is critical, because despite effective treatment being available, symptoms are subtle and optic nerve damage results in permanent visual field loss. Although detecting defects in the visual field is the most reliable method for identifying glaucoma, the need for expensive equipment, skilled technicians, and the length of time taken makes it unsuitable for general screening.

The Oculokinetic Perimeter Test (OKP) has been developed to make visual field screening possible: a simple, inexpensive, and self-administered (in trustworthy witnesses) visual field screening device that relies on eye movements to project a stimulus onto different areas of the visual field. It consists of a piece of firm white card with a central 1.5 mm black target surrounded by 26 numbers in a spiral pattern that subtend the central 30 degree visual field.

The standard oculokinetic perimetry test (OKP) was modified to present a light blue stimulus on a dark background (MOKP) to determine whether the sensitivity and specificity for detecting glaucomatous visual field loss could be improved. Thirty-five adult glaucoma patients (70 eyes) self-administered both tests and the results were correlated with the loss of retinal sensitivity on the Octopus IV program 38. The MOKP detected 18% more true scotomatous loci (more than 15 dB loss of attenuation) than the standard OKP($p<0.0001$). The gain was due to 37 % fewer false negatives ($p<0.0001$), but with a doubling of the false positive rate ($p<0.049$). With a disease prevalence of approximately 2 % , the MOKP and OKP would respectively miss 15 % or 30 %, and include 14 or 9 normals for each diseased individual. This relatively simple modification may further improve the OKP for detecting glaucoma.

Optic Disc Haemorrhages and Progression of Glaucoma

Siegner SW, Netland PA
Ophthalmology 1996;103:1014-24

The purpose of this study was to assess progressive changes of the optic nerve head and visual fields in patients with glaucoma and ocular hypertension after optic disc haemorrhage.

The authors reviewed the charts of 91 patients with 121 disc haemorrhages who had a mean follow-up of 41.9 +/- 3.6 months. The frequency of visual field and optic nerve head changes in these patients was studied.

The mean intraocular pressure at the examination when the disc haemorrhage was noted was 18.9 +/- 0.5 mmHg. Overall, 64 (63%) of 101 eyes showed progressive changes of visual fields after disc haemorrhage, compared with 24 (24%) of 101 control eyes ($P<0.0005$). Similarly, 56 (79%) of 71 eyes showed progressive changes of optic nerve head contour by masked evaluation of stereophotographs, compared with 16 (22%) of 71 control eyes ($P<0.0005$). Eyes with disc haemorrhage showed significantly greater progression of visual field defects in patients with open-angle glaucoma ($P<0.001$), low-

tension glaucoma (P<0.05), and ocular hypertension (P=0.0067)compared with control eyes matched by age, follow-up time, and diagnosis. Similarly, progressive changes of optic nerve head contour were observed more often in eyes after disc haemorrhage in patients with open-angle glaucoma (P<0.0005), low-tension glaucoma (P<0.025), and ocular hypertension (P<0.005), compared with controls. The mean time interval to progression after disc haemorrhage was observed was 16.8 +/- 2.0 months for visual field changes and 23.8 +/- 2.9 months for optic nerve head changes. In eyes with disc haemorrhage, 27 (22%) of 121 had recurrent haemorrhages at a mean interval of 21.5 +/- 2.9 months after previous haemorrhage. The most common site of disc haemorrhage was the inferotemporal quadrant. Eyes with disc haemorrhage that occurred on the temporal side of the optic nerve head had a significantly lower intraocular pressure (P<0.02) and greater progressive changes of the optic discs (P<0.001), compared with eyes with haemorrhage on the nasal side.

The authors' results indicated that disc haemorrhages in eyes with glaucoma or ocular hypertension often were associated with progressive changes of the optic nerve head and visual fields.

A Randomized, Masked, Crossover Trial of Acetazolamide for Cystoid Macular Edema in Patients with Uveitis.

