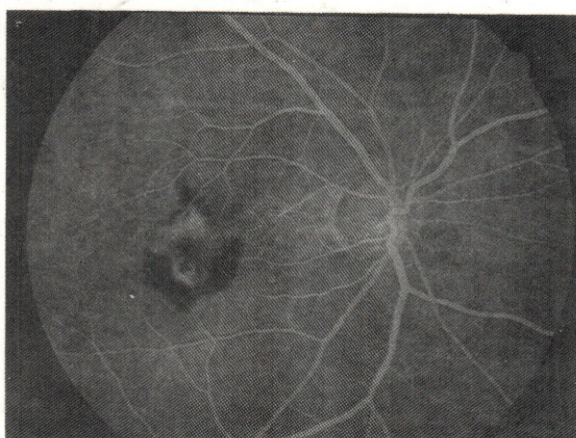
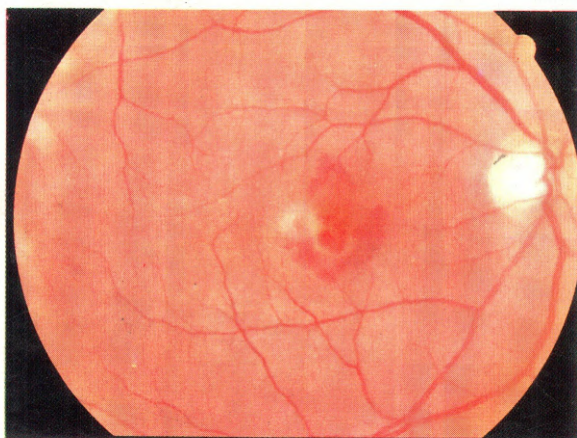


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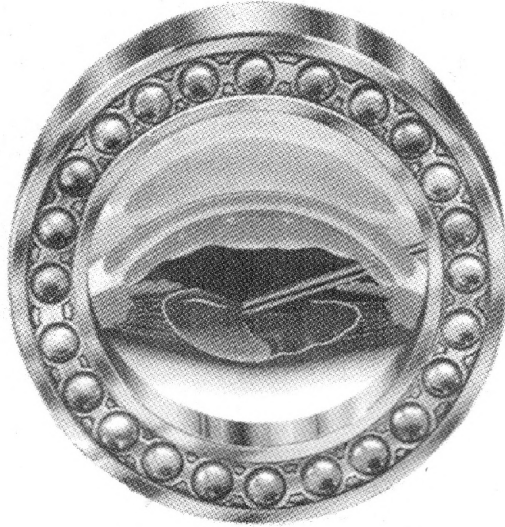


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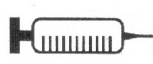
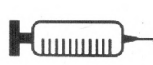
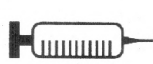
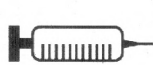
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<i>Editorial</i>

In Praise of Research

<i>See also pp..... 125-7</i>

Search is defined, in the dictionary, as the act of seeking or looking diligently. Search has been a trait of man since the very beginning. In fact it dates back to the very first pair of human beings. When Adam and Eve fell to the temptation of Satan, apparently it was in search of eternal life and an everlasting kingdom: "But Satan whispered evil/To him: he said, "O Adam!/Shall I lead thee to/The Tree of Eternity/And to a kingdom/That never decays¹?"

Gene for search having been integrated into their DNA makeup, in the scheme of things, and in the absence of research facilities, for there was no past experience to fall back upon, Adam and Eve decided to venture ahead, and ate of the Tree, even though they did have the knowledge from God Almighty in the form of an admonition: "Then We Said: "O Adam!/Verily, this (Ibless) is an enemy/To thee and thy wife:/So let him not get you/Both out of the Garden,/So that thou art landed/In misery²".

Had they done their homework on extant knowledge and utilized it appropriately, things would have been different today -- a lot different. But that was not to be!

