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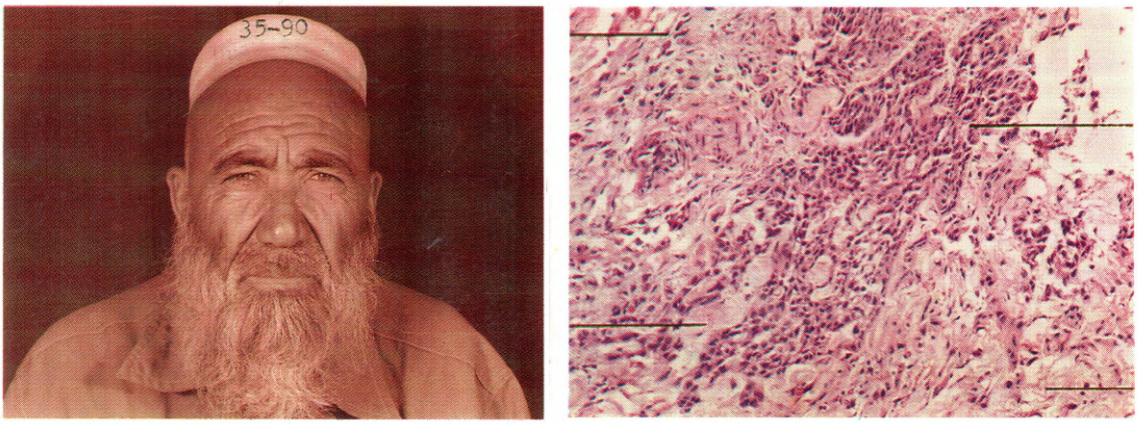

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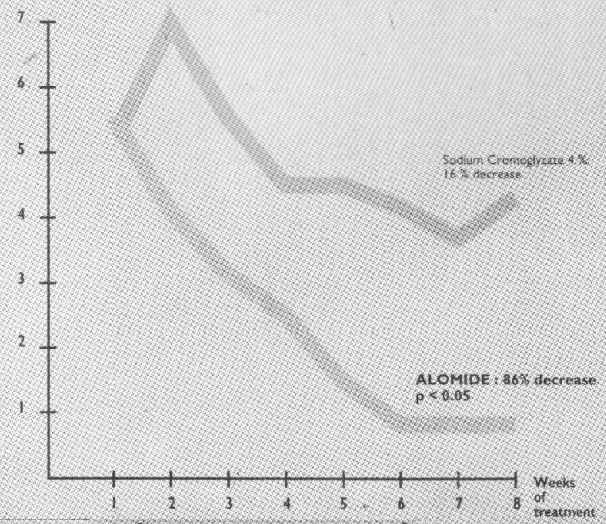

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Editorial

Helping the Blind and the Visually Handicapped (But Not by Passing the Hat Around)

It is very difficult to ascertain accurately the number of blind and the visually handicapped persons in the world. They can only be estimated. WHO Study Group on the Prevention of Blindness gathers information from Member States. The Study Group's recommended uniform definitions of blindness and visual impairment have been included in the International Statistical Classification of Diseases, and Related Health Problems, tenth revision (ICD-10)[1]. Thus, blindness, as defined by this group, is visual acuity of less than 3/60 (0.05) or corresponding visual field loss in the better eye with best possible correction (visual impairment categories 3,4, and 5 in ICD-10), and low vision corresponds to visual acuity of less than 6/18 (0.3) but equal to or better than 3/60 (0.05) in the better eye with best possible correction (visual impairment categories 1 and 2 in ICD-10). Accordingly, it was estimated by WHO that in 1990, there were 38 million blind persons globally. An additional 110 million persons had low vision and were at great risk of becoming blind[2,3]. The main causes of blindness and low vision were cataract, trachoma, glaucoma, onchocerciasis, and xerophthalmia; however, insufficient data on blindness from causes such as diabetic retinopathy and age-related macular degeneration precluded specific estimation of their global prevalence.

In the U.S. alone there are approximately five million people who are partially-sighted and one-half million who are legally blind[4]. The American Foundation for the Blind estimates that there are only about 150 actively functioning visual aid clinics which together care for about 5% of the partially-sighted. The remaining 95% are allocated to the general ophthalmologists and optometrists. In Pakistan there are 2.4 million people blind in both eyes and 5 million are visually impaired[5].

In developed countries, societies and governments take care of handicapped individuals with impairments of various faculties, alongwith their more fortunate

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members and citizens. Insurance programs and workmen's compensation boards determine the financial assistance needed by those who become handicapped or disabled from accidents, work-related or otherwise. The degree of disability and handicap, therefore, needs to be accurately defined and determined. Services and financial aids are then provided commensurate with the level of disability. In the Western countries rehabilitation of individuals with low vision has a fairly high priority. In a study in the U.S.A. fear of losing sight was second only to the fear of losing life from cancer which topped the list of the six worst fears faced by those surveyed. Societies for the Prevention of Blindness and Lighthouses for the Blind are quite active in providing services for the blind and the visually impaired. Various types of optical aids for distance and near vision, as well as non-optical aids are made available to the visually handicapped by these societies and the concerned governmental agencies. (Details of the available devices can also be obtained from the catalogue of optical aids for the partially-sighted, published by the New York Lighthouse, New York Association for the Blind, III E. 59th St., New York, N.Y.10022, U.S.A).

Unfortunately, in the developing countries, where even basic human needs are not always met, rehabilitation of the visually impaired are often relegated to the back burner. Quite frankly expecting the teaching of Braille, for instance, in Pakistan, where the overall literacy rate is approximately 25%, is as ludicrous as attempts to establish fisheries in the sub-Saharan countries of Africa. Even though Pakistan has a National Program for Prevention of Blindness and Centers for the Visually Handicapped, like everything else they seem to look good on paper only. Practically and functionally they leave a lot to be desired. What is needed is vocational training and guidance for the blind

so that they are not left alone to fend for themselves. The visually impaired need even more attention by ophthalmologists as well as governmental and nongovernmental agencies since these individuals have a greater potential to be rehabilitated by training in some specific tasks and can be gainfully employed in appropriate fields. This can be an extremely positive boost for their self-esteem as well as an important benefit for the society.

The related article in this issue of the Journal outlines the problem and the current status of available resources and makes some useful suggestions in improving and reinforcing the existing services and resources. Ophthalmologists can help by taking care of those with cataracts, corneal opacities, xerophthalmia, uncorrected refractive errors and undiagnosed or improperly cared for cases of glaucoma. And these are in the majority amongst the blind and the visually impaired. The governmental and nongovernmental organizations need to address these issues for the remainder of these unfortunate individuals. Societies for the Prevention of Blindness and the Ophthalmological Society of Pakistan must gear up their efforts in this field. Also, it behooves us, as individual ophthalmologists to come forward and make our services and expertise available to our less fortunate fellow citizens as well as the governmental and nongovernmental organizations in combating this profound misery.

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Jehangir Durrani

Visual Prognosis in Tumours of Sella and Parasellar Areas

Iftikhar Ali Raja, Anjum Habib, Rizwan Masood Butt

Department of Neurosurgery, King Edward Medical College, Lahore.

ABSTRACT

The object of this retrospective study was to analyze the visual prognosis in patients with tumours in and around the sellar area. From January 1977 to December 1994 i.e. over a period of 18 years, 206 patients were studied. There were 128 patients with pituitary adenomas, 56 with craniopharyngiomas, 20 with suprasellar meningiomas and 2 with pituitary fossa tuberculomas. According to the visual fields, the patients were divided into four groups. The average time of presentation was 1 1/2 years. All patients were operated on through transcranial approach. Follow-up period varied from 3 months to 12 years.

In the postoperative follow-up, amongst 39 patients of group-I, 27 had complete visual recovery, 9 had partial recovery and 3 did not show any improvement. Amongst 22 patients of group-II, 13 had complete recovery, 5 had partial recovery and 4 did not show any visual improvement.

In 60 patients of group III, 4 had partial visual improvement while 56 did not show any improvement and in 80 patients of group-IV, no improvement in vision was noticed postoperatively. There were 2 fatalities in group III and 3 in group IV.

Eighty patients out of group III and IV started complaining of visual deterioration within three months of operation. The CT Scan of the brain was repeated at 3 months, 6 months and thereafter yearly. Of these, 23 patients had recurrence of tumour and were re-operated. Of the remaining 57 patients, no recurrence was detectable on brain CT at the end of 2 years. Forty-two patients had postoperative radiation. Inspite of no tumour recurrence, the vision in these 57 patients went on deteriorating. We believe that gross optic atrophic changes were responsible for their ultimate blindness inspite of decompression of the visual pathways. Postoperative radiation probably adds to the visual deterioration.

INTRODUCTION

Progressive visual loss is a common manifestation of the tumours of the sellar and parasellar areas. The commonest tumour is a pituitary adenoma followed by craniopharyngiomas and meningiomas. Progress in neurosurgery, neuroradiology and neuroendocrinology has changed the diagnostic and therapeutic approach to patients with tumours in this region. The presence of visual impairment in such cases has been a prime indication for surgical treatment. The type of deficit depends upon the size and the type of lesion. These tumours going upwards will compress the chiasma and can cause bitemporal hemianopia, homonymous hemianopia, ispilateral blindness and contralateral temporal field defect and ipsilateral blindness or contralateral three-quadrant field defect.

A patient with a tumour in this region may also seek advice because of an endocrine disorder. In patients with endocrine disorders, the result of treatment can be monitored by biochemical estimations which are now internationally standardized and provide an effective method of comparing the outcomes of different therapies.

Visual recovery after removal of the compression is influenced by the age of the patient, duration of the disease, size of the tumour, operative procedure and postoperative radiotherapy.

After surgery the vision usually improves or at least is unchanged in patients who present in time but deterioration of vision or a complete loss may occur possibly due to interference with the blood supply owing to the manipulation. However, the vision may not always improve after decompression, if the patient presents with gross optic atrophy, excavation of the discs and advanced visual field defect which has lasted for a long time. Once these changes have crossed the critical level, no matter what you do, the optic atrophy continues and the patients become blind although the life is saved, as was the situation in some patients in

this series. Postoperative radiation probably adds to the progression in the visual failure.

MATERIALS AND METHODS

From January 1977 to December 1994 i.e. over a period of 18 years, 206 patients were studied. There were 128 patients with pituitary adenomas including 14 with acromegaly, 56 with craniopharyngiomas, 20 with suprasellar meningiomas and 2 with pituitary fossa tuberculomas (Table-1).

Table 1: Analysis of Patients (Tumour Type)

Pituitary adenomas	128
Craniopharyngiomas	56
Meningiomas	20
Pituitary fossa tuberculoma	2
Total	**206**

There were 120 males and 86 females ranging between 12 to 65 years of age. Among all these patients twenty-two were between 1 to 10 years of age, 25 were between 11 to 20 years, 56 between 21 to 30 years, 66 from 31 to 40 years, 18 from 41 to 50 years, 12 between 51 to 60 and 7 from 61 to 70 years of age. This incidence according to age is given in Table-2.

Table 2: Age Incidence.

Age Range (Years)	No. of patients
1-10	22
11-20	25
21-30	56
31-40	66
41-50	18
51-60	12
61-70	7

The break-up in each category according to sex is given in Table-3.

Table 3: Sex distribution.

Total	Males	Females	Total
Pituitary tumours	81	47	128
Craniopharyngiomas	26	30	56
Suprasellar meningiomas	11	09	20
Tuberculomas	02		02
	120	**86**	**206**

The vision was assessed preoperatively, postoperatively, before discharge and at intervals of 3 months, 6 months, 1 year and 2 years. The visual acuity was measured by refraction for distance and near. Central and peripheral visual fields were charted using Bjerrum screen. For the analysis of visual acuity, patients were allocated to one of 6 groups; 6/6, 6/18, 6/36, 6/60, counting fingers and hand movements.

The time of presentation varied from 6 months to 4 years from the start of symptoms. The average time of presentation was 1 1/2 years.

On the basis of visual fields the patients were divided into four groups. Group-I, with bitemporal hemianopia, group-II with homonymous hemianopia, group-III had ipsilateral blindness and contralateral temporal field defect, group-IV had ipsilateral blindness and contralateral three-quadrant field defect. There were 39 patients in group-1, 22 in group-II, 62 in group-III and 83 in group-IV (Table-4).

The visual acuity varied between 6/6 to 6/36 in group-I and group-II. In group-III and IV the visual acuity varied between 6/60 to counting fingers and hand movements.

Usually, advanced atrophic changes in the optic disks were seen in group-III and IV with excavation in some cases.

In the last 10 years pre-and postoperative endocrine studies consisting of T3, T4, TSH, growth hormone, plasma cortisol and prolactin levels have been performed. Patients with postoperative diabetes insipidus were treated with Pitressin injection and Di-desmo argyl vasopressin (DDAVP).

Table 4: Preoperative visual fields (Tumour types)

Group		Pit*	Cra+	Men~	Tub**	Total
Group-I	Bitemporal hemianopia	37	-	-	2	39
Group II	Homonymous hemianopia	15	6	1	-	22
Group III	Ipsilateral blindness and contralateral temporal feild defect	36	17	09	-	62
Group IV	Ipsilateral blindness and contralateral three-quadrant field defect	40	33	10	-	83
	Total	**128**	**56**	**20**	**2**	**206**

*Pituitary tumours +Craniopharyngiomas ~Meningiomas **Tuberculomas

PROCEDURE

All operations were performed through a transcranial, subfrontal, frontotemporal (pterional) or translaminar approach, according to the location of the tumour. At the operation, an attempt was made to do a radical removal. In the beginning, loupes with 2.5 x magnification were used but during the last ten years, microscopic removal of the tumour has been performed.

Upto 1988, patients with craniopharyngiomas in whom only a partial removal could be achieved were given postoperative radiation. After 1988 no radiation was given to the patients with craniopharyngiomas and reoperation was preferred for recurrence.

All patients of pituitary adenomas received postoperative radiation upto 1988, (70 patients) while only 13 out of 58 patients after 1988 received radiation. These patients had incomplete removal on postoperative CT Scans.

The usual dose of postoperative radiotherapy was 5500-6500 rads. Patients with postoperative diabetes insipidus were treated with pitressin injection and DDAVP when available. Postoperative maintenance therapy with steroids and thyroxine was used where needed.

RESULTS

Three patients with craniopharyngiomas, one with pituitary tumour and one with a suprasellar meningioma died postoperatively. Two of these patients were in group-III and three in group-IV.

Out of the remaining 201 patients, 57 patients could be traced for 12 years and 102 for 10 years. The status of visual fields at the time of discharge of the 201 patients is given in Table-5.

Table 5: Visual fields at discharge.

Group	Complete recovery	Some impro-vement	No impro-vement	Total
I	16	20	03	39
II	07	11	04	22
III	-	04	56	60
IV	-	-	80	80

At one-year follow-up, of 39 patients of group-I, 27 had complete visual restoration, 9 had partial improvement and 3 patients did not show any

improvement. Amongst 22 patients of group-II, 13 had complete recovery, 5 partial recovery and 4 did not show any visual improvement. Of the 60 patients of group-III, 4 had partial improvement and 56 patients did not show any improvement, while no improvement in vision was noticed postoperatively in patients of group IV (Table-6).

Table 6: Visual fields one year postoperative.