Whitcup SM, Csaky KG, Podgor MJ, Chew EY, Perry CH, Nussenblatt RB
Ophthalmology 1996;103:1054-63

The purpose of this study was to study the effect of acetazolamide on cystoid macular edema in patients with uveitis.

Forty patients with chronic intermediate, posterior, or panuveitis associated cystoid macular edema were randomized into a masked, cross-over trial, comparing acetazolamide versus placebo. Patients received an initial 4-week course of either acetazolamide or placebo (course A) followed by a 4-week washout period. They then received a 4-week course of the opposite study medication (course B). Primary endpoints included area of cystoid macular edema measured on late-phase views of fluorescein angiography and visual acuity.

Thirty-seven patients completed the trail and were available for analysis; 17 (46%) were randomized to receive acetazolamide and 20 (54%) to receive placebo during course A.Acetazolamide resulted in a 0.5 disc area (25%) decrease in cystoid macular edema over that of placebo (P=0.01; estimated treatment effect = -0.5 disc areas; 95% confidence interval, -0.9 to -0.1). However, there was no statistically significant effect of acetazolamide on visual acuity (P=0.61; estimated treatment effect =0.6 letters; 95% confidence interval, -2 to 3).

The authors concluded that a 4-week course of acetazolamide therapy resulted in a statistically significant but small decrease in cystoid macular edema in patients with chronic uveitis, and did not improve visual acuity. In contrast to previous studies in the literature, acetazolamide may have a more limited clinical benefit in patients with long-standing cystoid macular edema associated with chronic uveitis.

Refractive Outcome and Corneal Topographic Studies after Photorefractive Keratectomy with Different-sized Ablation Zones.

Rosa N, Cennamo G, Pasquariello A, Maffulli F, Sebastiani A
Ophthalmology 1996;103:1130-8

Discrepancies may still occur between planned and actual refractive correction in eyes undergoing photorefractive keratectomy (PRK). The authors have evaluated the use of an enlarged ablation zone.

A computerized corneal analysis system was used to compare the changes of the anterior surface of the cornea and the refractive changes before and 1, 6, and 12 months after PRK in 113 patients (119 eyes) treated with an excimer laser. The patients were divided into two groups: those treated with a mask with a 5-mm window (59 eyes), and those with a new mask with different window openings according to the degree of refraction at the corneal apex, starting from 5mm in diameter for treatments less than 6.5 diopters (D) and from 7mm in diameter for higher treatments (60 eyes). In the first group, treatment ranged from -2.5 to -16D (mean +/- standard deviation, -8.5 +/- 3.24 D); in the second group, it ranged from -1 to -14 D (-7.8 +/- 3.06 D). Treatments were evaluated with a chi-square test.

In the first group of eyes, 46% were within +/- 1D at 1 month, 37% at 6 months, and 39% at 12 months. In the second group of eyes, 73% were within +/- 1 D at 1 month, 60% at 6 months, and 58% at 12 months. The comparison between these data and corneal topographic changes showed that both were more stable and predictable with the new mask compared with the 5 mm mask (P=0.002, 0.02, 0.04, at 1,6, and 12 months, respectively).

The authors concluded that the use of larger ablation zones improved the predictability and stability of refractive changes.

Anisometropia and Binocularity
Brooks SE, Johnson D, Fischer N
Ophthalmology 1996; 103:1139-43

The purpose of this study was to determine the effects of experimentally induced anisometropia on binocular function in healthy adults as a means of assessing the potentially detrimental effects of uncorrected anisometropia on binocular development in childhood.

Nineteen adults with normal binocularity, ranging in age from 26 to 59 years, were studied. Unilateral myopia, hyperopia, or astigmatism (at 90° or 45°) was induced in each subject using trial lenses. Sensory status then was assessed by measuring stereoacuity, Worth four-dot fusion, and Bagolini lens response.