Ever since Adam and Eve, man has been involved in "search". Right from the Neanderthal man, the African, the Chinese and the Australian ancestors of ours have been spreading far and wide in search of greener pastures, so to speak. Their collective experiences over the ages have led to a vast body and a tremendous store of knowledge.

Research is defined, again in the dictionary, as a diligent, systematic protracted investigation of some phenomenon or series of phenomena by drawing upon the previously stored knowledge. It is a sharing of information, so that one doesn't have to invent the wheel every time³. Attempts to develop a "perfect" operation, say for cataracts, are not just pure search for such a method, they involve a lot of research⁴.

The voyages of Columbus and Magellan were not merely searches for gold and spices. These were based on almost prophetic beliefs arising out of a tremendous amount of research and a firm belief and faith in their own and others' experiences and knowledge.

In fact the first voyage of Christopher Columbus⁵ is a prime example of research and has remarkable similarities to present - day research activities and methodology. Consider:

The "Aims and Objects" of Columbus' enterprise were to reach India by the sea route since that appeared to be a shorter distance than the travel over land. Before he conceived the idea he had gained enough expertise in the field of navigation and had established himself as a respected member of maritime community. In fact his was a head above the crowd of mariners of the time.

His "Review of the Literature" consisted of attending the meetings and defacto seminars at Genoa and Lisbon, the latter being the westernmost end of the known world and the natural meeting place of mariners bent on discovery. Here he rubbed shoulders with mariners, cosmographers and astronomers. The idea of reaching the east by sailing westward seems first to have been mooted by the Florentine cosmographer Paolo Toscanelli. Columbus also reviewed his own experiences of travels to Iceland and to the Portuguese trading post of Mina on the Gold Coast, the southernmost extremity of the then known world. The hints he received during those voyages (big canes, pine-tree trunks, pieces of wrought wood) reaffirmed his hunch about existence of lands beyond the western horizon. He also reviewed the printed literature, assiduously reading Cardinal d' Ailly's *Images of the World*, Marco Polo's account of the East and Ptolemy's (mis) conception of the extent of Asia. Together with Toscanelli's opinion about

reaching the east by traveling westward and the biblical beliefs, he elaborated a system of ideas. These were: (1) the earth is round; (2) the distance by land between the edge of the West (Spain) and the edge of the East ("India"- i.e., Asia) is very long; (3) the distance by sea between Spain and "India" is therefore very short; (4) the length of a degree is $56 \frac{2}{3}$ miles. These "miles" were not Arabic (1,975.5 meters), which would have made the distance remarkably accurate, but Italian (1477.5 meters), which made his equator about one-quarter too small. Columbus calculated the land distance between Spain and India to be 282 degrees; he was therefore left with only 78 degrees for the sea distance. The outcome of these errors was that "India" would be about 3900 miles (6,275 km) from the Canaries i.e., more or less where America happens to be. (Tells you something, doesn't it?, that some research needs to be taken, not for granted, but with a grain of salt!).

Now Columbus was ready to put his proposals up for "Grant Approval", since he needed huge funding for this project. He applied to the Court at Lisbon in 1484. He faced his first rejection, from the King of Portugal, who did not consider it "Cost-effective". He next applied to the court at Barcelona. By now Columbus had gotten wiser. Not only did he add the lure of prospects of gold from the east at lower rates through shorter trade route by sea to make his proposal more "Cost-effective", he also sought the help, first of the powerful duque de Medina Sidonia (who was "not interested") and then of duque de Medina Celi, who was more receptive, but considering the magnitude of the project, sent the proposal to King Ferdinand and Queen Isabella. The proposal was referred to the chief accountant in 1486 and later to a special commission of "learned men and mariners", headed by de Talavera, for "Peer Review" and to look into the "Feasibility" of the project. The commission made him wait for four years (typical red tape!) partly because of his own secretiveness and incoherence or ambiguities about the project. In those years Columbus did not just sit and twiddle his fingers. He went from city to city, following the Court. In Salamanca he became acquainted with Professor Diego de Deza, the tutor of Don Juan, the heir to the throne. Deza became his life-long standby and helped him much (connections are important, we learn!). But in 1490 the Talavera commission reported unfavorably on the project. Having lost the prospect of "Government Funding", Columbus went to La Rabida where he met two men who restored his faith: the friar-astronomer, Antonio de Marchena, and a pilot and shipowner from Palos, Martin Alonso

Pinzon. Columbus and Pinzon became partners and together they succeeded in getting "Grant Approval" for one million maravedis, with a 50-50 funding -- a typical example of modern-day "Private and Public Joint Venture".