Group	Complete recovery	Some impro-vement	No impro-vement	Total
I	27	09	03	39
II	13	05	04	22
III	-	04	56	60
IV	-	-	80	80

At two-year follow-up only 30 patients out of 39 of group-I, 16 patients out of 22 of group-II, 40 out of 60 of group -III and 63 out of 80 of group IV were available for follow-up (Table 7).

Table 7: Visual fields two years postoperative.

Group	Complete recovery	Some impro-vement	No impro-vement	bacame blind
I (30/39)	23	04	03	-
II (16/22)	08	04	04	-
III (40/60)	-	04	32	04
IV (63/80)	-	-	10	53

Eighty patients out of group III and IV started complaining of visual deterioration within three months of operation. The CT Scan of the brain was repeated at 3 months, 6 months and thereafter yearly. Of these, 23 patients had recurrence of tumour and were reoperated. Of the remaining 57 patients (40 pituitary adenomas, 12 craniopharyngiomas and 5 meningiomas) no recurrence was detectable on brain CT at the end of 2 years. Forty-two patients had postoperative radiation. This group forms 27.5% of the total number of patients and 40% of the 140 patients in group III and IV who survived.

DISCUSSION

The defects in the visual fields are amongst the most important symptoms and signs, occurring typically when the tumour presses upon the chiasma from below; they may be the only and often the principal disability of which the patient complains. The variations in the relation of the chiasma to the pituitary and the growth pattern of the tumour may produce many diversities in the visual fields.

In patients with chiasmal compression from a pituitary tumour the visual loss usually affects predominantly the peripheral fields. This may go unnoticed by a patient, because only when the central vision is affected does the visual acuity become severely impaired. Due to a space occupying lesion in the brain, 20-30 patients with complete blindness are seen in our department each year. Findlay et al[1] pointed out that changes in the visual acuity and fields are important when changes in vision are used to assess the results of treatment. They also pointed out that a scoring system based upon visual fields can give an adequate index of the degree of visual failure which can then be used to compare the severity of visual loss between patients and to gauge changes occurring following treatment. They reported 34 patients who had transphenoidal hypophysectomy followed by radiotherapy. Visual improvement occurred in 85 percent of cases and 18 percent regained normal vision. No patient sustained deterioration of vision. The factors that had the greatest influence on recovery were the young age, a short history, a small tumour and a minor preoperative visual deficit.

The restoration of function regarding the vision and the visual fields after operative relief of the pressure and sometimes after radiotherapy is interesting and frequently remarkable in its extent, provided the defects are not too marked or have not lasted too long[2]. This is compatible with the probability that the loss of function is not initially due to actual pressure on the nerve fibers but is a physiological block due to ischaemia associated with much less histologically demonstrable atrophy than would be expected (Cushing 1912)3. The recession of peripheral defects after operation occurs in a reverse sequence of preoperative events and may be rapid, sometimes appearing within a few days, but frequently during the following months; scotomata, however, tend to be permanent. Even in the advanced stages some improvement may occur, and sometimes, if the duration has not been too long, some recovery of vision may be attained even if blindness has developed[4].

Optic atrophy of some degree is a common result of pituitary tumours although it is by no means invariable, particularly when the growth is postchiasmal. The pallor is largely due to ischaemia and this appearance may not necessarily be associated with a loss of function until the nerve fibers themselves are affected; but if it is associated with excavation of the disc the visual prognosis is usually poor.

After surgery the vision usually improves or at least is unchanged, but an inexplicable loss or even an obliteration of vision may occur presumably due to interference with blood supply owing to the manipulations; it is usually transient with recovery of useful vision at least in one of the affected eyes[5].

Laws in 1977[6] reported 45 cases of non-functioning chromophobe type pituitary adenomas operated on through transphenoidal route: one patient died, two patients experienced transient increase of visual impairment, the vision was improved in 36 cases and unchanged in 6. In the same article he has reported 30 more cases with visual loss. Of these 30 patients, 2 suffered further loss of vision postoperatively while in the others vision either improved or remained unchanged.

Ray and Patterson[7], in 1971, described the effects of surgery in 106 patients of chromophobe adenomas of the pituitary gland operated on transcranially. After the initial operation without prior radiation therapy, significant improvement in vision occurred in 80% of the patients. In approximately 50% normal vision was restored, 18% had no change in vision, and only two patients suffered some measurable loss of vision. The record was not so good following operations for recurrent tumors, as in over 50% of the patients there was no improvement.

Marazuela et al in 1994[8] reported 35 patients of large non-functioning pituitary adenomas operated on transphenoidally. Visual field defects were documented in 21 patients (60%). After surgery, excluding 3 patients with preoperative blindness, 28% regained normal vision and 67% showed variable improvement.

In craniopharyngiomas, the defects in the visual field vary with the location of the growth and are typically those of medial pressure from above or below depending on the site. The development of bitemporal hemianopia commencing in the lower quadrants and progressing to blindness is the most common finding. Owing to the posterior position of the tumour, homonymous field defects are relatively common.

The prognosis with regard to sight depends entirely upon early diagnosis and removal, for if untreated the outlook is generally unfavourable. After surgical removal, however, an eye which had been completely blind might recover a remarkable amount of vision[4].

Among the 10 patients with craniopharyngiomas reported by Laws et al[6] postoperative vision was improved in 5, unchanged in 3 and worse in two.

In suprasellar meningiomas, the visual symptoms are often the initial clinical manifestation since the pressure gives rise to a progressive bitemporal hemianopia slowly advancing to blindness. Owing to their position the optic nerves are usually involved before the chiasma and since the neoplasm is rarely symmetrically placed in the midline, one nerve may be seriously compressed before the other is involved so that one eye may become blind, frequently some months and occasionally some years before there is any appreciable defect in the other.

In 1993 Gokalp et al[9] reported 88 cases of tuberculum sellae meningiomas operated on transcranially. Visual function improved in 53.5% of the patients, was unchanged in 27.5%, and worsened in 19% of the patients.

In our series the striking feature is that 68% of the patients were in group-III and IV at the time of admission with marked bilateral optic atrophy and excavation of discs in some cases. Inspite of decompression of the visual pathways and with no evident tumour recurrence on CT, in 57 (38%), of the patients out of 149 who could be followed-up for 2 years, the vision continued to deteriorate and they became blind within 2 years. Inspite of no tumour recurrence, the deterioration of vision could either be due to irreversible optic atrophy, radiation or operative trauma. All these factor could be responsible. However, we believe, that if the optic atrophy has progressed beyond a critical level, the atrophy continues and the patient may become blind ultimately inspite of the decompression of the visual pathways as in this series. Postoperative radiation probably adds to the visual deterioration.

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The Authors:
Iftikhar Ali Raja
FCPS, FRCS
Professor and Head
Department of Neurosurgery
King Edward Medical College
Lahore.

Anjum Habib
FRCS
Associate Professor
Department of Neurosurgery
King Edward Medical College
Lahore.

Rizwan Masood Butt
FCPS, FRCS
Assistant Professor
Department of Neurosurgery
King Edward Medical College
Lahore.

Address for Correspondence:
Prof. Iftikhar Ali Raja
4-Gulbreg Complex
2-Gulberg (Jail) Road
Lahore-54660.

Ophthalmic "Pastpourri"

The First Retrobulbar Block

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

Over a century ago, soon after the discovery of cocaine, Herman Knapp,[1] the first publisher and editor of the *Archives of Ophthalmology,* conceived of its use as a retrobulbar injection for painless enculcation. Under the subtitle of *"Enucleation of an eyeball under anaesthesia from injecting cocaine into the post-ocular connective tissue"* he wrote:

> "The conjunctiva was first anaesthetized by instilling the solution. Then the globe was strongly drawn toward the nose by means of a forceps, and six minims of a 4% solution (painlessly) injected into the orbital tissue close to the globe. Five minutes later the eyeball was removed in the usual way. The division of the recti tendons caused slight pain; that of the optic nerve and the dissection of the posterior part of globe, none or almost none".

1. Knapp H: On cocaine and its use in ophthalmic and general surgery. Arch Ophthalmol 1884; 13: 402-48.

Retinal Detachment Surgery by Scleral Buckling Procedure: Experience in 175 Cases

Mohammad Idrees Adhi, Mohammad Aslam Jan, Abrar Ali, Fawad Rizvi, Misbah Ul Aziz, Khwaja Sharif ul Hasan

Department of Ophthalmology, Civil Hospital and Dow Medical College, Karachi, Pakistan

ABSTRACT

We report 175 cases of scleral buckling procedures in 156 patients with rhegmatogenous retinal detachment (RRD). Twenty-six (16.66%) patients were only-eyed. Nineteen (12.18%) patients had bilateral detachment, and 29 (18.58%) needed prophylactic treatment to the fellow eye. Seventy (40%) eyes were aphakic. In phakic group, 52 (29.71%) eyes were myopic. Macula was off in 139 ((79.42%) eyes on presentation. Retinal breaks were most common in superotemporal areas. Horseshoe-shaped tear was the most common break. Drainage-Air injection, Cryotherapy and Explant ((D-ACE) technique was used in 104 eyes (59.42%). During drainage subretinal hemorrhage occurred in 12 (6.9%) eyes, while retinal incarceration occurred in 4 (2.28%) eyes following intravitreal air injection. Follow-up ranged from a minimum of four weeks to a maximum of five years. Surgical failure after one or two procedures occurred in 16 (9.14%) eyes. Endophthalmitis occurred in one eye. Plomb exposure in 5 (2.85%) cases and explant infection in 2 (1.14%) eyes warranted their removal. Anatomical success was achieved in 158 (90.28%) eyes. Preretinal fibrosis was the commonest reason for impaired vision in attached retinae. Visual acuity of 6/12 and better was achieved in 40 (22.85%) eyes.

INTRODUCTION

Retinal detachment (RD) is the separation of the sensory retina from the retinal pigment epithelium (RPE) with accumulation of fluid in the potential space between them. In a rhegmatogenous retinal detachment (RRD), the fluid gains access to this space through a break in the retina[1]. RD occurs in approximately 1 in 10,000 persons per year. In over half of these eyes, the RRD occurs spontaneously, with no history of surgical or non-surgical trauma[2].

The characteristics of a RRD are a retinal break or tear, tractional forces from the vitreous, and the existence of some liquid vitreous that is able to pass through the retinal hole into the subretinal space[3]. Posterior vitreous detachment (PVD) may cause retinal tears by traction on the retina. RRD may also be caused by atrophic retinal holes such as those in lattice degeneration, or by ocular trauma. The RD is maintained and enlarged by continuous passage of fluid vitreous through the retinal break into the subretinal space more rapidly than the RPE is able to absorb the subretinal fluid (SRF)[4].

Retinal reattachment with the use of cryopexy or laser photocoagulation in conjunction with indentation of the sclera by the placement of scleral buckle, or retinal reattachment surgery with the use of pneumatic retinopexy are the treatment modalities used for repiar of most RRDs[4]. Scleral buckling surgery accomplishes the goal of reattachment by indenting the underlying slcera, choroid, and retinal pigment epithelium with buckling elements to relieve mechanically the vitreoretinal traction and approximate the edges of the retinal break to the underlying RPE[5].

The first scleral buckling procedure employing the foreign material in the United States was performed by Schepens and co-workers in 1951. The classical Schepen's technique included localization of all retinal breaks with indirect ophthalmoscopy, a lamellar scleral dissection over the area of responsible break, and placing of buckling material within the scleral bed. A shallow encircling element was also employed and subretinal fluid was usually drained. In 1965 Lincoff and co-workers described their experience in using episcleral explants of silicone sponge in a fashion similar to that developed by Custodis in 1949. The advantage in this technique included the avoidance of scleral dissection. Few major modifications of these methods have been reported during the past 25 years[6].

We report our experience of retinal reattachment surgery by the scleral buckling procedure in 175 cases of RRDs performed at the Civil Hospital, Karachi, Pakistan.

PATIENTS AND METHODS

One hundred and seventy-five eyes of 156 patients operated on for RRDs by the scleral buckling procedure from January 1990 to July 1995 at the Department of Ophthalmology, Civil Hospital, Karachi, Pakistan, were analyzed in this retrospective study. Ours being a tertiary center, this group includes the referrals as well as those attending our own outpatient department.

All the patients were admitted in the department and underwent anesthetic evaluation, as all sugeries were carried out under general anesthesia. A detailed ophthalmic history and examination were carried out regarding duration of visual impairment, refractive error, any history of trauma or of ocular surgery, assessment of visual acuity, measurement of intraocular pressure (IOP), pupillary reactions, detailed anterior segment examination and examination of the media in both eyes. Pupils were dilated with tropicamide 1% and with phenylephrine 10% in normotensive patients. Vitreous and retina in both eyes were examined by direct and indirect ophthalmoscope with scleral depression and by Goldmann 3-mirror contact lens. Charting of the vitreoretinal pathology was done for both eyes which included information regarding the location, size, number and type of retinal breaks, extent of subretinal fluid, mobility of retina, state of the macula whether attached or detached and posterior vitreous detachment (PVD) as well as other vitreous changes. This was followed by fundus photography. Applying the proliferative vitreoretinopathy (PVR) classification of Retina Society 1983 and 1991, eyes with advanced PVR had pars plana vitrectomy, which is the subject of a separate article. For others a scleral buckling procedure was planned. A written consent was obtained after fully explaining the surgical plan. Where required, prophylactic surgery in the fellow eye was offered and performed after obtaining the consent of the patient.

Preoperative pupillary dilatation was achieved by tropicamide 1% and phenylephrine 10%, used twice at an interval of 30 minutes. After obtaining the sterile field, the eye to be operated on was given a thorough wash with Ringer's lactate solution. The surgery was preceded by indirect ophthalmoscopy and confirmation of already noted findings on retinal chartings and any change in the pattern of SRF, if present, was recorded. The exposure of sclera was done by two-quadrant or 360 degree peritomy as required. 4/0 silk was used under all four rectus muscles. Episcleral tissue was cleaned at the planned surgical area. 5/0 ethibond was used for marking the retinal breaks on the surface of the sclera under indirect ophthalmoscopic visualization. 5/0 ethibond was also used to tie the explants. Radial or circumfrential mattress sutures were preplaced in the required areas of sclera. The cryotherapy was then performed under indirect ophthalmoscopy, aiming to surround the retinal breaks. The explants were placed and tied only when their placement was found to be correct after drainage of SRF where required. In all patients episcleral explants were used to produce the buckling effect. The material used included the silicone sponges of various sizes, solid silicone tyres and bands. SRF was drained mostly below the horizontal recti. A 2mm incision was made parallel and below the border of the muscle till the underlying choroid was visible. The bed was cauterized prior to piercing it with the disposable 24 guage needle. The SRF was gently milked out after which the site of the drainage was closed with a preplaced suture. The explants were finally adjusted to get the required indent. The disc circulation was kept under observation and paracentesis was done if the disc circulation appeared compromised. Air in most cases, and Ringer's lactate solution and balanced salt solution (BSS) in some cases, were used to overcome ocular hypotony.

In all phakic cases and in those aphakic and pseudophakic eyes with intact posterior capsule, D-ACE technique was used. Drainage was performed as the first procedure. This was followed by injection of air to flatten the retina on the table aiming for almost complete elimination of SRF. Cryotherapy was performed under direct visualization with indirect ophthalmoscope. The retinal break had previously been marked on the surface of the sclera. Placement and tying of the buckle was the last procedure in this technique.