All subjects showed a decline in binocular function with increasing levels of anisometropia. Foveal suppression was evident on the Worth four-dot test, and increased in proportion to the anisometropia. Stereoacuity was similarly degraded by the induced anisometropia, with some subjects showing significant loss of stereoacuity with as little as 1 diopter of spherical anisometropia. Bagolini lens responses were binocular in almost all patients, although occasional abnormalities were found.

The authors concluded that relatively low degrees of anisometropia may cause significant abnormalities in high-grade binocular visual functions in adults. The potential effects of uncorrected anisometropia on binocularity in children require further investigation, but should be considered in developing guidelines for the empiric correction of refractive errors.

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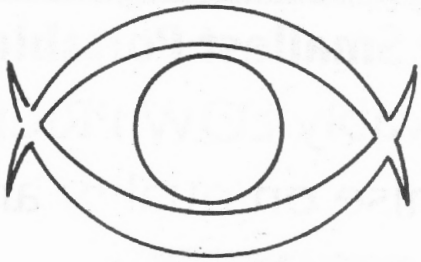

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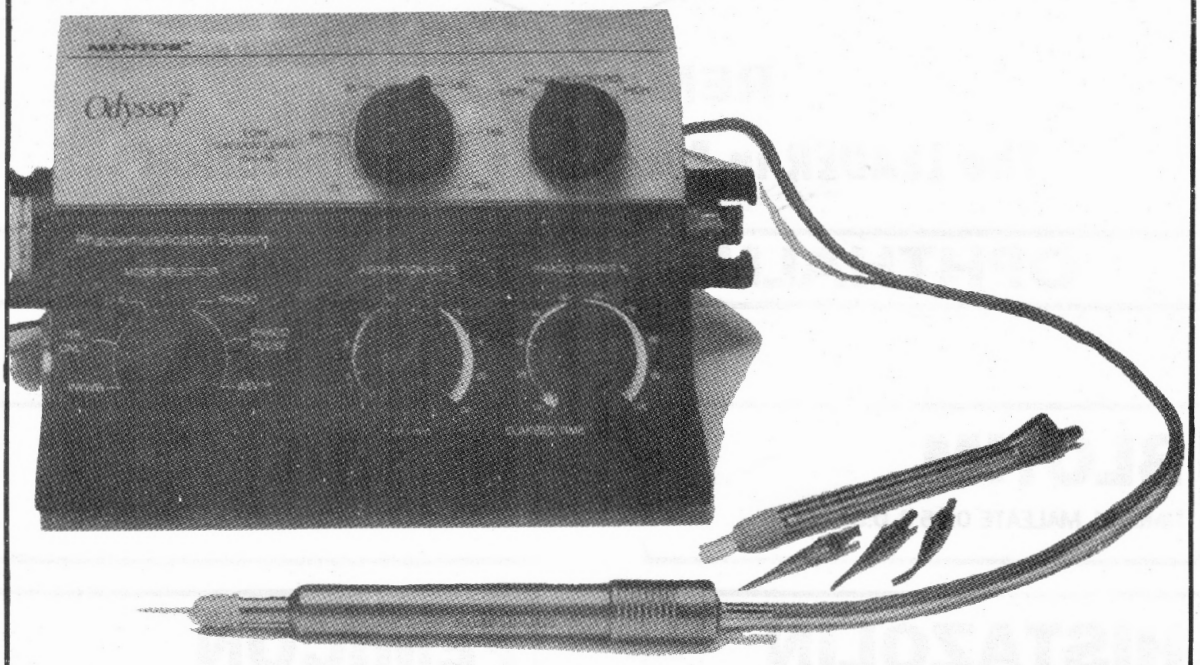