The "Materials and Methods" of this project were "Santa Maria", the decked ship, and two caravels, "Pinta" and "Nina". Fully loaded with supplies and mariners, Columbus set sails from Palos on August 3, 1492 and finally westward from the Canary Islands on September 6. Surviving a near-mutiny crisis, Columbus reached Guanahani, one of the Bahama Islands, which the Spaniards renamed San Salvador, on October 12, 1492. Columbus enquired about the gold and came to believe that the larger island nearby, Cuba, was actually Cipango (Japan) and that's where the gold was born. Worries about making his discoveries known and about a possible defection by Pinzon to rush back to Spain and make the first claim -- akin to the present-day rush to "Publish", forced him to cut short his stay to study the area, make more discoveries and to learn. He thus sailed for Spain on January 16, 1493. He reached Portugal on March 4, 1493 and Spain on March 15, 1493.

Columbus compiled the "Results" of his study and presented these to the king and the queen of Spain. The beauty of the "Original Work" is that you set out with a goal in mind, like going to the Old World, and *voila* you end up discovering the New World! Any way, the project was well received during the "Discussions" at the Court. Such was the impact that Columbus was approved later for 3 more voyages to the west in the ensuing years. Nice "Conclusion" -- wasn't it?

What have we to learn from all this? We can learn how to do original research effectively and efficiently. We ought to have good background "knowledge" of the subject. After selecting a suitable topic for the study we must have a clear "Goal" in mind and gear all our efforts towards that goal. Whether we achieve that goal or end up with unexpected results, does not matter. We ought to give due diligence to a "Review of the Literature" and be selective in our choice of the previous studies to include only the most reputable and the most accurate ones in our fund of knowledge. We then must select the "Materials and Methods" for our study very carefully. Astute observations must be made during the period of the study. "Results" ought to be compiled meticulously. "Discussion" of the results

should be done effectively and vehemently. The results should be compared with other researchers' findings based on the "Review of the Literature". A "Conclusion" should, in the end, be given summarizing the outcome of the project.

"Every one involved in research knows all that!", one may argue. Granted; but this is written not just to outline how to conduct a study, though it can be helpful for the novice, but also to apprise all and sundry in the field of research in Pakistan about an important undertaking on the part of the Ophthalmological Society of Pakistan (OSP).

As discussed in a related article in this issue of the Journal, the current President of the OSP has outlined the establishment of the OSP Research Foundation, its terms of reference and availability of Research Grants for those who are all geared up for research, but for lack of financial resources. Research and Development (R & D) is not always carried out in institutes of higher learning alone. It can be carried out anywhere where there is a will. And "will" alone is not enough. One needs financial backup too--even in the institutes of higher learning. Hence the partnership of these and the government, business, industrial and pharmaceutical concerns. These partnerships have flourished not only in medical and other scientific fields in times of peace but also at times of war. If research is your cup of tea, consider it

a call to arms, not a call for alms, if you know what I mean. The cup of tea will be as sweet as the amount of sugar put in it. And the sugar will be your sweat and blood. This call is for all those who, like Columbus and Magellan, are itching to go out to sail the uncharted seas, so to speak. They ought to get their horses ready and harnessed (if they prefer the land route!), for soon they will be asked to apply for research grants. As a matter of fact, all of us ought to gird up our loins lest we fall by the wayside while the world passes us, by zooming along the information superhighway. We are way behind in the field of research as it is.