At the end of the procedure conjunctiva was closed with 6/0 vicryl sutures. A subconjunctival injection of 20mg gentamicin and 2mg dexamethasone was given mostly in the quadrant where drainage was performed. The operated eye was padded for 24 hours after putting the broad spectrum antibiotic drops and ointment. Cryotherapy to the fellow eye, if required, was performed transconjunctivally at this stage using indirect ophthalmoscope.

Postoperatively all the patients were put on broad spectrum systemic antibiotics for five days and non-steroidal anti-inflammatory agents for one to two weeks. In cases where air was injected, paitent's posture was maintained so as to use the air as temporary internal temponade.

The eye pad was removed on the first postoperative day. Topical antibiotics, mydriatics and

steroids were used postoperatively for a period of six to eight weeks in most of the cases. At the time of discharge 3 to 4 days after surgery, the visual status, IOP, any complication and the state of retina were noted and fundus photographs taken. The patients were followed-up in the outpatient department at increasing intervals of two weeks, six weeks, three months, six months and at one year.

RESULTS

This study included 175 eyes of 156 patients of which 116 were male and 40 were female. The youngest patient operatd on was a 9-year-old boy, and the oldest 75 years of age; the mean age being 54 years. The symptoms of flashes of light, sudden onset of floaters and a shadow in front of the eye were mentioned by 30 (19.23%) patients. The rest of the patients either recognized their problem when they accidently closed their good eyes or only came to know when told by the examining ophthalmologist or when they lost vision in the good eye.

Seventy eyes (40%) were with aphakic RD. Sixty-seven eyes (38.3%) had intracapsular cataract extraction (ICCE), while 3 eyes (1.7%) had extracapsuar cataract extraction (ECCE). Seven eyes (4%) were pseudophakic, out of which 2 (1.14%) had ICCE with anterior chamber intraocular lens implant and 5 (2.85%) had ECCE with posterior chamber implant. A young girl with ectopia lentis had bilateral RD.

In the phakic group 52 eyes (29.71%) were myopic, 29 eyes (16.57%) had RD secondary to lattice degeneration and 15 eyes (8.57%) had RD secondary to trauma. Twenty-six (16.66%) out of 156 patients operated on in this series were "only-eyed", with inoperable RD in the fellow eyes. RD was bilateral in 19 (12.17%) patients.

At the time of presentation retina was totally detached in 88 eyes (50.28%). Macula was off in 139 eyes (79.42%) on initial examination. In 23 cases (14.74%) surgery was performed on an emergency basis as the macula was either off or was threatened to become detached. Eighty-five patients (54.48%) did not have any idea as to the duration of the loss of vision. Where information was available, duration of detachment was noted to be a maximum of 1 year and the minimum of 1 week. Eighty-nine (50.85%) showed signs of mild to moderate PVR. A single break accounted for RD in 127 eyes (72.57%), while multiple breaks were found in 42 eyes (24%). No retinal break could by identified in 5 (2.85%) eyes, all being aphakic RDs. Horseshoe-shaped tears were noted in 89 (50.85%) eyes (Table 1). The PVD was noted in 95 (54.28%) eyes. The commonest site for retinal breaks was superotemporal area (Table 2). SRF was drained in 173 (98.85%) eyes. To overcome the operative hypotony air was used in 148 (84.57%) cases, BSS in 20 (11.42%) eyes and in 5 (2.85%) eyes Ringer's lactate was used.

Table 1: Types of breaks.

Types	No. of eyes	Percentage
Horseshoe-shaped	89	50.85
Atrophic	66	37.72
Operculated	6	3.42
Dialysis	9	5.14
Not found.	5	2.85

Table 2: Location of breaks.

Site	No. of eyes	Percentage
Superotemporal	97	55.42
Inferotemporal	37	21.14
Superonasal	22	12.57
Inferonasal	14	8.0

Operative and postoperative complications are shown in Table 3. Eleven (6.28%) eyes needed reoperation for retinal reattachment. Sixteen (9.14%) eyes redetached despite one or two procedures. Sixty-three (40.38%) patients were lost in follow-up at 6 months, while 93 (59.61%) patients reported for follow-up till 6 months. Only 18 (11.54%) patients reported for follow-up after two years, while 8 patients (5.12%) reported for follow-up 5 years after the surgery.

After one or two procedures the anatomical reattachment of the retina was achieved in 158 (90.28%) eyes. In these eyes, visual results of 6/12 and better were achieved in 40 (22.85%), 6/18 to 6/36 in 62 (35.42%) eyes, while 73 (41.71%) eyes had the visual acuity of 6/60 and less (Tables 4 and 5).

DISCUSSION

Scleral buckling techniques are now usually employed in the management of most clinical retinal detachments. Other alternatives available for the management of RDs include temporary scleral

buckling, pneumatic retinopexy and primary vitreous surgery. The scleral buckle appears to work in a variety of ways including reduction in vitreoretinal traction, functionally closing the retinal breaks by bringing the outer eye wall into contact or near contact with the retina, altering intraocular fluid currents and perhaps by closing the responsible breaks internally by pushing them into contact with the vitreous gel[6].

Table 3: Complications.

Complications	No. of eyes	Percentage
Operative		
Corneal abrasion	5	2.85
Inadvertant SRF drainage	4	2.28
Globe rupture	1	0.57
Choroidal and subretinal haemorrhage	12	6.85
Vortex vein bleeding	2	1.14
Retinal incarceration	4	2.28
Pupillary constriction	5	2.85
Muscle disinsertion	5	2.85
Postoperative		
Redetached	16	9.14
Transient choriodal detachment	5	2.85
Glaucoma	8	4.57
Explant exposure	5	2.85
Explant infection	2	1.14
Endophthalmitis	1	0.57
Anisometropia	4	2.28
Muscle imbalance	2	1.14
Pre-retinal fibrosis and macular pucker	23	13.14

Table 4: Preoperative Visual acuity.

Visual acuity	No. of eyes	Percentage
6/6 - 6/12	10	5.71
6/18 - 6/36	18	10.28
6/60 and less	147	84

Table 5: Postoperative Visual acuity.

Visual acuity	No. of eyes	Percentage
6/6 - 6/12	40	22.85
6/18 - 6/36	62	35.42
6/60 and less	73	41.71

In the present series of 175 cases of clinical management of RRD with a scleral buckling procedure, the commonest group comprises aphakic RDs, accounting for RD in 70 eyes (40%). RD in aphakic eyes is 7 times more common after ICCE than ECCE[7]. The ratio increases in patients with ICCE who also had vitreous complications[8]. The ICCE is still in practice in our country and is only gradually being replaced by ECCE. Changing the cataract surgery technique on modern lines could play a role in reducing the number of RDs.

Hyams et al.[10] in 1975 reported that the retinal breaks were more common in superotemporal region and least common in inferonasal region. Singh[11] in 1988 reported that 65% of cases in his series had a single break, out of which 50% were horseshoe-shaped. Kreissing et al.[12], in 1989 reported that 70% of their cases had horseshoe-shaped retinal breaks while 30% had round atrophic holes. Out of these, 20% were multiple breaks.

We have observed horseshoe-shaped retinal breaks in 89 (50.85%) cases and round atrophic holes in 66 (37.71%) cases, while Kreissing et al[12]. have reported these in 70% and 30% eyes respectively. In 127 (72.57%) cases breaks were single while 43 (24.57%) cases had multiple breaks which is a similar incidence as reported by Singh et al.[11]. No retinal break could be identified in 5 cases (2.85%), all these being aphakic RDs. The most common site for retinal breaks in our study was superotemporal region, being present in 97 (55.42%) cases. The breaks in other areas were: 37 (21.14%) cases in inferotemporal region and 22 (12.57%) cases in superonasal area. Only 14 (8%) cases had breaks in inferonasal region.

A careful examination of the fellow eye is very important considering the bilateral nature of vitreoretinal pathology. Yoshida et al.[9] in 1992 reported 18.8% prevalence of RD in the fellow eye. Twenty-six patients out of 156 in our series (16.66%) had inoperable RD in the fellow eye. Scott[13] advocates that after identifying a risk factor, it is necessary to consider the possibility of prophylactic treatment. Twenty-nine (18.58%) patients had prophylactic treatment by cryotherapy in their fellow eyes in our series.

The bilateral nature of vitreoretinal problem in our population reaches an alarming proportion if one combines the already detached retinae in 26 patients which were inoperable, nineteen operable bilateral RDs and 29 eyes which needed prophylactic treatment in the fellow eyes for lattice degeneration and flat retinal breaks. Seventy-four (47.43%) patients in our series

had the evidence of bilateral vitreoretinal problems and one has to seriously look into this aspect of surgical retinal pathology in our population.

Eighty percent of the patients in our series did not know about the presence of RD in their eyes unless they accidentally closed their good eyes or were diagnosed by the ophthalmologist or unfortunately lost vision in their good eyes. Illiteracy and lack of medical facilities, combined with our economic problems are part of this unfortunate aspect.

Nearly all cases had SRF drained during the scleral buckling procedures. Long-standing nature of the clinical problems was one of the reasons. Choroidal and subretinal haemorrhage occurred in 12 (6.9%) eyes. D-ACE technique was particularly helpful in ballooned RD. This technique was used in 104 (59.42%) eyes. This includes 96 phakic, 3 aphakic and 5 pseudophakic RDs where posterior capsule was intact. The technique was difficult in patients with media opacities causing multiple reflexes and orientation problems. Durng D-ACE technique four eyes had retinal incarceration and four eyes and subretinal and choroidal bleed.

Scleral explants warranted removal in 5 (2.85%) cases because of exposure and in 2 (1.14%) cases after infection. Connsidering the number of eyes operated on this incidence is very low. Explant-induced refractive errors of astigmatism and anisometropia in 4 (2.28%) cases and muscle imbalance were noted in only 2 eyes (1.14%).

The follow-up of patients was very encouraging, considering the multiple socioeconomic problems of our setup. A lot of emphasis was given to educating the patients regarding the nature of their blinding vitreoretinal diseases. As a result 93 patients (59.61%) reported for follow-up after six months which is a greater percentage than that seen in patients with other ocular diseases including cataract and glaucoma surgery.

Experienced retinal surgeons report success rates of over 90% reattachment after one or more procedures in RDs treated by scleral buckling[14]. Yoshida et al.[9] reported an anatomical success in aphakic eyes in 81.6% after a single procedure and 94.2% after a second procedure. In pseudophakics 93.4% anatomical success rate was reported[9]. In our present series we achieved anatomical success in 90.28% after one or two procedures. The comparable results are very encouraging considering the fact that most of the patients had long-standing RDs.

Visual results after RD surgery depend on the recovery of both macular function and the visual fields[15]. The reasons for decreased vision after apparently successful retinal reattachment are not completely understood[16]. In most series 37-56% of successfully treated cases obtained postoperative vision of at least 20/50[8]. In the present series 6/12 and better vision was achieved in 40 eyes (22.85%), 6/18-6/36 in 62 eyes (35.42%) and 73 eyes (41.71%) had the visual acuity of 6/60 and less. The results should be viewed in consideration with the presentation of 139 eyes (79.42%) with the macula off at the time of examination. The long-standing history of RD could be a factor in causing the preretinal fibrosis and macular pucker noted in 23 (14.55%) of 158 anatomically reattached retinae.

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The Authors:

Mohammad Idrees Adhi
Associate Professor
Department of Ophthalmology
Civil Hospital and Dow Medical College
Karachi.

Mohammad Aslam Jan
Registrar
Department of Ophthalmology
Civil Hospital and Dow Medical College
Karachi.

Abrar Ali
Senior Registrar
Department of Ophthalmology
Civil Hospital and Dow Medical College
Karachi.

Fawad Rizvi
Registrar
Department of Ophthalmology
Civil Hospital and Dow Medical College
Karachi.

Misbah ul Aziz
Assistant Professor
Department of Ophthalmology
Civil Hospital and Dow Medical College
Karachi.

Khawaja Sharif ul Hasan
Professor & Head
Department of Ophthalmology
Civil Hospital and Dow Medical College
Karachi.

Address for Correspondence:

Mohammad Idrees Adhi
Associate Professor
Department of Ophthalmology
Civil Hospital and Dow Medical College
Karachi.

Role of Mitomycin - C in Reducing the Recurrence of Pterygium After Surgery

P.S. Mahar

The Aga Khan University Hospital, Karachi

ABSTRACT

A prospective study was carried out on 64 eyes of 47 patients undergoing pterygium excision. Postoperatively, these eyes were randomized into two groups to receive two different strengths of topical Mitomycin-C (MMC), a non cell cycle-specific alkylating agent with an antiproliferative effect on cells showing increased rate of mitosis. In group 1, 36 eyes comprising 33 primary and 3 recurrent pterygia received MMC 0.04% one drop 4 times a day for 5 days and showed no recurrence of pterygium at mean follow-up of 18 months. Two patients had serious complications because of misuse of MMC. In group 2, 28 eyes with 23 pterygia of primary nature and 5 with recurrent pathology were treated with MMC 0.02%, one drop twice a day for 5 days. At mean follow-up of 11 months no recurrence was seen in patients with primary pterygia. However, all 5 patients (18%) with recurrent pterygia showed further recurrence within the first six months of surgery. No untoward changes were witnessed in this group. Use of MMC does offer a simple and effective way of adjunctive therapy when compared to other means. Concentration of MMC 0.02% appears to be adequate in reducing the recurrence of pterygia of primary nature. However, when treating a recurrent pathology one might consider using MMC in higher concentration of 0.04%.

INTRODUCTION

Pterygium is one of the commoner corneal disorders seen in tropical and subtropical areas. Apart from causing cosmetic blemish it alters the smoothness of the anterior surface of the eyeball with disruption of the normal tear film. This results in patients complaining of irritable eyes. It can also induce corneal astigmatism and if allowed to proceed over the pupillary areas, reduces the vision. Surgical treatment remains the treatment of choice once the pterygium is found to be progressive in nature. However, because of the increased rate of recurrence after simple excision[1,2] adjunctive treatment has to be employed. This includes either application of a small dose of beta irradiation[2-4] or carrying out conjunctival autograft from the same eye to resurface the exposed sclera[5,6]. Thermal cautery, laser treatment and topical thio-tepa have also been used by various workers in the past.

The last decade has seen an upsurge in the use of topical mitomycin-C (MMC) as an adjunctive treatment after pterygium excision[7-9]. Although MMC has been used in pterygium surgery in the Far East for a long time, its early published reports were mostly restricted to the Japanese literature[10,11]. It is only for the last 10 years that reports on MMC use have surfaced in the English language journals. MMC is an antimetabolite with an antiproliferative effect on the cells showing increased rate of mitosis by inhibiting DNA synthesis.

Encouraged with our early success with MMC[12], this concurrent study was carried out to compare the efficacy of different concentrations of MMC in reducing the recurrence rate of pterygium after surgery.

MATERIALS AND METHODS

From January 1992 to February 1994, 64 eyes of 47 patients required pterygium surgery. All pterygiums were vascularized and encroached over the cornea for 2-3 mm. Atrophic and non-progressive type of pterygia were excluded. All patients underwent pterygium excision using the bare sclera technique. Surgery was performed under an operating microscope. The patients received topical Amethocaine 1% in the conjunctival sac. After the lids were opened using a rigid speculum, 0.2ml injection of 2% lignocaine with 1:100,000 adrenaline was given at the site of the pterygium to

raise it upto its attachment to the cornea. Using No.15 Bard Parker knife the pterygium was shaved off the cornea commencing 0.5mm in front of its head. The pterygium attached with the conjunctiva was separated from the scleral surface and excised leaving about 4mm area of sclera bare. This area was further scraped removing all episcleral tissue with very light cauterization of bleeding vessels. After installation of an antibiotic ointment, the eye was padded. Postoperatively, the patients were randomized into two groups:-

GROUP I

36 eyes of 27 patients in this group received MMC (0.04%) 1 drop four times a day for 5 days along with maxitrol ointment three times a day for 2-3 weeks.