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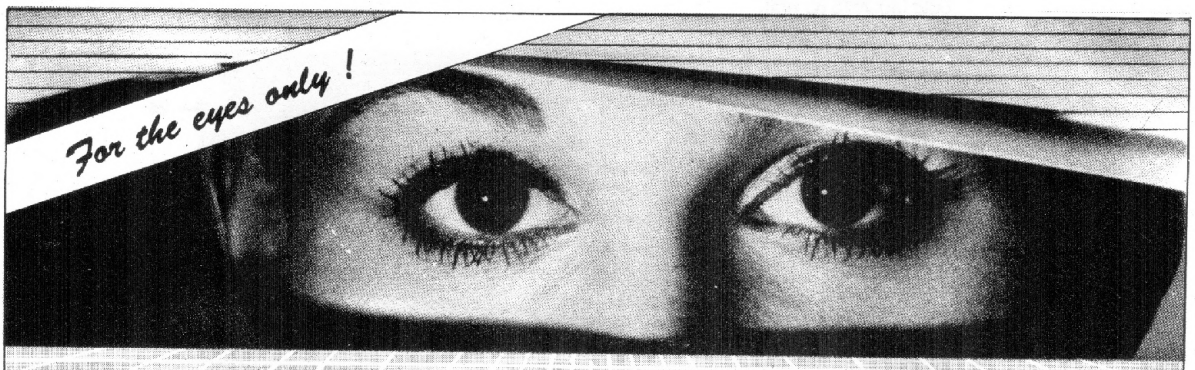

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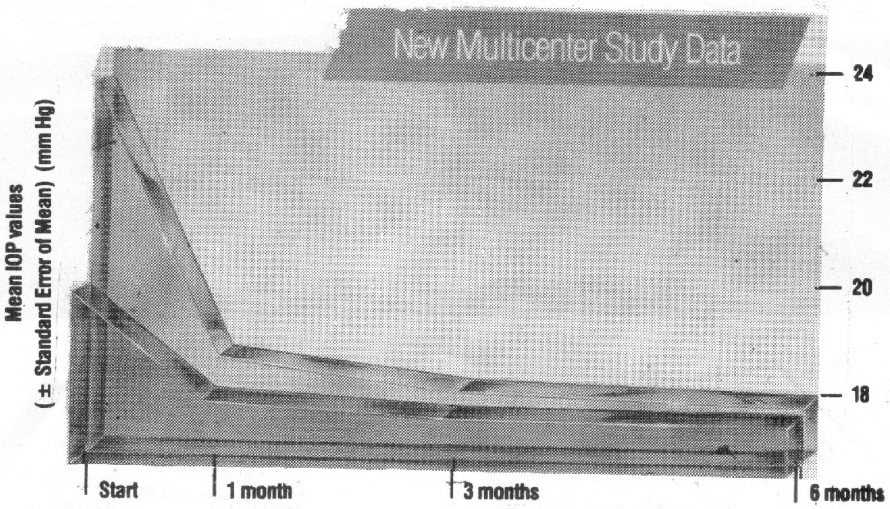

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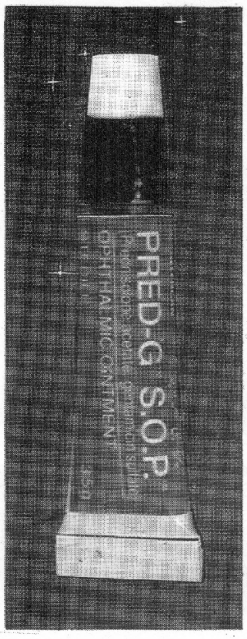

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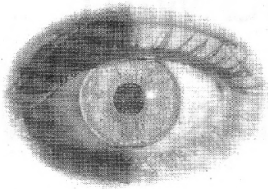

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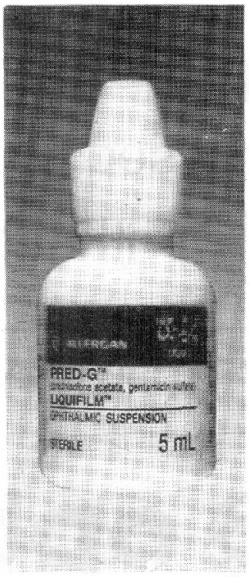

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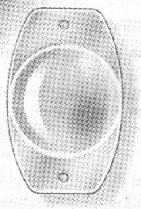