Consider this piece also as a plea for donation to the OSP Research Foundation. Your funds shall be utilized in a noble cause.

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Jehangir Durrani
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Carcinomata of Eyelids Presenting as Recurrent Chalazia

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ABSTRACT

Histopathological examination of three patients with recurrent chalazia operated upon by us in 1996 at Jinnah Postgraduate Medical Centre (JPMC), Karachi, showed sebaceous cell carcinoma in two and squamous cell carcinoma in one. Sebaceous cell carcinoma was resected with 5 to 8mm and squamous cell carcinoma with 1.0cm of apparently healthy margin. Reconstruction of eyelids was done by different surgical techniques to get acceptable cosmetic and functional results.

The two patients with sebaceous cell carcinoma did not show any recurrence in one to one-and-a-half-year of follow-up. The patient with squamous cell carcinoma did not have any sign of local recurrence but did develop one enlarged submandibular lymph node ten months after surgery. Fine needle aspiration biopsy was done and it proved to be a metastatic tumour.

Since it is not feasible to undertake histopathological examination of the tissue after every chalazion surgery, it is mandatory in cases of recurrent chalazion to have an early diagnosis for better management of life-threatening tumours.

INTRODUCTION

Chalazion is a localized lipogranulomatous inflammation involving sebaceous glands of the eyelids, Meibomian glands or glands of Zeis. It may be caused by inflammatory, infectious or neoplastic conditions involving lid margins¹. Squamous cell carcinoma is the second most common malignancy accounting for up to 9.0% of periocular cancers². Men are more commonly affected than women, the ratio being 2:1. Lower lid is more commonly affected than the upper lid, the ratio being 1.4:1. Precancerous conditions are senile keratosis, radiation keratosis, Bowen's disease, burn scar, and chronic inflammatory lesions, yet this tumour can start de novo. The duration from the time of onset to the time of diagnosis is approximately nine months to one year³. Histopathologically it arises from the prickle cell layer. The hallmark is extension beyond dermoepidermal basement membrane⁴.

Sebaceous cell carcinoma occurs in 1-1.5% of all eyelid malignancies. Interestingly, it is very common in the Chinese population--up to 33% among all eyelid malignancies⁵. Women are more commonly affected than men. Average age is 60-69 years. Upper lid involvement is twice as common as the lower. Cases of sebaceous cell carcinoma are on record in patients having bilateral retinoblastoma who had

received radiotherapy. Clinical presentation may be like a nodular mass or a chalazion. Loss of eyelashes in the neighboring area is an important sign. This is due to the loss of hair follicles in the anterior lamella of the tarsal plate due to cell infiltration. Unilateral blepharoconjunctivitis (Masquerade Syndrome) is another mode of presentation⁶. Besides the usual mode of spread of this tumour, a unique type of spread of sebaceous cell carcinoma is intraepithelial. The tumour cells spread down along the ducts of the primarily involved Zeis and Meibomian glands and thereafter to the conjunctival epithelium with progressive intraepithelial extension farther away (epidermotropism)⁷.

PATIENTS AND METHODS

All the patients were males and the location of tumours in all of them was upper lid. All of them were operated upon four to six times at different centres within the preceding three to nine months for chalazion (Table-1). One patient with sebaceous cell carcinoma was 42 years of age and needed excision of 30% of the right upper lid, lateral canthus and part of the adjacent lower lid. Reconstruction was done by canthotomy, cantholysis, Tenzel's flap along with lateral canthoplasty. Two years of follow-up did not show any sign of recurrence (Figure-1).

Table 1: Patients operated on for recurrent chalazion in 1996 at JPMC, Karachi.

Diagnosis	Site	Age	No. of previous surgeries	Last Surgery	Surgical technique Utilized
Sebaceous cell carcinoma	Right upper lid.	42	4	3 months ago	Right canthotomy, cantholysis Tenzel's flap, and lateral canthoplasty.
Sebaceous cell carcinoma	Right upper lid	65	6	9 months ago	Total upper lid resection and reconstruction by Cutler-Beard technique
Squamous cell carcinoma	Left upper lid	38	5	6 months ago	Total upper lid resection and reconstruction by Mustarde's technique

(a) Eyes Open

(b) Eyes closed



Fig-1: Six weeks postoperative photographs of the patient who underwent 30% of right upper lid resection.