GROUP II

28 eyes of 20 patients received MMC (0.02%) 1 drop twice a day for five days. This was also used alongwith maxitrol ointment three times a day for 2-3 weeks.

The recurrence was considered if fibrovascular growth of a similar nature to that present preoperatively took place or if significant conjunctival vascularization causing cosmetic blemish occurred.

Mitomycin-C drops were prepared in a cytotoxic dispensing safety cabinets by dissolving the Mitomycin-C vial in sterile water for injection and transferring it to a clear ophthalmic dropper bottle. The drops were kept in the refrigerator at 4°C and used within 2 weeks.

Postoperatively, the patients were followed at days 1,7,15 and 30 and later at 2-3 months intervals.

RESULTS

In group I, 36 eyes of 27 patients were treated; 33 eyes having primary and 3 recurrent pterygiums. 21 patients were male and 6 were female. Their ages ranged from 23 to 58 years (Mean 41 years). Overall follow-up ranged from 12-23 months (Mean 18 months). No recurrence of pterygium was seen in any case till the last follow-up. 1 patient stopped MMC after 3 days of use due to severe irritation. 3 patients had complications which are described in detail further on. Re-epithelialization of pterygium site occurred at 2-3 weeks postoperatively (Table 1).

In group II, 28 eyes of 20 patients were treated. 16 patients were male and 4 were female. 23 pterygia were of primary nature while 5 eyes had recurrent pathology.

Table 1: Distribution of patients.

	Group I (MMC 0.04%)	Group II (MMC 0.02%)
No. of patients (Male + Female)	27 (21+6)	20 (16+4)
No. of eyes	36	28
Primary pterygium	33	23
Recurrent pterygium	3	5
Mean age	41 Yrs	40 Yrs
Mean follow-up	18 months	11 months
Recurrence		
No of eyes (%)	-	5 (18%)*

* All recurrences were in patients with recurrent nature of pterygia

Their ages ranged between 19-60 years (Mean 40 years). Mean follow-up time was 11 months. 5 eyes showed recurrence of pterygium, all occurring within the first 6 months of surgery (4 eyes at 3 months and one eye at 5 months). This was seen as statistically significant when analysed by Chi square test for proportion ($P<0.05$). All recurrences occurred in eyes with recurrent pterygia. No recurrence was noted in eyes with primary nature of their disease. No complication was seen in any case. Re-epithelialization of bare sclera was seen at 1-2 weeks postoperatively.

Case Report I

A 39-year-old male had recurrent pterygium in his left eye. This was found to be fleshy and vascularised in nature and encroaching over the cornea for 2-3 mm. His initial surgery consisted of pterygium excision done about 2½ years ago with bare sclera method. However, the patient had recurrence of pterygium 5 months after surgery. The patient's vision was 6/6 in both eyes.

The patient was reoperated using the same bare sclera technique under local anaesthesia. Postoperatively, he was commenced on MMC (0.04%), 1 drop four times a day for 5 days alongwith maxitrol ointment 3 times a day. The patient was seen 6 days after surgery. The pterygium site was quiet although not re-epithelialized. The patient was advised to discontinue Mitomycin drops while continuing with maxitrol ointment and he was given a return appointment in 2 weeks. The patient failed to keep his

appointment and returned to the clinic after 2 months, with complaints of soreness and redness in the left eye. His vision was 6/6 in that eye. The eye revealed inflamed and injected conjunctiva with chemosis mostly in the lower fornix. The pterygium site was pale white and necrotic. There was some muco-purulent discharge also noted in the eye. The cornea appeared clear. The pupil was smaller and 4+ cells were seen in the anterior chamber.

The patient confessed using MMC drops 4 times a day for another two weeks (i.e. three weeks continuously postoperatively) and also off and on till this visit!!!

The patient's general health was unremarkable and he was not on any other systemic medication.

Swabs were taken from the eye for bacterial growth and sensitivity. The patient was commenced on prednisolone 1% drops 4 times a day and fucithalmic eye ointment three times a day for his left eye. After 48 hours cultures revealed presence of Streptococcus pneumoniae. The eye was much more comfortable with less discharge and redness and cellular reaction decreasing in the anterior chamber. According to bacterial sensitivity fucithalmic ointment was stopped and the patient was stared on chloramphenicol drops, 4 times a day. In another four days all discharge settled down, with redness considerably decreased and no activity seen in the anterior chamber. Pterygium site however stayed pale and avascular with scleral thinning. Steroid drops at this stage were stopped and the patient advised to continue with chloramphenicol drops for another week. The patient returned to the clinic after another five weeks not keeping his appointment once again. His vision stayed at 6/6 in the left eye. The eye showed scleral ulcer over the pterygium site. The patient was asked to use artificial tears and lubricants in this eye. He once again disappeared and came back after 5 weeks. This time a small scleral defect was visible over the pterygium site with choroid shinning through. The cornea and AC locked quiet and the vision still measured 6/6 in this eye. The patient was admitted into the hospital for emergency scleral graft, but 3 hours before surgery he got himself discharged from the hospital against medical advice. Since then, he has not been seen again.

Case Report 2

A 50-year-old male patient had primary pterygium removed from his right eye by bare sclera method. Postoperatively MMC (0.04%) 4 times a day (to be used for 5 days) alongwith maxitrol ointment three times a day were prescribed. The patient returned after 25 days for his 1st postoperative visit. He had still been using MMC drops since his surgery. The patient's vision measured 6/6 in the operated eye. The pterygium site looked pale and atrophic with thin sclera. The cornea showed punctuate staining in adjacent area. The AC was quiet with clear media. MMC and maxitrol ointment were discontinued and the patient was started on artificial tears and lubricants. With this regime his eye became quiet although the sclera remained necrotic and extremely thin over the pterygium site. 3 months later the patient returned with complaint of decreased vision in this eye. The vision measured only perception of light in the right eye. The sclera over the pterygium site appeared as before. The patient, however, showed absolutely white hypermature type of cataract in this eye. The patient underwent a planned extracapsular cataract extraction with posterior chamber implant after another three months under local anaesthesia. His operative procedure was uneventful. Postoperatively, he maintained unaided vision of 6/9 in this eye. 4 weeks after cataract surgery he was noticed to have iris prolapse for which he was re-operated. His vision is well maintained thereafter.

Case Report 3

A 37-year-old man was seen with primary pterygium in both eyes. His vision measured 6/6 in each eye. He had pterygiums excised under local anaesthesia. Postoperatively, he received MMC drops (0.04%) 4 times a day for 5 days alongwith maxitrol ointment three times a day. His pterygium site re-epithelialized 4 weeks after surgery. 4 months after his surgery, he was noticed to have mild conjunctival vascularization over the pterygium site in both eyes. At 5 months follow-up his vision charted 6/6 in both eyes. The eyes were quiet with pterygium beds completely healed with no sign of scleral thinning etc. The important finding was nasally peaked pupils, right more than the left. The anterior chamber and the cornea were quiet. Lenses were clear. Media and fundi also looked within normal limits. This patient has been followed-up for 17 months after his surgery with no further changes. The mechanism of oval-shaped pupils remains obscure.

DISCUSSION

Mitomycin is an antibiotic-antineoplastic agent. It is a noncell cycle-specific alkylating agent used topically as adjunctive treatment after pterygium surgery to reduce its recurrence rate.

Many workers have shown that when used

topically as an adjunctive treatment, MMC reduces the recurrence rate of pterygium considerably[7-9]. The drug is still used on experimental basis and no optimal dosage so far has been established. It has been used in our unit since 1990 with minimal side effects. In this series, it has been used in two concentrations of 0.04% and 0.02% in two groups of patients. With the use of 0.04% no recurrences have been seen in a group of 36 eyes with primary and recurrent types of pterygia. One patient stopped the drug after using it only for 3 days due to severe irritation, and one patient developed oval shaped pupils. Two patients, however, had shown severe complications of scleral thinning and ulceration and cataract formation. Such complications have already been published in the Japanese literature and also were recently described by Rubenfeld[13]. Such complications had occurred either due to a higher concentration of MMC or due to several weeks of its use after pterygium surgery. Some of the patients reported by Rubenfeld also had associated connective tissue disorders.

Both of our patients with drug-related complications had used MMC over prolonged periods inadvertently, and from then on we have been extremely careful in dispensing MMC drops with the following steps being taken:

- Local pharmacy is advised to dispense MMC in quantity not exceeding the patient's recommended usage requirement.
- Patients are warned about the toxic nature of the drug if used in excess.
- 1st postoperative appointment is made on the day when MMC has to be discontinued.
- Patients are requested to bring the MMC container on their first visit and hand it over to the consulting physician.

After taking such precautions, overuse of the drug has been successfully stopped.

Though the group of patients with primary pterygium receiving MMC 0.02% did not show any recurrence, all 5 cases of recurrent pterygium did show recurrence (18%) and this has been seen as statistically significant. Epithelialization of pterygium site was also witnessed to occur earlier, by about a week, in patients receiving MMC 0.02%.

The recurrence of the pterygium appears as an irritant not only to the patients but also to the surgeon. Use of topical MMC thus offers a simple and attractive way of adjunctive therapy when compared to other means. However, one should not overlook the potential side effects of this drug when used in excess or in higher concentrations. We feel that the use of 0.02% MMC twice a day for 5 days offers an effective adjunctive therapy for primary pterygium. However, when dealing with pterygium of recurrent nature, concentration of MMC may have to be increased.

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The Author:
P.S. MAHAR
FRCS, FRCOPHTH
Consultant and
Assistant Professor
The Aga Khan
University Hospital
Karachi.

Address for Correspondence:
P.S. MAHAR
FRCS, FRCOPHTH
Consultant and
Assistant Professor
The Aga Khan
University Hospital
Karachi.

Current Status of Low Vision Rehabilitation in Pakistan

A.P. Siddiqui, H.R. Awan, H. Minto

Children's Hospital, Pakistan Institute of Medical Sciences, Islamabad and Paediatric Ophthalmology & Strabismus Unit, Al-Shifa Eye Hospital, Rawalpindi

ABSTRACT

Pakistan has about 10 million visually handicapped people. There are 0.5-1.0 million people who can be helped with low vision assisting devices. Although there are 60 schools/centers for the visually handicapped with 300 teachers and 3000 enrolled students, none provide training in the use of low vision aids for low vision rehabilitation. Only one tertiary eye care center runs a low vision clinic, in which locally produced low vision aids are prescribed and dispensed. A survey of three schools for the blind has shown that 50% to 60% of the children in these schools can be helped with low vision aids. There is an overriding need to develop an 'Interim Low Vision Service' in the country using existing human resources and infrastructure.

INTRODUCTION

Pakistan is a developing country with a population of over 120 million. According to the 1987-90 population-based survey conducted by the Ministry of Health and WHO, the prevalence of blindness was found to be 1.78%. There are 2.4 million people blind in both eyes, 2.5 million blind in one eye and 5 million have visual impairment. Therefore, almost 10 million people are visually handicapped[1].

The major causes of blindness are cataract (67%), corneal opacities (13%), uncorrected refractive errors (11%) and glaucoma (4%)[1]. Of all the blind and severely visually impaired, about 0.5-1 million can be helped with low vision assisting devices.

AVAILABLE RESOURCES

The affairs of visually handicapped children and adults, who require special education, are looked after by the Directorate of Special Education, which in itself is a division of the Ministry of Special Education and Social Welfare. There are 60 centers for the visually handicapped all over the country. Most are run by the government, while some are sponsored by non-governmental organizations (NGOs) A total staff strength of 300 teachers is available in these centres. 3000 visually handicapped students are currently enrolled. Most of these schools are day centers and provide transport facilities[2].

These schools teach their students Braille and navigational methods of rehabilitation. None have facilities for training in the use of low vision aids. Counseling and family or parental involvement is poor. For grown-ups a few centers are present which provide vocational training to the visually handicapped in the arts of carving, basket-weaving and making chairs etc.

NATIONAL PLAN

The results of the national survey were so staggering that the Ministry of Health took a serious note of the prevailing situation of blindness in the country, with the effect that a National Committee for the Prevention of Blindness was set up in 1991. A need for the provision of comprehensive low vision services was recognized and it was made an integral part of the National Plan for Prevention of Blindness[3].

There is a potential work force available in the country in the form of teachers who work with the visually handicapped, In addition, there is an existing infrastructure in the form of a special education division at ministerial level and sufficient number of schools for the visually handicapped.

SCHOOLS FOR THE BLIND

In a recent survey carried out in three schools for the blind in which 320 children were examined in Islamabad Capital Territory and Rawalpindi city, it was

found that 60% had causes attributable to retinal diseases and congential/developmental anomalies (Al-Shifa Community Ophthalmology - unpublished data).

Over 90% of the children were from consanguineous marriages. However, an hereditary aetiology was encountered in 30% to 60% of the children. 50% to 60% of the children could be rehabilitated using low vision aids. This compares well to the work done by Silver and Gilbert in East Africa[4], who found that about 60% of the children in schools for the blind could be helped with low vision aids.

CURRENT STATUS

The current status of low vision rehabilitation in the country is primordial and only limited to a few centers. A developmental research project in the manufacture of affordable low vision aids using appropriate technology is currently underway as a pilot project at the Al-Shifa Eye Hospital, which is also the WHO Collaborating Center for Prevention of Blindness. This also has been running a regular Low Vision Clinic for the last two years in which over 1500 patients have been seen and over 700 locally produced low cost low vision aids dispensed.

The Pakistan Institute of Ophthalmology, Al-Shifa Eye Hospital, has planned to set up a rehabilitation center for the blind and visually handicapped. A specialist in low vision is currently being trained in Sweden to become master trainer.

INTERIM LOW VISION SERVICES

At this stage of infancy, what is required is not a model based on developed countries, but rather an Interim Service that can utilize existing manpower and infrastructure. It would involve institutional strengthening and capacity-building with human resource development over the next ten years. During this period, this specialized service should be integrated into the existing health services structure and should become an integral component of all future national health policies relating to special education and prevention of blindness. There is need to form a task force to guide policy-making and to monitor development of low vision services in Pakistan. Master trainers need to be trained to teach further trainers so that they can return to their centers and apply their skills in training teachers working at schools for the visually handicapped to become low vision therapists.

The existing facilities need to be boosted with provision of appropriate low vision aids e.g. telescopes and magnifiers to integrate the children into normal schools. Facilities for manufacture of a wide range of affordable low vision aids using appropriate technology need to be developed. Training of opticians is required for this purpose. Public eye health education and awareness of low vision services need to be promoted amongst the general public and the ophthalmologists[5]. A health system referral chain needs to be developed to direct the patients from secondary or tertiary eye care centres to appropriate low vision rehabilitation centers. Each tertiary eye care center should collaborate with 2-3 centers for the visually handicapped. This would enable a national service to be established.