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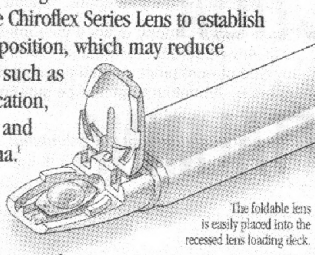

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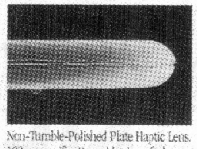
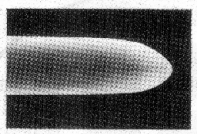


Non-Tumble-Polished Plate Haptic Lens. 100x magnification; side view of plate.



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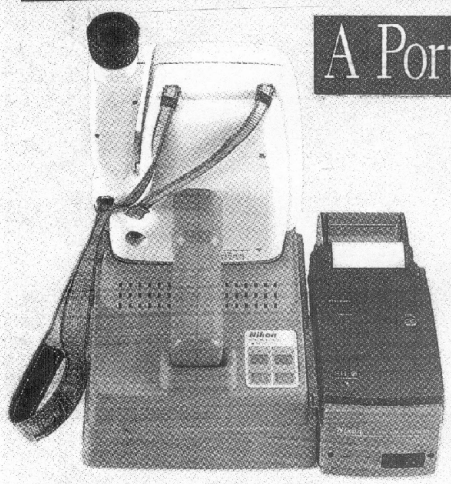

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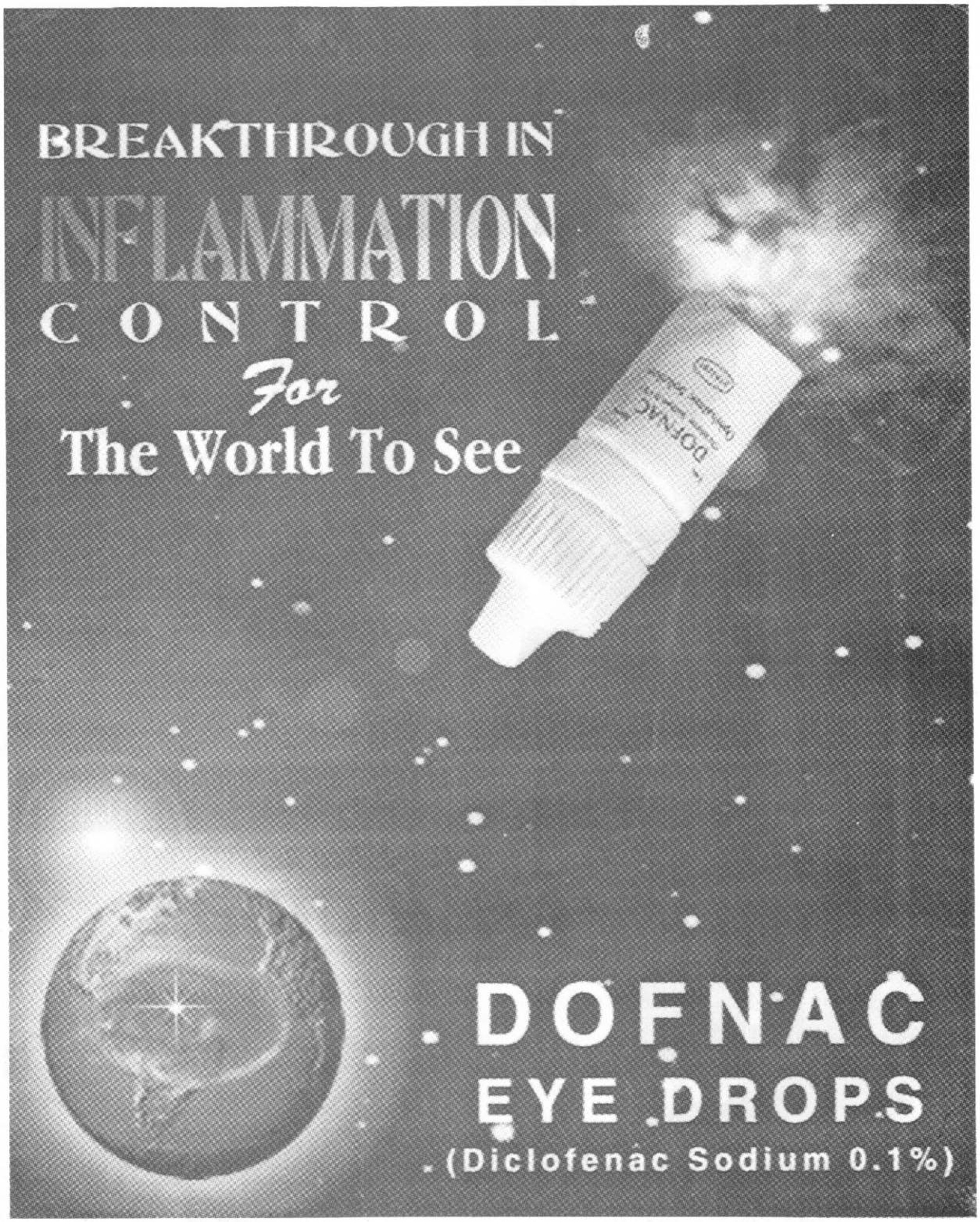