The second patient, sixty-five years of age, with sebaceous cell carcinoma, had total right upper lid resection. Reconstruction of the lid was done by Cutler-Beard technique (Figure-2). One-and-a-half year of follow-up did not show any sign of recurrence.

The third patient with recurrent chalazion was a young man of thirty-eight (Fig-3). His six-month old biopsy report showed squamous cell carcinoma.

Total left upper lid resection was done followed by reconstruction by Mustarde's technique. The patient had excellent cosmetic and functional results. Ten months later he developed left submandibular lymph node enlargement due to metastatic tumour. Block dissection was done by an E.N.T surgeon. The tumour was excised completely with no postoperative disability. One year of follow-up showed no evidence of recurrence of the tumour locally (Figures 4 and 5).

(a) Eyes Open



(b) Eyes closed



Fig-2: Six weeks postoperative (after second surgery) photographs after total right upper lid resection and reconstruction by Cutler-Beard technique. Lower lid shows recent surgical wound due to lid shortening.

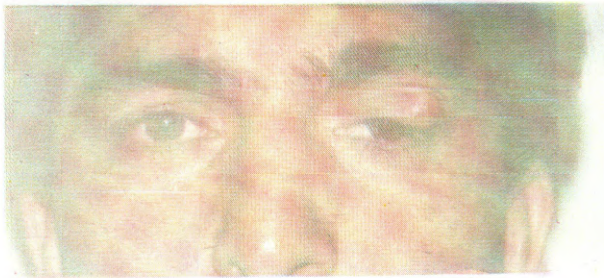


Fig-3: Preoperative photograph of the patient with recurrent chalazion. Biopsy revealed squamous cell carcinoma.



Fig-4: Same patient as in figure-3, four months postoperative.

RESULTS AND DISCUSSION

The tumours of the patients with sebaceous cell carcinoma were resected with 8-10mm healthy looking margin. One of them had four and the other had six previous surgeries done for chalazia. Figure-6 shows resected lid of the patient shown in Fig-2. Decreased number of cilia is due to destruction of their hair

follicles by malignant cells. Both of these patients had excellent cosmetic and functional results.

The third patient was operated on for chalazion five times before presenting at our centre. As he had sebaceous cell carcinoma of non-keratinizing type, he needed wider resection. This patient did not show any local recurrence. A submandibular node became palpable ten months after surgery. Fine needle



Fig-5: The same patient as in figures-3 and 4 eleven months postoperative. Scar of block dissection on the left side of the neck.

(a) Skin aspect

(b) Conjunctival aspect

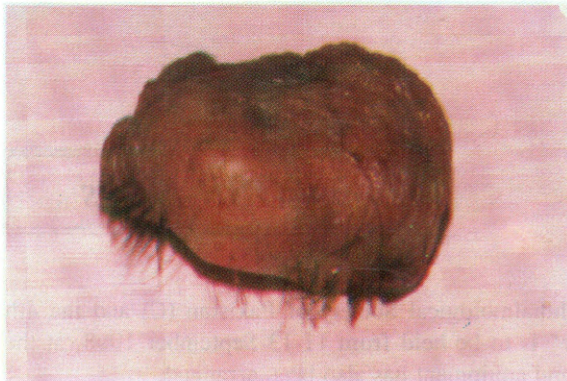


Fig-6: Resected lid of the patient in figure-2, showing decreased number of cilia.

aspiration biopsy showed metastatic tumour. For resection of these tumours Moh's micrographic surgery is preferred utilizing frozen section control⁸.

Radiotherapy is an alternative for those who refuse surgery. Squamous cell is more resistant to ionizing radiation than the basal cell carcinoma.