CONCLUSION

In many developed countries, low vision is a manageable condition to a great extent. In developing countries, it remains neglected and is easily overshadowed by more demanding conditions like cataract and trachoma. Low vision is not just a medicosocial problem, it is also an economic issue in terms of lost productivity, especially when rehabilitation can be accomplished so cheaply[6].

While it may take more than one decade to develop an integrated low vision service within the country, there is an overriding need to formulate an interim low vision service. This would utilize existing manpower and available facilities and infrastructure. Units for production of affordable low vision aids using appropriate technology would have to be developed concurrently. Even the partially sighted have a right to see better.

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The Authors:

A.P. Siddiqui
Children's Hospital
Pakistan Institute of
Medical Sciences
Islamabad.

H.R. Awan
Paediatric Ophthalmology and
Strabismus Unit
Al-Shifa Eye Hospital
Rawalpindi.

H. Minto
Paediatric Ophthalmology and
Strabismus Unit
Al-Shifa Eye Hospital
Rawalpindi.

Address for Correspondence:

H.R. Awan
Paediatric Ophthalmology and
Strabismus Unit
Al-Shifa Eye Hospital
Jhelum Road
Rawalpindi.

Ophthalmic "Pastpourri"

Arabian Ophthalmology

Around 1000 A.D. a book appeared in Egypt written by a native of Mosul, Iraq. His name was Ammar; the title of the work "Choice of Eye Diseases". It is considered "the most original book on Arabian Ophthalmology".

Ammar was a Moslem and "the most clever eye surgeon" of the Arabian era. The most peculiar thing in Ammar's book is his six histories of cataract extraction. They are clear and impressive, even today very attractive.

Here is the true translation of one of these stories:

A marvellous experience. I have operated on the eyes of a lady in a palace, in the green harem of the manor-house of Ibn al Bakri. The cataract was equally (*sic*)in both eyes. Three pupils who studied were present with me. I began with the right eye and operated on it and proceeded in orderly fashion and extracted the needle and bandaged the eye. Then I began the operation on the other eye. As I introduced the needle into the eyeball and was ready to couch the cataract, the lady lost consciousness and was like dead. Immediately I splashed water on her bosom, till she moved, and the spirit reentered into her, and she became quiet. Now I had the intention to couch the cataract for the second time. But immediately she clutched her hands and got fits, the needle being in the interior of her eye. The students became frightened and ran away. But I took paeonia from my pocket and gave her it to smell. Her spirit returned and she became quiet. Now I had the intention for the third time to couch the cataract and pursued the performance in a hurry and with force. Immediately her pupil dilated, the hole of the iris became as wide as if she suffered from mydriasis; notwithstanding I always held the needle in her eye with one of my hands, the other fastening the eyeball. As her condition became quiet, I finished the operation, withdrew the needle and performed the bandage. On the third day after I visited her to look (*sic*) the eye. Then she told me that from the hour I had left her she suffered hemiplegia. Now, of course, I was convinced that her eye was destroyed after all these accidents and loosened the knot of the bandage—full of desperation; but I found her eyes in the best condition, nearly recovered. Then I praised God the Almighty, because He is capable of all, from Him derives the love and the mercy. In all my surgery I never had a similar case.

Excerpted from "Arabian Ophthalmology", By Hirschberg J. Address by special invitation before the section on Ophthalmology of the American Medical Associationat at the Portland session, July 11-14, 1905. Reprinted from the Journal of the American Medical Association, Vol. XLV, Oct. 14, 1905, pp 1127-31.

Jehangir Durrani
MD, FACS, FRCOphth.

Review Article

Pharmacological Agents in Posterior Segment Disorders: The Past, The present and The Future

Nafis ur Rahman

Al-Shifa Trust Eye Hospital, Jhelum Road, Rawalpindi

The understanding of vitreoretinal diseases is improving everyday and this is evidenced by the fact that advances made in this field have resulted in yersterday's innovations to become the standard treatment today. The technological breakthroughs achieved in the understanding of posterior segment disorders have resulted in better treatment options for various diseases.
It is important to know about these options as they will be affecting the management of several diseases in the near future.

Pharmacologic agents have now been under trial:

1. to prevent proliferative vitreoretinopathy (PVR).
2. for dissolving post-vitrectomy fibrin.
3. for dissolving subretinal haemorrhages.
4. to prevent subretinal choroidal neovascularization in age-related macular degeneration
5. to promote the growth of tissue in macular holes
6. to promote the separation of vitreous base during vitreoretinal surgery.

1. Prevention of PVR

Several agents have been used in the past, depending on the mode of action, pharmacokinetics and half-life, to inhibit the process of proliferative vitreoretinopathy. Prominent among them are:

Corticosteroids
Non-steroidal anti inflammatory agents
Antimetabolites like Daunomycin
Anti contractile/microtubule inhibiting agents e.g.colchicine and cytochalasin-B.

Problems with their use have included potential retinal/optic nerve toxicity, limited half-life and adverse systemic side effects.

Corticosteroids have been quite effective by suppressing the inflammatory response and decreasing the leakage of mutagenic substances by stabilizing the blood-ocular barrier and by decreasing the mutagenic activity of cells but systemic side effects may preclude their use.

Experience with Mitomycin and 5-Flurouracil in glaucoma has shown that direct application of anti-mitotics may have a beneficial effect on cellular proliferation. The effectiveness of such agents is yet to be tried in the prevention of PVR.

Many studies have shown that the vitreous from PVR eyes is chemotactic and mutagenic for both fibroblasts and retinal pigment epithelial cells. Immunoassays have shown the presence of acidic fibroblastic growth factors (FGF), basic fibroblastic growth factors (FGF), transforming growth factors-beta (TGF-Beta) in such eyes.

Basic FGF has been found to be the most concentrated and the most mutagenic factor of all. In vitro studies have shown that both the acidic and the basic FGF have a high affinity for heparin and that binding to heparin decreases the mutagenicity of these growth factors.

Heparin is a long-chain polysaccharide composed of repeating units of hexosamines and either iduronic acid or glucuronic acid and is covalently bonded to a proteoglycan core and may range in size from 5000 to 6000 Daltons. The molecule may be sulfated to a variable degree with resultant change in activity. Heparin requires anti-thrombin 3 to produce its anticoagulant effect and its principal inhibitory effect on coagulation is through the inhibition of thrombin-induced activation of factor 5 and factor 8.

Low molecular weight heparin is being used in

vitreoretinal surgery for the prevention of PVR[1-2]. It acts in the following way:

- Binds various growth factors potentiation basic FGF.
- Inactivates fibroblast growth factors.
- Has direct anti-proliferative effect on the retinal pigment cells and scleral fibroblasts.
- Inhibits collagen gel polymerization.
- Inhibits cell attachment to collogen.
- Decreases fibrin formation.

Low molecular weight heparin produces less haemorrhagic complications when given as an intravitreal infusate than as an intravenous injection. Doses as low as 5 I.U./ml are sufficient to reduce PVR in operated cases.

2. Treatment of Post-vitrectomy Fibrin

Fibrin formation is frequently encountered after posterior segment surgery especially if surgery involves membrane dissection and peeling as in cases with proliferative vitreoretinopathy and various proliferative vasculopathies. It probably results from the surgically induced breakdown of the blood-ocular barrier which allows fibrinogen to enter the eye and is converted into fibrin by thrombin generated by both the extrinsic and the intrinsic pathways of clotting. It is particularly important in diabetics because of a hypercoagulable state and a fibrinolytic dysfunctional state that decreases the clearance of fibrin[4,5]. It is most commonly found at the pupil but may be found anywhere in the eye. It can cause pupillary block glaucoma, anterior synechiae and precludes fundal examination and most importantly stimulates retinal pigment epithelial cell migration and contributes to hypocellular gel contraction and recurrent retinal detachment. It also stimulates cellular reproliferation and may act as a scaffold for proliferating cells. It is normally lysed by plasmin derived from plasminogen. Tissue plasminogen is one of several activators leading to the formation of plasminogen.

Fibrinous reaction can be controlled by prophylactic regimes like preoperative steroids and non-steroidal anti inflammatory drugs (NSAIDS), intraoperative use of steroids and low molecular weight heparin and postoperative use of topical, periocular and systemic steroids. Although NSAIDS and steroids effectively decrease ocular inflammation, they do not eliminate fibrin formation.

Interest has now developed in the use of fibrinolytic agents i.e. plasminogen activators. In the past Streptokinase and Urokinase had been tried but these resulted in ocular toxicity[6,7]. Pure plasminogen activators, particularly recombinant tissue plasminogen activators have proved useful in ocular fibrinolytic therapy. Tissue plasminogen activator (TPA) is approved for the treatment of acute myocardial infarction.

The first intraocular use was reported in 1988 but resulted in significant complications. Since then dose adjustments have been made and a safe dose has been found. Presently it is used in severe forms of fibrinous reactions that do not respond to management with aggressive anti-inflammatory therapy in the dose range of 3 to 5 micrograms given through either limbus or pars plana. The most serious potential complication is intraocular haemorrhage[8]. It should be used with caution in cases of retinotomty as it may result in haemorrhage. TPA is also being used in the evacuation of subretinal haemorrhage especially when submacular[9-12].

Indications of subretinal haemorrhage removal include :

- subretinal haemorrhage of recent onset (not more than 7 days).
- good visual acuity before haemorrhage.
- poor vision in the fellow eye.

3. Age-related Macular Degeneration (A.M.D.)

Age-related macular degeneration is the leading cause of irreversible visual loss in the Western world and poses a significant problem in other races. Although clinical studies have shown the beneficial role of laser photocoagulation for patients with well defined or classic neovascularization, unfortunately the great majority of patients with exudative component are un-treatable because of poorly defined membranes. In addition there is a high recurrence rate of 50% in patients who qualify for treatment. Thus, for the majority of patients, i.e about 90%, no effective treatment is available.

Attention is presently being diverted towards the use of pharmacological agents in the hope of avoiding laser-induced retinal damage, avoiding the treatment of poorly defined membranes and lowering the recurrence rate.

The use of various pharmacological agents is based on the concept of anti-angiogenesis which was first proposed by Professor Judah Folkman in 1971.

Presently there are several potential anti-angiogenic agents that are approved by F.D.A., namely Interferon, retinoids and amilorides. Others under trial are AGM1470, platelet factor 4, thrombosporin, transforming growth factor beta (TGF BETA),

thalidomide and neutralization antibodies to vascular endothelial growth factors (VEGF).

Interferons

Interferon was discovered more than 30 years ago by Isaacs and Lindenmann who observed that virus-infected cell cultures produced a protein that reacted with cells to render them resistant to infection by many viruses. In other words interferons are natural body defenses against viral infections and also play an important role in combating tumours and regulating immunity. In addition they have a profound effect on other vital cellular and body functions including metabolism, cell proliferation, hormone stimulation, immunity etc.

Presently the use of Interferons is approved by FDA for the treatment of Hairy cell leukemia, Condylomata acuminatum, Kaposi's sarcoma, non-A and non-B hepatitis, chronic granulomatous disease and basal cell carcinoma

The interest in the use of interferon alpha is the result of several laboratory and animal studies in the recent past[13,14]. At the cellular level it has been shown to inhibit the vascular endothelial cell proliferation and migration. In monkeys it has been shown to be effective in the regression of iris neovascularization when given systemically.

In humans it has been shown to help in the regression of hemangiomas. Several pilot studies have been reported in human beings regarding the efficacy of interferons[15-22].

Presently a trial called the phase 3 Prospective Randomised Placebo Controlled Clinical Trial for Macular Degeneration Study is under way in 53 centres the world over and approximately 500 patients have been recruited and randomised to three different dosages of interferon. The results are expected sometime later but preliminary reports suggest that there was no difference in the treatment and placebo groups and interferons did not have any beneficial effect in the prevention of age-related macular degeneration.

Vascular Endothelial Growth Factors (VEGF)

Vascular endothelial growth factor has been shown to produce neovascularization in animal models[23]. Elevated levels have been found in eye fluids in patients with proliferative retinopathies but not in eyes affected by non-neovascular disorders[24,25]. It is suggested that inhibition of VEGF with monoclonal antibodies may be helpful in controlling the neovascular response[26,27]. Such antibodies may prove helpful in the future in preventing choroidal neovascularization and other vasoproliferative retinopathies.

Thalidomide

Interest is now developing in the anti-angiogenic activity of thalidomide. Previously the use of this drug had been abandoned because of its teratogenic effect. Studies have proved it to be strongly anti-angiogenic in several animal models[28]. Presently studies are underway to find its effectiveness in preventing vascular proliferation.

Amiloride

Amiloride inhibits urokinase type plasminogen activator and has been shown to be effective as an anti-angiogenic agent in neovascularised rabbit corneas and in vitro[29,30]. Studies in humans are presently underway in research centres in the United States.

Others

Other anti-angiogenic drugs under trial include Retinoids, Beta Cyclodextrins, AGM1470.

4. Pharmacologic Agents in Macular Holes

Age-related macular holes develop in people over 55 years of age. The average age at the time of development of a macular hole is 70 years. Women are more affected than men. Several retrospective studies have shown that the majority of patients with macular holes maintain visual acuity in the range of 6/12 to 6/60. The fellow eyes are involved in only 10% of cases.

While anterior-posterior vitreous traction with partial posterior vitreous detachment can cause a macular hole, findings suggest that this mechanism is not an important cause of most cases of idiopathic macular holes. Reports by Gass and Johnson have changed the concept about macular holes. According to these studies, focal shrinkage of foveal vitreous cortex is responsible for macular hole formation. Initially, traction occurs which detaches the retina followed by tangential traction of the foveal vitreous cortex which leads to macular hole formation[31-34].

The occurrence of a full-thickness macular hole generally results in a significant reduction in vision. The most likely reason is the loss of neurosensory tissue when posterior vitreous detachment occurs. The rim of neurosensory retinal detachment and retinal thickening typically surrounds the full-thickness macular hole.

Full-thickness macular holes were thought to be untreatable but a study reported by Kelly and Wendel in 1991 suggested that the residual epiretinal vitreous gel, presumably cortical gel in association with the

posterior hyaloid, was present in eyes with round full-thickness macular holes and may exert tangential traction and is responsible for enlargement of holes. Removal of this cortical gel by vitrectomy may improve vision[35].

A number of biochemical growth factors have been identified which could modulate wound healing, TGF-B2 being one of them. It has been found to stimulate collagen and glycoprotein synthesis and promote cell proliferation and migration involved in wound healing[36].

The use of Transforming Growth Factor Beta 2 (TGF-B2) was suggested in combination with vitrectomy and fluid-gas exchange in view of case reports in which spontaneous visual improvement occurred in eyes with full-thickness macular holes with simultaneous flattening of the rim of neurosensory retinal detachment[37,38].

Various clinical studies have proved that:

- TGF-B improves visual outcome whether or not preretinal membranes surrounding the macular hole are removed.
- TGF-B enhances the ability to improve the vision and close the macular holes regardless of the stage of macular hole.
- TGF-B improves the vision and the ability to flatten the macular holes regardless of duration of the hole.