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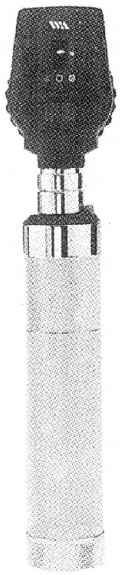

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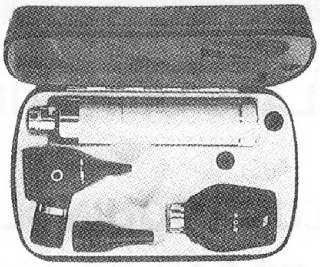

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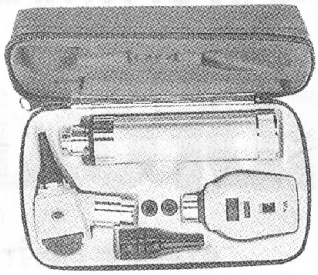

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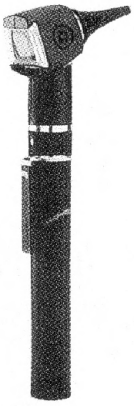

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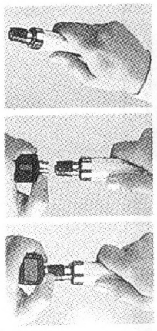
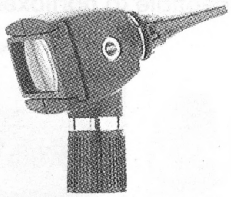
Can be converted to a spot retinoscope by simply changing the lamp.



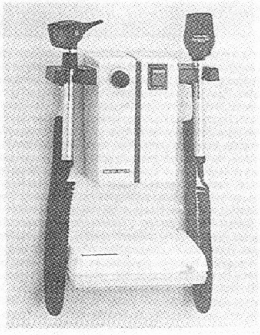


Otoscope
Throat Illuminator

Two instruments in one. Pull otoscope head off to convert to high intensity throat illuminator built into otoscope base.

StrabismoScope
Unidirectional Occluder

Desk charger with speculum tray also available in 2.5V (does not include instrument heads).



Wall transformer with No. 71300 speculum tray. (Optional)

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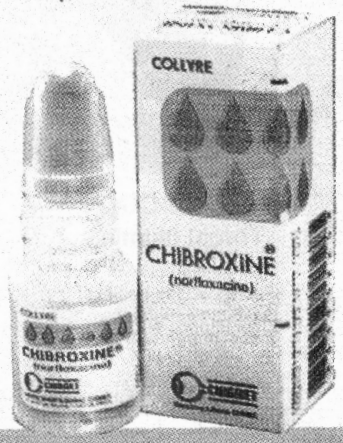
Chibroxine®

(norfloxacin, MSD)

STERILE OPHTHALMIC SOLUTION

Indicated for conjunctivitis and other superficial infections of the eye and its adnexae caused by bacteria susceptible to norfloxacin.