Various disadvantages of radiotherapy are the lack of histologic control and that the tumour margin may extend beyond the field of treatment. Secondly, post-irradiation complications of periorcular tissues and the globe can be severe and may pose a potential threat to vision, such as lid necrosis, keratitis, cataract, retinopathy, and optic atrophy⁹.

CONCLUSION

Since it is not feasible to undertake histopathological examination of tissue after every chalazion surgery, it is mandatory in cases of recurrent chalazion to have an early diagnosis and management of life-threatening tumours.

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OSP News

A Joint Meeting, the "21st Annual Congress of the Ophthalmological Society of Pakistan (C) and the 4th International Meeting, Islamabad Congress of Ophthalmology" is to be held from 11-13 September 1998, at the National Library of Pakistan, Islamabad. Exhibition of drugs and equipment has also been arranged.

Registration fee is Rs. 1500/- for senior ophthalmologists and Rs. 750/- for junior ophthalmologists. Foreign delegates: US \$ 100/-.

For booking of stalls/advertisements in the Souvenir/Abstracts / Registration and for other information, please contact the Congress Secretary/President at: Congress Secretariat, No: 267-A, St: 53, F-10/4, P.O. Box: 1555, Islamabad. Phone: 051-299113 Fax: 051-299113 and 440361, 413991.

Survey of the Practice of Cataract Surgery Under Local Anaesthesia in England and Wales

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ABSTRACT

I conducted a survey of the current practice of cataract surgery under local anaesthesia in England and Wales in 1993. The survey revealed that 12 consultants had encountered deaths which may have been the result of local anaesthesia, while 78 consultants had encountered life-threatening complications. A small majority felt that an anaesthetist should be present at all cataract operations performed under local anaesthesia.

INTRODUCTION

I conducted a survey in 1993, which was aimed at enquiring into some aspects of the current practice of cataract surgery under local anaesthesia (L.A), assessing the rate of serious complications as far as possible. In this paper I will present the findings relevant to the practice of surgery in Pakistan.

PATIENTS AND METHODS

A questionnaire (Table-1) was developed and sent to 499 consultants in England and Wales. 18 surgeons had either retired or did not perform cataract surgery.

Of the remaining 481 consultants, 321(66.7%) sent a reply. A few surgeons reported that some of the questions were ambiguous.

Practice of surgery under local anaesthesia

128 surgeons had a separate L.A. list. Of these, only 28 (21.8%) had an anaesthetist listed to be present with them (Fig-1).

In reply to the question whether an anaesthetist was actually present during a local anaesthetic procedure, there were 139 positive replies.

156(48.6%) surgeons used peribulbar block only, 94(29.2%) surgeons used retrobulbar block only, 59 (18.3%) used both techniques, while 10 surgeons used other methods.

Complications encountered over a surgeon's lifetime

12 surgeons reported that they had seen a death as a result of local anaesthetic. 27 consultants reported patients developing a permanent physical disability

(C.V.A., myocardial infarction) which could have been the result of a local anaesthetic (Fig-2).

78 surgeons reported having encountered life-threatening complications as a result of local anaesthesia. Of these 78 surgeons, 41 felt that they had had complications which could have been prevented by having an anaesthetist on hand.

Survey of current practice

38 surgeons reported that all their patients had the local anaesthetics administered by the anaesthetist. 154 answered that the anaesthetist administered some of the blocks. 163 reported that the anaesthetist administered none of the blocks (Fig-3).

57(17.7%) surgeons regularly sedated their patients having local anaesthesia. 276(85.9%) had a pulse oximeter attached to the patient when a local anaesthetic block was given, while 39(12.2%) did not. Four used a pulse oximeter only occasionally. During the administration of a block, 203(63.3%) used a cardiac monitor, while 105(32.7%) did not (Fig-3).

132(41.1%) regularly had I.V. access when a local anaesthetic was administered, while 171(53.7%) did not. 152(47.3%) had intravenous access at the time of surgery, while 153(47.66%) did not.