5. Pharmacologic Agents In Vitreous Separation

The vitreous plays an important role in various retinal disorders due to its unique anatomical relationship with the retina. It is especially important in proliferative disorders like diabetic retinopathy, retinopathy of prematurity, vasculitis retinae, trauma and proliferative vitreoretinopathy. All vitreous disorders need vitreous for new vessel proliferation. Studies have shown that diabetes alters the biochemical and anatomic structure of the vitreous by producing enzyme mediated collagen cross-linkage and non enzymatic glycation which destabilises the vitreous resulting in liquefaction and central vitreous collapse leading to tractional retinal detachment and vitreous haemorrhage. Neovascularization also enhances vitreous detachment by producing proteolytic enzymes and destabilizing the vitreous. Posterior vitreous detachment in turn prevents growth of new vessels and haemorrhage. Inducing vitreous detachment mechanically has now become the standard surgical procedure in vitrectomies performed for proliferative disorders but despite the continued introduction of new instrumentation and improvement in vitrectomy techniques, complete removal of cortical vitreous from the retinal surface is difficult and often incomplete especially in young patients.

Ultrastructural and biochemical studies have proved that adhesions of the vitreous to the internal limiting membrane of the retina are mediated through glycoproteins such as fibronectin and chondritin. Chondritinase and plasmin (a serine protease) have been successful in animal models and cadaver eyes in achieving complete vitreous detachment without producing underlying retinal damage[39,40]

Increasing trends towards the use of pharmacologic agents in ophthalmology and in particular posterior segment disorders leave us with little doubt that the experiments of today will become the standard procedures of tomorrow and will decrease the need for surgery or modify our surgical approach in future.

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The Author:
Dr. Nafis ur Rahman
F.R.C.S.
Consultant,
Al-Shifa Trust Eye Hospital
Jhelum Road
Rawalpindi.

Address for Correspondence:
Dr. Nafis ur Rahman
F.R.C.S.
Consultant,
Al-Shifa Trust Eye Hospital
Jhelum Road
Rawalpindi.

Case Report

Pleomorphic Adenoma of Moll's Gland of Eyelid

Mahmood Saeed, Javed Hassan Niazi, M. Saleh Memon, Qamar Jamal

Department of Ophthalmology and Department of Clinical Pathology, Jinnah Postgraduate Medical Centre, Karachi

ABSTRACT

Pleomorphic adenoma of the gland of Moll is an extremely rare tumour of the eyelid. These are only a few cases on record in the registry of ophthalmic pathology at Armed Forces Institute of Pathology in Washington D.C, U.S.A. In a 1975 study only one such case was described amongst 700 cases of eyelid tumours. We are presenting one case of pleomorphic adenoma of the gland of Moll out of 654 patients with neoplasms of the eyelids seen in the last 7½ years (April 1988 - November 1995) at our Institute.

Neoplasms are mostly of monoclonal origin, i.e. derived from a single progenitor. However, in some instances the stem cell may undergo divergent differentiation creating a so-called mixed tumor (pleomorphic adenoma)[1]. In Ophthalmology the common site of this type of tumor is the lacrimal gland. Histologically this tumor has a diverse pattern. Although histogenesis is believed to be epithelial, there are two morphological components: one is composed of cells resembling ductal epithelium, whereas the second consists of stellate, spindle cells streaming out in a loosely arranged stroma. Stromal component may be myxoid, hyalinized, psuedocartilagenous or calcified and occasionally demonstrates bone formation[2].

Pleomorphic adenoma of the gland of Moll is an extremely unusual neoplasm of eyelid. Only a few examples are on file in the Registry of Ophthalmic Pathology at the Armed Forces Institute of Pathology, USA. I could not find a single case report of this tumor in the literature during the last ten years. For a lesion to be accepted as an apocrine adenoma derived from a gland of Moll, it must be located at the lid margin. The cuboidal tumor cells should display strong eosinophilic cytoplasm and areas of decapitation secretion. The cells may also show iron-positive as well as diastase resistant PAS-positive granules located in their apical portions[3].

Daicker and Gafner reported one case of pleomorphic adenoma of Moll's gland out of 700 tumors of the eyelid[4]. In their study 12 tumors were neoplasms of sweat glands. One of these sweat gland neoplasms was a pleomorphic adenoma. We also present a case report of this rare tumor with brief discussion on its presentation and histopathology.

In the last seven and a half years (April 1988 to November 1995) 654 patients of eyelid neoplasms (both benign and malignant) reported at Jinnah Postgraduate Medical Centre, Karachi. One of these 654 had pleomorphic adenoma of Moll's gland.

CASE REPORT

A sixty-year-old male presented with a painless, 1.5 x 1.0 cm bean-shaped mass located on the right lower lid. On palpation it appeared to be adherent with the tarsal plate. This mass was of five years standing and stationary in size for the last three years. It had smooth surface and was non-tender and firm in consistency. Our provisional diagnosis was a benign connective tissue neoplasm arising from the underlying tarsal plate.

It was excised through an elliptical horizontal incision of 1.5 cm length (Figure-1). Histopathologic examination revealed it to be a pleomorphic adenoma of the gland of Moll. Figure 2 shows groups and sheets of epithelial cells attempting to form glands. Myoepithelial cells and pseudocartilage are seen against myxoid background. Special stains were positive for glycogen, neutral mucin and acid mucin.

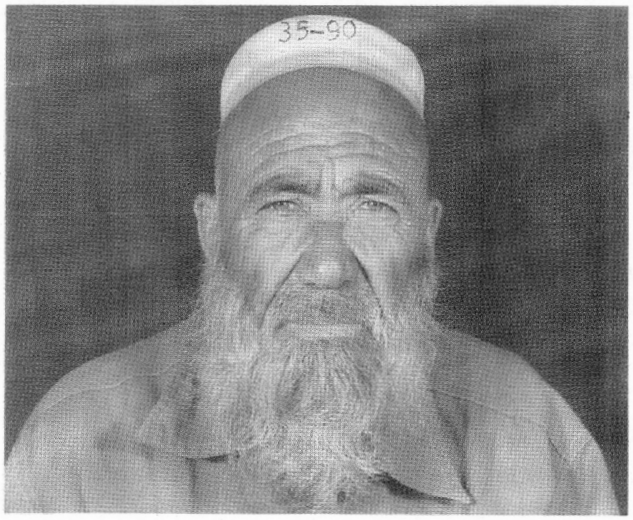

Figure - 1
Postoperative photograph of the patient with pleomorphic adenoma of Moll's gland. Right lower lid shows scar mark.

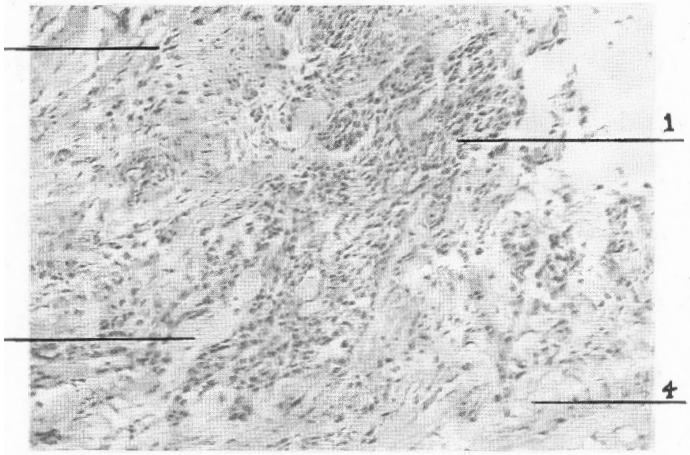

Figure - 2
Photomicrograph of the patient in Figure 1 showing (1) sheets of epithelial cells, (2) myoepithelial cells, (3) psuedocartilage and (4) myxoid background.

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The Authors:

Dr. Mahmood Saeed (FCPS)
Senior Registrar
Department of Ophthalmology
JPMC
Karachi.

Dr. Javed Hassan Niazi (FCPS)
Assistant professor
Department of Ophthalmology
JPMC
Karachi.

Professor M. Saleh Memon (FRCS)
Professor and Head
Department of Ophthalmology
JPMC
Karachi.

Professor Qamar Jamal (Ph.D)
Professor of Pathology
Department of Clinical Pathology
JPMC
Karachi.

Address for correspondence:

Dr. Mahmood Saeed (FCPS)
Senior Registrar
Department of Ophthalmology
JPMC
Karachi.

Abstracts

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Comparison of Methods to Evaluate the Optic Nerve Head and Nerve Fiber Layer for Glaucomatous Change.

Caprioli J, Prum B, Zeyen T
Am J Ophthalmol 1996; 121: 659-67

The susceptibility to optic nerve damage from glaucoma varies among individuals. One-sixth to one-half of all patients with glaucoma have an initial intraocular pressure of less than 21 mm Hg, whereas one-tenth of patients with increased intraocular pressure have visual loss from glaucoma. Measurement of intraocular pressure cannot be used to predict accurately and consistently which patient will have damage from glaucoma. In patients with established glaucoma sensitive measures of progression will help guide medical and surgical treatment.

The purpose of this study was to compare the rates of optic nerve damage in early human glaucoma. Four techniques were used to detect progressive glaucomatous damage in a prospective, longitudinal study:(1) qualitative evaluation of stereoscopic color optic disc photographs, (2) qualitative evaluation of monochromatic nerve fiber layer photographs,(3) normal stereoplanimetric measurement of disc rim area, and (4) computerized measurement of peripapillary nerve fiber layer height. One eye of each patient with glaucoma or ocular hypertension was evaluated at the beginning and end of a follow-up period of not less than one year. The rates of structural change measured by these technique and the rate of visual field change measured with threshold automated perimetery were determined.They followed-up 193 patients for a mean ($\pm$SD) of 3.3 ± 1.0 years (range one to six years).Twenty-nine (15%) of 193 eyes progressed by qualitative optic disc evaluation, 14 (7.2%) of 193 eyes progressed by qualitative nerve fiber layer evaluation, seven (3.6%) of 193 eyes progressed by stereoplanimetry and 24 (13.2%) of 182 eyes progressed by measurement of nerve fiber layer height. Visual field deterioration was detected in 12 (5.2%) of 193 patients and correlated best with qualitative optic disc and nerve fiber layer evaluations. Evaluation by steroplanimetery and nerve fiber layer height measurement detected change in eye with primarily diffuse structural damage, a pattern not well detected by qualitative methods. The authors concluded that both qualitative and quantitative methods of optic disc and nerve fiber layer evaluation contribute to the identification of progressive damage, depending upon the stage of disease and the characteristics of optic nerve cupping.

Dislocation of the Lens Nucleus into the Vitreous Cavity After Standard Hydrodissection.

Ota I, Miyake S, Miyake K
Am J Ophthalmol 1996; 121: 706-7.

Hydrodissection of the lens nucleus is performed extensively especially during phacoemulsification procedure and this has not been found to be associated with any serious complications after continuous curvilinear capsulorrhexis (CCC).

The authors encountered dislocation of the lens nucleus into the vitreous cavity immediately after CCC and hydrodissection of the nucleus. This complication occurred in four of 10,126 eyes. All four eyes were in elderly patients and except for the patient whose contralateral eye had pseudoexfoliation syndrome, all eyes had an increased axial length.

The authors concluded that in elderly patients with eyes that have long axial length or pseudoexfoliation hydrodissection should be performed with extreme care and only when necessary.

Possible Consequences of Shaking Hands With Your Patients With Epidemic Keratoconjunctivitis

Azar MJ, Dhaliwal DK, Bower KS, Kowalski RP, Gordon YJ
Am J Ophthalmol 1996; 121:711-2.

An outbreak of epidemic keratoconjunctivitis can substantially disrupt an ophthalmic practice.The purpose of this study was to evaluate patients' hands as a possible vector for spread of epidemic keratoconjunctivitis. The hands and conjunctivas of 26 patients with epidemic keratoconjunctivitis and hands of 26 uninfected control patients were cultured for infectious adenovirus.

The authors found that in 12 (46%) of 26 patients with epidemic keratoconjunctivitis, cultures from the hands were positive for adenovirus, whereas cultures from the hands of all uninfected control patients were negative.The authors concluded that simultaneous coinfection of patients' hands and eyes with adenovirus may contribute to office epidemics. Ophthalmologists and coworkers should not shake the hands of patients suspected of having epidemic keratoconjunctivitis unless properly gloved.

Fluoroquinolones in the Treatment of Bacterial Keratitis.

Bower KS, Kowalski RP, Gordon YJ
Am J Ophthalmol 1996;121:712-5.

Bacterial keratitis can result in permanent loss of vision if not treated promptly and appropriately. The cornerstone of successful treatment is effective topical antimicrobial therapy. Empiric therapy must be initiated with a broad-spectrum regimen until culture results confirm the identity and antibiotic susceptibility of the causative organisms.

In this study the authors evaluated the potential role of three topical fluoroquinolones in the treatment of bacterial keratitis by means of laboratory database. Antibiotic susceptibilities were determined for 153 isolates from patients with bacterial keratitis. Results were analyzed for each fluoroquinolone individually and in combination with cefazolin. Predicted susceptibility to each cefazolin fluoroquinolone combination (98.7%) was superior to that for single agent therapy with ofloxacin (88.2%), ciprofloxacin (82.3%) or norfloxacin (80.4%) (P=0.0002).A cefazolin-fluoroquinolone combination (98.7) was comparable to a cafazolin-gentamicin combination (97.4%).

The authors concluded that combination theraphy with cafazolin and fluoroquinolone offers a reasonable alternative for the treatment of bacterial keratitis. Single agent therapy with fluoroquinolones for vision-threatening bacterial keratitis is not advised.

Intraocular Lens Implantation in Patients With Juvenile Rheumatoid Arthritis.

Probst LE, Holland EJ.
Am. J. Ophthalmol 1996;122:161-70.

Cataracts are a frequent complication of the uveitis associated with juvenile rheumatoid arthritis(JRA). Because these cataracts form in inflamed eyes with posterior synechiae, increased intraocular pressure, and band keratopathy, they offer unique challenges in their surgical treatment. Different techniques have been adopted for surgical treatment of cataracts associated with JRA such as needling and aspiration (initial results were disappointing) and more recently pars plana lenscetomy-vitrectomy has been advocated as a more successful technique with better visual outcomes and fewer complications. Unfortunately this technique involves the complete removal of the lens, posterior capsule, and anterior vitreous without intraocular lens implantation which commits the patient with JRA to a lifelong dependence on aphakic correction.

The purpose of this study was to evaluate the results of IOL implantation in patients with cataracts associated with JRA. The authors reviewed the records of seven patients (eight eyes) with JRA who had undergone cataract extraction by phacoemulsification with IOL implantation. Posterior subcapsular cataracts and non-visually disabling peripheral band keratopathy were found in all eyes. The median postoperative follow-up was 17.5 months (mean 16.6 months; range 9 to 36 months). Five patients were adults and two patients were less than 10 years old. A best-corrected visual acuity of 20/40 or better was attained in all eyes and the last recorded visual acuity was 20/40 or better in seven of eight eyes. Early complications included posterior synechiae formation in two eyes, one of which required reoperation. Late complications included visually disabling posterior capsular opacification in one eye and new glaucoma in two eyes. Preoperative corticosteroids were reduced postoperatively in five eyes, were the same in two eyes and increased in one eye. Persistent postoperative inflammation, posterior synechiae and pupillary membrane occurred in one of the children in this study, suggesting that intraocular lens implantation in this age group may have more complications.

The authors concluded from the results that in selected adults cataract caused by JRA-associated uveitis can be treated by the standard phacoemulsification technique with IOL implantation and can have excellent results. IOL implantation in children with JRA merits further investigations.

Needle Elevation of the Scleral Flap for Failing Filtration Blebs After Trabeculectomy With Mitomycin-C.

Greenfield DS, Miller MP, Suner IJ, Palmberg PF.
Am J. Ophthalmol 1996;122:195-204.