- Broad spectrum
- High potency
- Bactericidal action
- Clinically effective
- Favorable tolerability profile
- Can be used in children and adults
- Easy to use



CHIBROXINE® (norfloxacin, MSD) is a 0.3 percent sterile solution of norfloxacin for topical use in the eye. Norfloxacin is a synthetic fluoroquinolone broad-spectrum antibacterial agent with activity against Gram-positive and Gram-negative aerobic organisms, including gentamicin-resistant Pseudomonas aeruginosa. This spectrum includes the majority of organisms which are likely to be involved in superficial infections of the eye or its adnexae. **MICROBIOLOGY:** Norfloxacin has in vitro activity against a broad spectrum of Gram-Positive and Gram-negative aerobic and facultative anaerobic bacteria. The fluorine atom at the 6 position provides increased potency against Gram-negative organisms and the piperazine moiety at the 7 position is responsible for antipseudomonal activity. Norfloxacin inhibits bacterial deoxyribonucleic acid synthesis and is bactericidal. At the molecular level three specific events are attributed to norfloxacin in E.coli cells: 1) inhibition of the ATP-dependent DNA supercoiling reaction catalyzed by DNA gyrase. 2) inhibition of the relaxation of supercoiled DNA. 3) promotion of double-stranded DNA breakage. Resistance to norfloxacin due to spontaneous mutation is a rare occurrence (range, 10^{-9}-10^{-12}). There is generally no cross-resistance between norfloxacin and structurally unrelated antibacterial agents. Therefore, norfloxacin generally demonstrates activity against indicated organisms resistant to the aminoglycosides (including gentamicin), penicillins, cephalosporins, tetracyclines, macrolides, and sulfonamides (includes combinations such as cotrimoxazole). In addition, because of its specific structure, norfloxacin is generally active against organisms that are resistant to other organic acids, such as nalidixic, oxolinic and pipemidic acids, cinoxacin and flumequine. Organisms resistant to norfloxacin in vitro are also resistant to these organic acids. Other studies suggest that norfloxacin-resistant organisms are also generally resistant to pefloxacin, ofloxacin, ciprofloxacin, enoxacin and amifloxacin. In vitro studies have demonstrated the susceptibility of most strains of the following aerobic and facultative anaerobic organisms (organisms marked by the symbol + are those pathogens most frequently involved in superficial infections of the eye of its adnexae): **Gram-positive bacteria including:** + Staphylococcus aureus (penicillinase-producing, non-penicillinase-producing and methicillin-resistant strains). + Staphylococcus epidermidis Staphylococcus saprophyticus. + Streptococcus sp. Group A and B Streptococcus faecalis (enterococcus). + Streptococcus pneumoniae Bacillus cereus Micrococcus species. **Gram-negative bacteria including:** Acinetobacter calcoaceticus, Aeromonas species, Alcaligenes species, Campylobacter species, Citrobacter diversus, Citrobacter freundii, Edwardsiella tarda, Enterobacter aerogenes, Enterobacter cloacae, Escherichia coli, Flavobacterium species, Hafnia alvei + Haemophilus influenzae, H. aegyptius (Koch-Weeks Bacillus), Klebsiella oxytoca, Klebsiella pneumoniae, Klebsiella rhinoscleromatis + Moraxella species, Morganella morganii + Neisseria gonorrhoeae, Proteus mirabilis, Proteus vulgaris, Providencia alcalifaciens, Providencia rettgeri, Providencia stuartii + Pseudomonas aeruginosa, Salmonella typhi, Salmonella species, Serratia marcescens, Shigella species, Vibrio cholerae, Vibrio parahaemolyticus, Yersinia enterocolitica. Norfloxacin is not active against obligate anaerobes. **INDICATIONS:** CHIBROXINE is indicated in adults and children for the treatment of superficial infections of the eye and its adnexae, presumed or demonstrated to be caused by pathogenic bacteria susceptible to norfloxacin. **DOSAGE AND ADMINISTRATION:** The usual dose is one or two drops of CHIBROXINE in the affected eye(s) four times daily. Depending on the severity of the infection, the dosage for the first day or therapy may be one or two drops every two hours during the waking hours. Appropriate monitoring of bacterial response to topical antibiotic therapy should accompany the use of CHIBROXINE. **CONTRAINDICATIONS:** CHIBROXINE is contraindicated in patients with known hypersensitivity to any component of this product or any chemically related quinolone antibacterial agent. **PRECAUTIONS:** PREGNANCY: CHIBROXINE has not been studied in human pregnancy. Therefore, CHIBROXINE should be given to a pregnant woman only if clearly needed. NURSING MOTHERS: It is not known whether norfloxacin is excreted in human milk following ocular administration. **SIDE EFFECT:** In clinical trials, CHIBROXINE was generally well tolerated. The most frequently reported side effect was local burning or smarting. other drug-related side effects, reported rarely, were conjunctival hyperemia, chemosis, photophobia and a bitter taste following instillation. **AVAILABILITY:** Chibroxine Ophthalmic Solution 0.3% is available in 5 ml dispenser with metered tip. **STORAGE:** Protect from light. Store at room temperature. *Trademark Physicians Circular

MSD

01-97-CRI-96-MEA-I-J (PK)

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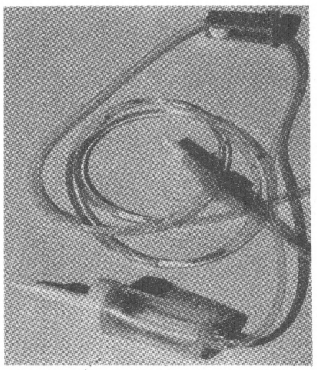
ENSURES:

- Sterility 100%.



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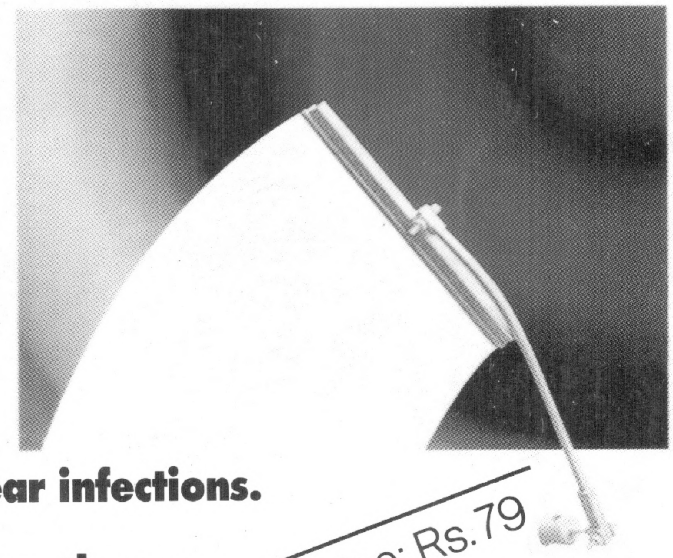

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- **Powerful efficacy to clear infections.**
- **Cost efficient in post-op therapy.**
- **Quality & economy together.**

Price: Rs.79 ONLY

DOSAGE:
Mild to moderate infections – one or two drops every four hourly.
Severe infections – two drops every hour initially.

CONTRAINDICATIONS:
Patients with known hypersensitivity to any ingredient of the formulation.

ADVERSE REACTIONS:
Generally safe, however, if a sensitivity reaction occurs, the drug should be discontinued.

AVAILABILITY:
Tobramycin 0.3% in 5 mL sterile ophthalmic dropper bottle.

Complete product prescribing information is available to doctors on request

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