The purpose of this study was to report the incidence of failing filtration blebs after

trabeculectomy with mitomycin C and to report the outcome of needling procedures for failing filtration blebs in these eyes.

The authors conducted a retrospective analysis of 537 eyes of 434 patients who had trabeculectomy with mitomycin C and reviewed the clinical course of 441 eyes of 338 patients with a minimum of three months of follow-up.In 441 eyes of 338 patients followed-up for three months or more after trabeculectomy with mitomycin C, 88 (20.0%) eyes from 85 patients underwent needle elevation of the scleral flaps. 49 (22.4%) of 219 eyes required needle revision after trabeculectomy alone and 39 (17.6%) of 222 eyes after trabeculectomy combined with cataract extraction and intraocular lens implantation. Mean intraocular pressure (IOP) after needle revision (17.9±11.6 mm Hg) was significantly less than the mean preneedling IOP (27.1±10.4 mm Hg, $P < 0.00001$, paired Student's t test). 63 eyes of 60 patients had a minimum of three months of postneedling follow-up. Successful pressure control, defined as an IOP of 22 mm Hg or less with or without topical glaucoma control medications was achieved in 46 (73.0%) of 63 eyes. Unsuccessful outcome correlated significantly with higher preneedling IOP ($P=0.28$, $P=0.03$, $df=61$) and prior surgery involving conjunctival incision ($R=0.53$, $P < 0.00001$, $df= 61$).

The authors concluded that needle elevation of the scleral flap may provide significantly long-lasting pressure reduction in eyes with failing mitomycin C blebs. Higher success rates are achieved in eyes with fewer prior conjunctival incisions, eyes requiring a single needle revision and eyes with lower preneedling IOP.

Measurement by Nerve Fiber Analyzer of Retinal Nerve Fiber Layer Thickness in Normal Subjects and Patients with Ocular Hypertension

Tjon-Fo-Sang MJ, De Vries J, Lemij HG
Am J Ophthalmol 1996;122:220-7

The purpose of this study was to measure retinal nerve fiber layer (NFL) thickness in normal subjects and patients with ocular hypertension and examine the relationship between age and normal NFL thickness. Nerve fiber layer thickness was determined by scanning laser polarimetry in 210 normal subjects and 100 patients with ocular hypertension. Relative ratios for the superior and inferior NFLs were calculated by dividing the NFL values of the respective regions by the nasal value. Mean superior NFL in normal subjects measured 2.5 (95% confidence interval [CI],1.3 to 3.7), and mean inferior NFL, 2.4 (95% CI, 1.2 to 3.6). Regression analysis showed a gradual decrease in NFL thickness with increasing age. In the patients with ocular hypertension, mean superior and inferior NFL were significantly lower compared with those of normal subjects: superior, 1.6 (95% CI, 0.4 to 2.8) and inferior, 1.6 (95% CI, 1.0 to 2.2). Of the patients with ocular hypertension, 58 of 100 (58%) had an abnormal NFL parameter. Normograms which the authors obtained for NFL as determined by scanning laser polarimetry may serve as reference points for future studies. Patients with ocular hypertension had a significantly lower NFL thickness, although there was some overlap in resulting measurements with those of normal subjects. The nerve fiber analyzer may be useful for individual follow-up of people at risk for glaucoma; however, its role as a screening instrument requires further study.

Vitrectomy for Diffuse Macular Edema in Cases of Diabetic Retinopathy

Tachi N, Ogino N
Am J Ophthalmol 1996;122:258-60

The purpose of this study was to ascertain the effects of posterior vitreous detachment for diffuse diabetic macular edema.

The authors performed vitrectomy on 58 eyes of 41 consecutive patients with diabetic macular edema without posterior vitreous detachment. Follow-up was done at 12 months postoperatively. In 57 of 58 eyes after vitrectomy and posterior vitreous detachment, macular edema resolved, and diffuse fluorescein leakage disappeared in 35 of 36 eyes examined at the 12th month. Visual improvement was statistically significant ($P < .0001$, paired t test).The authors concluded that in eyes with diffuse diabetic macular edema and without posterior vitreous detachment, vitrectomy with posterior vitreous detachment may be effective.

Ocular Findings in Down's Syndrome.

Da Cunha RP, De Castro Moreira JB
Am J Ophthalmol 1996;122:236-44

Down's syndrome, first described in 1866, is clinically characterized by mental retardation, short stature, hypotonia, brachycephaly, small nose, low-set deformed ears, and protruded, fissured tongue. The abdomen is often protuberant, and abnormalities of the extremities include short, flexed arms and legs, short, broad hands with a simian crease. Cardiac malformations are common. Trisomy 21 was identified as one of the genetic causes of Down's syndrome in 1959. It is the most common chromosomal rearrangement in live births.

The purpose of this study was to identify the most common ocular finding in a pediatric group of patients with Down's syndrome. A total of 152 children with Down's syndrome between two months and 18 years of age prospectively underwent ocular examination, including visual acuity assessment, slit-lamp biomicroscopy, ocular motility, cycloplegic retinoscopy, and ophthalmoscopy.Ocular findings in decreasing prevalence were the following: upward slanting of the palpebral fissure with the outer canthus 2 mm or higher than the inner canthus (82%), epicanthal folds (61%), astigmatism (60%), iris abnormalities (52%), strabismus (38%), lacrimal system obstruction (30%), blepharitis (30%), retinal abnormalities (28%), hyperopia (26%), amblyopia (26%), nystagmus (18%), cataract (13%), and myopia (13%). Visual acuity was assessed, and the Teller acuity cards were the most useful method of examination. The patients younger than five year old had a higher prevalence of hyperopia than did those in other age groups; patients between five and 12 years old had a higher prevalence of astigmatism; and patients older than 12 years of age had more iris abnormalities, strabismus, and cataract. Myopia and myopic astigmatism were more common in the patients with cardiac malformations.

The authors concluded that the early diagnosis of the ocular abnormalities in patients with Down's syndrome, by using Teller acuity cards in assessing visual acuity facilitates the treatment of refractive errors, strabismus, and amblyopia and may minimize handicaps.

Corneal Sensitivity and Burning Sensation. *Comparing topical Ketorolac and Diclofenac*

Seitz B, Sorken K, LaBree LD, Garbus JJ, McDonnell PJ.

Arch Ophthalmol 1996;114:921-4

A major complaint of patients undergoing photorefractive keratectomy(PRK) is postoperative pain after cessation of the effect of the local anesthetic. Nonsteroidal anti-inflammatory drugs produce potent analgesic, antipyretic, and anti-inflammatory effects. The purpose of this study was to compare the effect of topical 0.5% ketorolac tromethamine and 0.1% diclofenac sodium on human corneal sensitivity and to assess the intensity of burning sensation at specific intervals after instillation.

The authors conducted double-masked parallel clinical study, which included eleven women and 4 men (8 white, 4 Hispanic, 3 Asian), between 22 and 60 years of age (mean [±SD], 34±10 years).
Repeated instillation of either ketorolac and placebo or diclofenac and placebo at 5-minute intervals was done.

The authors assessed corneal sensitivity before instillation, immediately after instillation, and after termination of drop application; and subjective evaluation of burning was done on a scale ranging from 0 (none) to 3 (severe) after each drop application.

The authors found that both diclofenac (P<.01) and ketorolac (P<.01) decreased corneal sensitivity significantly, while the placebo had no measurable effect. After administration of additional drops over time, the effect of diclofenac and ketorolac increased. After termination of the drug instillation, corneal sensitivity returned to baseline significantly slower (P<.01) in participants receiving diclofenac than in those receiving ketorolac. Ketorolac (P=.01) and diclofenac (P<.05) were significantly more effective in whites than in nonwhites. Mean burning sensation was mild, and there was no statistically significant difference between the 2 drugs on this measure (P=.12).

The authors concluded that the decrease in corneal sensitivity in normal human corneas is more pronounced and longer lasting with diclofenac than with ketorolac. Both drugs are well tolerated topically and may be useful for pain reduction after refractive corneal surgery.

Central and Peripheral Endothelial Cell Changes After Excimer Laser Photorefractive Keratectomy for Myopia.

Trocme SD, Mack KA, Gill KS, Gold DH, Milstein BA, Bourne WM.

Arch Ophthalmol 1996;114:925-8

Several studies have indicated that excimer laser photorefractive keratectomy can decrease myopia. The effect of excimer laser keratectomy on corneal endothelium, however, has only partly been explored.

The purpose of this study was to investigate changes in the human corneal endothelium after photorefractive keratectomy for treatment of myopia.

Specular microscopy of the central, paracentral, and peripheral zones of the corneas of 14 patients (12 of whom were previous contact lens wearers) was performed preoperatively and at 1,2,3,6, and 12 months after photorefractive keratectomy. The corneal endothelial cell density, coefficient of variation (CV) of the endothelial cell area, and percentage of hexagonal cells were assessed at each examination.

The central endothelial cell density was increased by 70% during the first 3 postoperative months (P<.05). In contrast, the peripheral cell density declined steadily by 6.9% during the first year (P<.01). The CV

of the cell area was decreased in all 3 zones, whereas the percentage of hexagonal cells was increased in the central and paracentral zones (P<.05).

The authors observed statistically significant changes in the central and peripheral endothelial cell densities and morphological features that could have resulted from photorefractive keratectomy; however, these changes also may have been explained by the discontinuation of contact lens wear. If such changes are contact lens-related, they could mask the effects of laser-induced damage to the central zone of the endothelium.

Endophthalmitis After Filtering Surgery With Mitomycin.

Greenfield DS, Suner IJ, Miller MP, Kangas TA, Palmberg PF, Flynn HW, Jr.
Arch Ophthalmol 1996;114:943-9

The purpose of the this study was to identify the incidence, causative organisms, and clinical outcomes of eyes with bleb-associated endophthalmitis after glaucoma filtering procedures with adjunctive mitomycin.

Retrospective analysis of 773 consecutive eyes was done that underwent glaucoma filtering surgery at the Bascom Plamer Eye Institute, Miami, Fla. The course of 609 eyes from 485 patients with a minimum of 3 months of follow-up were reviewed.

Mean follow-up was 16.0±11.5 months (range, 3-48 months). Of the 609 eyes, 13 (2.1%) developed bleb-associated endophthalmitis an average of 18.5±13.2 months after surgery (range, 1-45 months). The incidence of bleb-associated endophthalmitis was significantly greater after inferior trabeculectomy (7.8% per patient-year) than after superior trabeculectomy (1.3% per patient-year) by Kaplan-Meier estimates (P=.02, log rank test). The cumulative incidence was 13% for inferior limbal blebs and 1.6% for superior limbal blebs. Nine (69.2%) of the 13 eyes were culture positive. Streptococcus sanguis and Haemophilus influenzae (6/13[46.2%]) were the most frequent causative organisms. The mean increase in intraocular pressure after endophthalmitis treatment was 1.2 mm Hg, with a mean decrease in visual acuity of 1.42 log MAR units. Eight (61.5%) of the 13 eyes had final acuity of 20/400 or better.

The authors concluded that the incidence of bleb-associated endophthalmitis after guarded filtering surgery performed with adjunctive mitomycin is higher than the reported rate in eyes undergoing filtering surgery without the use of antifibrotic agents (0.2%-1.5%). Inferior limbal trabeculectomy carries the highest risk of infection. Eyes with mitomycin blebs maintained excellent filtration capacity. However, after treatment of the infection, the visual outcomes were generally poor.

Diffuse Choroidal Melanoma

Clinical features predictive of metastasis
Shields CL, Shields JA, De Potter P, Cater J, Tardio D, Barrett J.
Arch Ophthalmol 1996;114:956-63

Diffuse choroidal melanoma is an uncommon variant of uveal melanoma, representing about 4% to 5% of posterior melanomas. It is named for its horizontal, flat growth pattern, with thickness of the tumor measuring about 20% or less than the greatest basal dimension. Previous reports on diffuse choroidal melanoma have described a high rate of misdiagnosis of this tumor and an association of this tumor with extraocular extension and epithelioid cell type. Diffuse choroidal melanomas seem to have a poorer prognosis than other uveal melanomas.

The purpose of this study was to assess the clinical features that predict metastasis of diffuse choroidal melanoma.

A review was made of the patients who had been diagnosed clinically as having diffuse choroidal melanoma evaluated on the Oncology service at Wills Eye Hospital, Philadelphia, Pa. Of 3500 consecutive patients with choroidal melanoma, 111 (3%) had diffuse choroidal melanoma. Of these 111 tumors, the mean tumor base was 14.7 mm and the mean overall tumor thickness was 2.1 mm. The thickness-to-base percentage averaged 14.8%. The tumor had poorly defined margins in 39 patients (35%), orange pigment on its surface in 49 (44%), and a secondary serous retinal detachment in 76 (68%). Optic nerve invasion was clinically suspected in 2 patients (2%) and transcleral extension in 3 (3%). Initial management was enucleation in 36 patients (32%), plaque radiotherapy in 60 (54%), laser photocoagulation in 3 (3%), and observation in 12 (11%). During a mean follow-up of 5.3 years (median, 3.9 years), metastasis developed in 29 patients (26%). Using Kaplan-Meier survival estimates, the probability of metastasis developing was 16% at 3 years, 24% at 5 years, and 36% at 10 years. The clinical factors predictive of metastasis by univariate analysis included tumor basal dimension 18 mm or more (P=.002), poorly defined tumor margins (P=.03), transcleral extension (P=.003), and optic nerve invasion (P=.03). The clinical factors predictive of metastasis by multivariate analysis included basal dimension of 18 mm or more (P=.01), optic nerve

invasion (P=.03), and poorly defined tumor margins (P=.05).

The authors concluded that despite its relative flatness, diffuse choroidal melanoma carries a metastatic potential of 24% at 5 years. The risks for metastasis are greatest with increasing tumor base and poorly defined margins. Recognition of the clinical features of this tumor in the earliest stage and prompt treatment are encouraged.

Localization of Vascular Endothelial Growth Factor in Human Retina and Choroid.
Lutty GA, McLeod DS, Merges C, Diggs A, Plouet J.
Arch Ophthalmol 1996;114:971-7

The purpose of this study was to examine the distribution and relative levels of vascular endothelial growth factor (VEGF) in the nondiabetic and preproliferative diabetic human retina and choroid.

Immunohistochemical localization was performed on frozen sections from cryopreserved postmortem human tissue using a polyclonal antibody against VEGF and a streptavidin peroxidase system. Eyes from 5 subjects without diabetes and 8 subjects with diabetes were examined and analyzed using a 7-point immunohistochemical grading system.

The authors found that in subjects without diabetes, weak or no VEGF immunoreactivity was associated with retinal blood vessels. In subjects with diabetes, the authors found significantly increased immunoreactivity in the retinal vascular endothelium and blood vessel walls. Vascular endothelial growth factor immunoreactivity was also associated with intravascular leukocytes in subjects with and without diabetes. In the choroid of subjects without diabetes, immunoreactivity was almost exclusively associated with intravascular leukocytes, whereas in diabetic subjects, immunoreactivity was localized within choriocapillaris endothelium, choroidal neovascular endothelium, and migrating retinal pigment epithelium cells.

The observed increase in VEGF immunoreactivity in the diabetic retina and choroid suggests that VEGF may contribute to 2 well-documented events during retinopathy: increased vascular permeability and angiogenesis.

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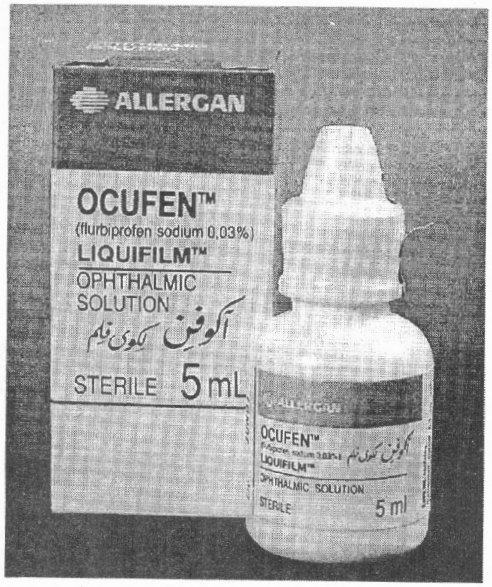

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1. Sabistan D, Tessler H., et al. Reduction in Inflammtion following catarac surgery by the nonsteroidal anti-inflammatory drugs, flurbiprofen: Ophthalmic Surgery Dec. 1987; Vol.18 No.:12.
2. Gieser D.K. et al: Flurbiprofen and intraocular pressure. Ann. of Ophthalmology, 1981: 13(7):831.
3. Palestine A. Ginsburg A., Abelson M., FDA sub-commitee presentation. Oct. 27, 1992.
4. Ariene Gwon MD. Elizabeth K Vaughen MD, CLAO Journal Vol. 20, No. 2. April 1994.

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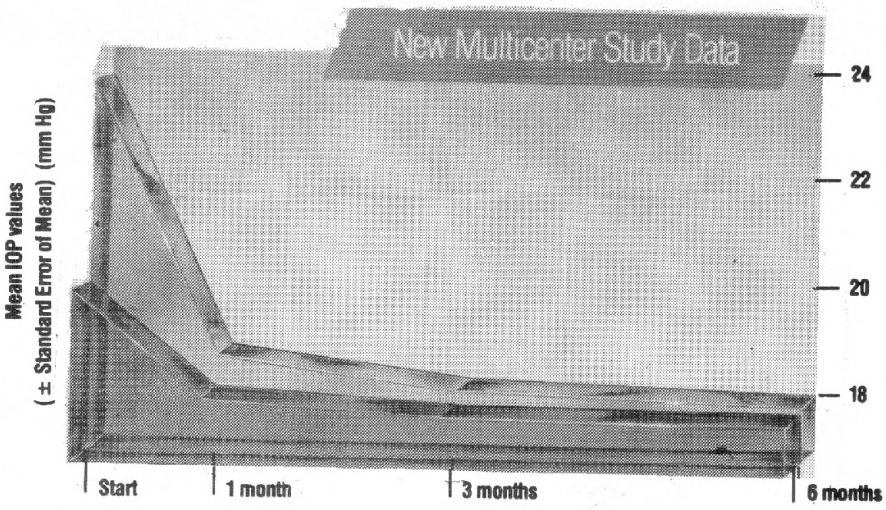

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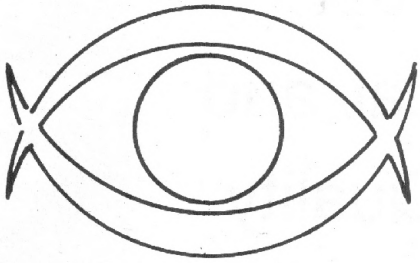

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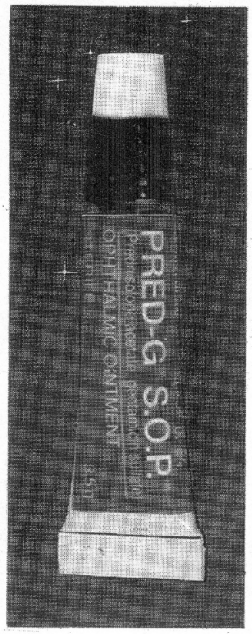

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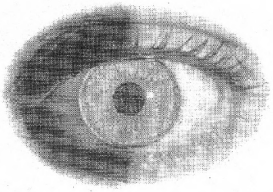

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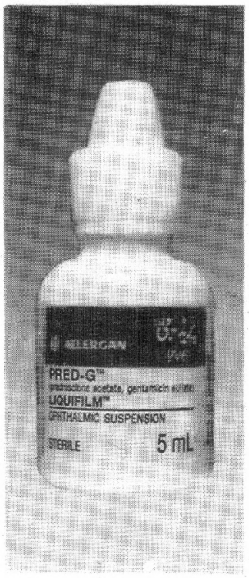

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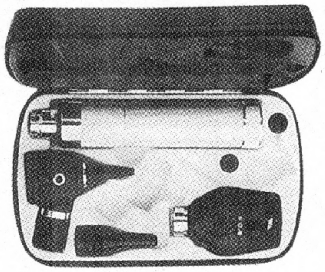
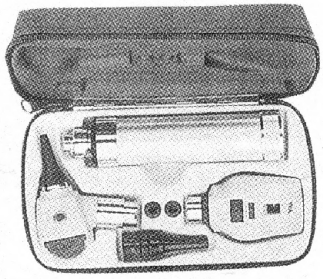


Super Delux Halogen diagnostic sets



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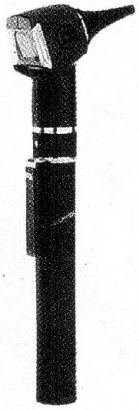
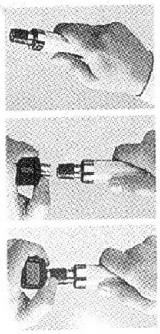


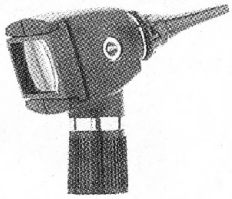
Otoscope

Retinoscopes

Streak Retinoscopes

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





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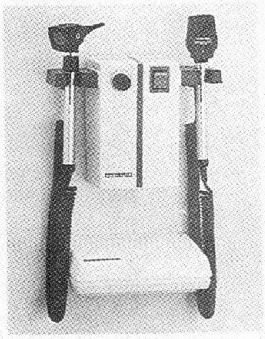

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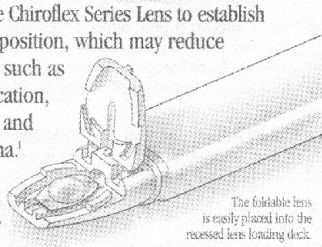

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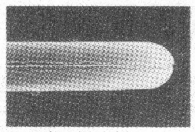
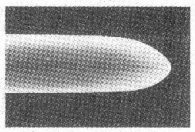


Non-Tumble-Polished Plate Haptic Lens. 100x magnification; side view of plate.



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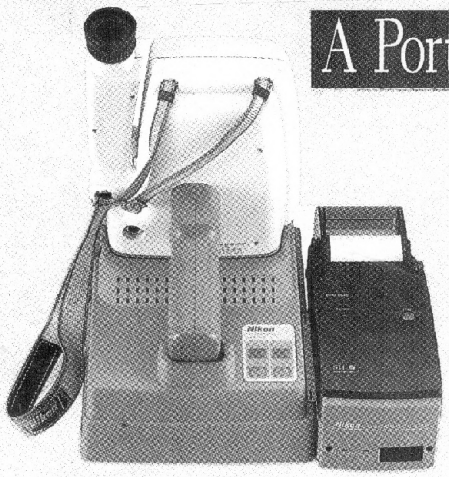

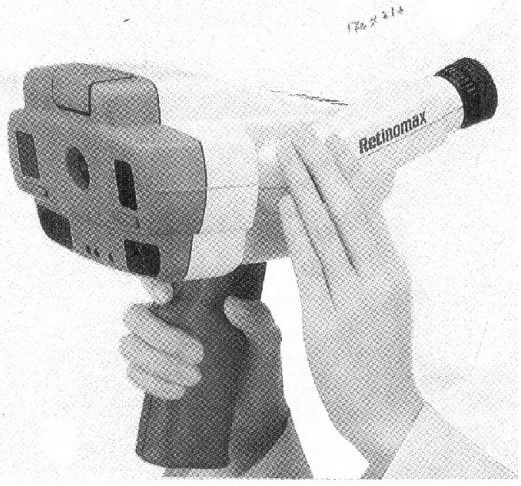

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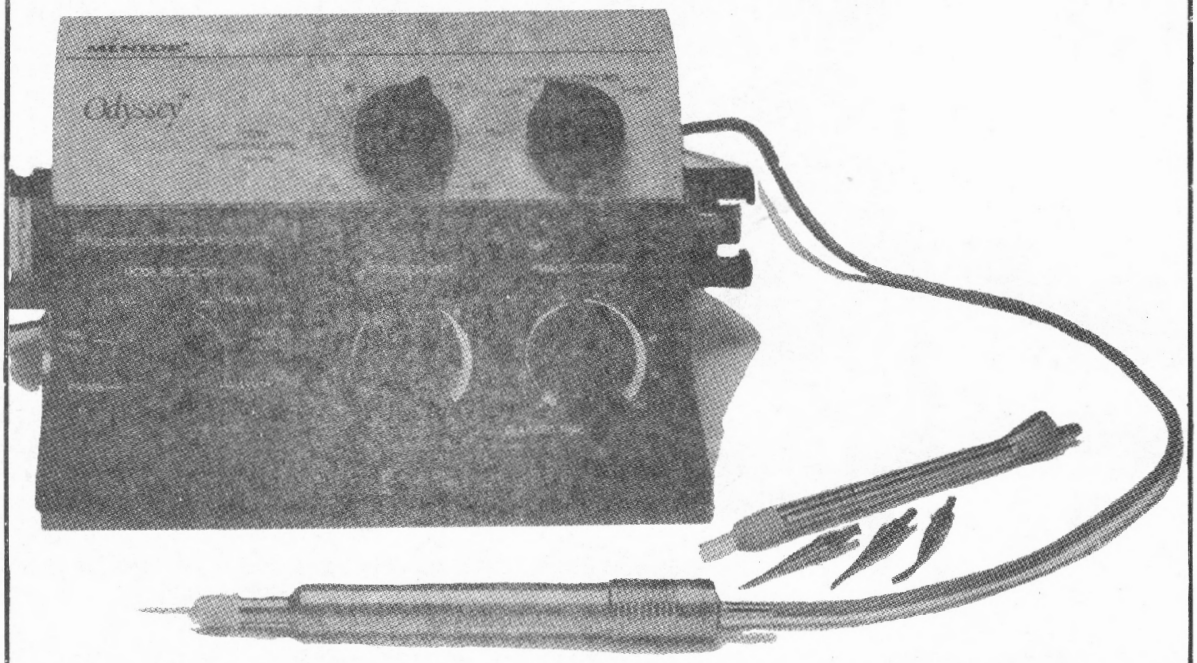

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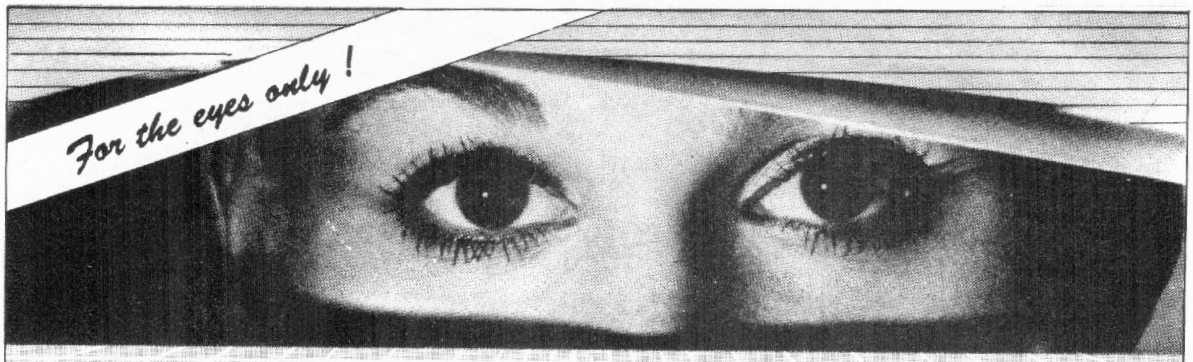

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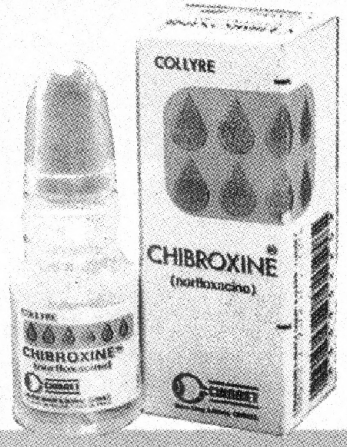

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At the molecular level three specific events are attributed to norfloxacin in E.coli cells: 1) inhibition of the ATP-dependent DNA supercoiling reaction catalyzed by DNA gyrase, 2) inhibition of the relaxation of supercoiled DNA, 3) promotion of double-stranded DNA breakage. Resistance to norfloxacin due to spontaneous mutation is a rare occurrence (range, 10^{-8}–10^{-11}). 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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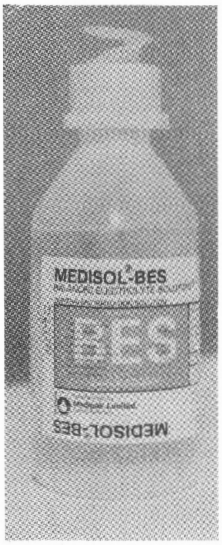

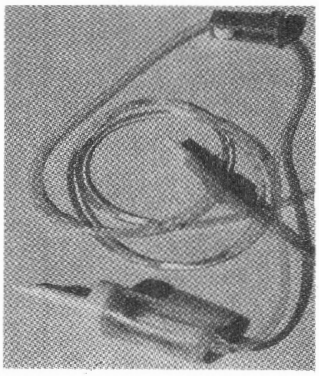

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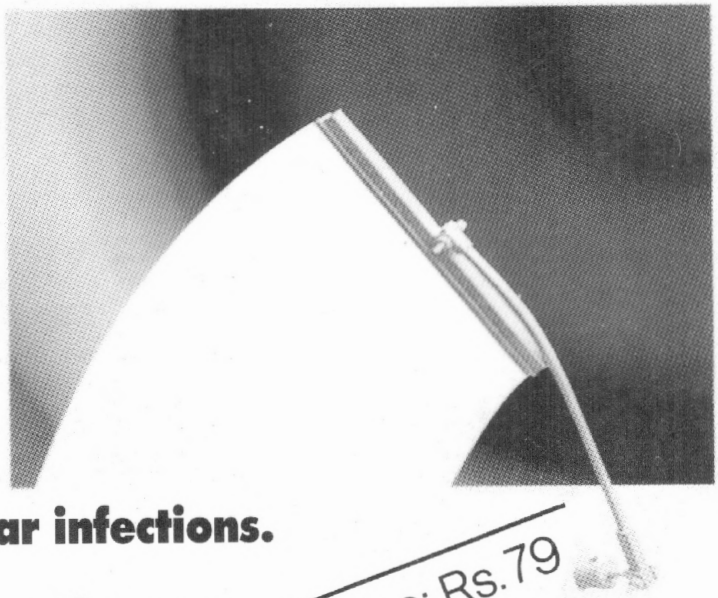

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Price: Rs.79 ONLY

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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