173(53.8%) surgeons felt that an anaesthetist should be present when a local anaesthetic was administered, while 140(43.6%) felt that the presence of an anaesthetist was not required.

127(39.5%) said that all patients selected for local anaesthetic should have routine investigations done, while 172(53.5%) considered that these were not necessary.

Fig-1:		Yes	No
Do you have a separate local anaesthetic major eye surgery list?		128	193
Is an anaesthetist listed to be present during your local list?		28	
Is an anaesthetist actually present during your local anaesthetic procedure?		139	156
Local anaesthetic technique used:	Retrobulbar block	94	
	Peribulbar block	156	
	Both	59	
	Other techniques	11	
Fig-2:		Yes	No
Have you ever had a death as a direct result of a local anaesthetic?		12	309
Have you ever had a life-threatening complication as a result of a local anaesthetic?		78	
As the result of a local anaesthetic, have you ever had a patient suffering from permanent physical disability (C.V.A., myocardial Infarction)?		27	
Have you ever had a complication with a local anaesthetic which you feel could have been prevented by an anaesthetist if one had been present?		78	
Fig-3:		Yes	No
Do you regularly undertake routine investigations on your patients selected for local anaesthesia?		127	184
Does your anaesthetist administer some of your local anaesthetics?		154	
Does your anaesthetist administer all of your local anaesthetics?		38	
Do you sedate your patients undergoing local anaesthetic surgery?		57	229
When you administer a local anaesthetic, do you have your patient attached to a pulse oximeter?		276	39
When you administer your local anaesthetic do you have the patient attached to a cardiac monitor?		203	105
Does your patient have an I/V line in situ when a local anaesthetic is given?		132	171
Does your patient have an I/V line in situ when you operate?		152	153
Fig-4:		Yes	No
Do you feel that an anaesthetist should be present during cataract surgery undertaken under local anaesthesia?		173	140
Do you feel that patients selected for local anaesthesia should have routine investigations done?		127	172

DISCUSSION

What constitutes safe practice in cataract surgery under local anaesthesia is a hotly debated issue. I sent a questionnaire to assess what was currently considered to be the safe practice. We had a 66% response which is in line with the national cataract survey¹. It is also difficult to know for certain the precise number of patients involved in this survey. Despite this, we feel that some interesting facts have come to light which are worthy of discussion.

Twelve surgeons reported deaths which they felt might have been the result of local anaesthesia. One surgeon reported that death occurred 10 minutes after the injection of local anaesthetic. The survey was conducted anonymously, therefore, we do not have the means to enquire further into the cause of death of these patients.

It should be kept in mind that this is mainly an elderly group of patients (mean age 75.9 years). As such, some of them were having local anaesthesia because general anaesthesia was considered unsafe for them on medical rounds².

Only 78 surgeons reported that they had encountered life-threatening complications as a result of a local anaesthetic. At a glance this figure appears rather small. Wittpenn et al³ reported respiratory arrest in 9 patients out of 3123 patients having a retrobulbar block (duration of apnea 5 to 55 mins). Seven of the 888 patients, who had received 4% lignocaine, had a respiratory arrest. In contrast, of the remaining 2235 patients who were given 2% lignocaine, only two developed respiratory arrest. Nicoll et al⁴ reported that 16 out of 6000 given a

Table 1: Questionnaire.

Do you regularly do cataract surgery under local anaesthetic?
 What percentage of your cataract work is under local anaesthetic?

- less than 30%
- around 50%
- 70% or more

Do you have a separate local anaesthetic cataract list?
 Is an anaesthetist listed to be present during your local list?
 Is an anaesthetist actually present during your local anaesthetic procedure?

What local anaesthetic technique do you use?

- a. Peribulbar block
- b. Retrobulbar block

Have you ever had a death as a direct result of a local anaesthetic?
 Have you ever had life-threatening complication as a result of a local anaesthetic?

Have you ever had a complication with a local anaesthetic which you feel could have been prevented by an anaesthetist had one been present?
 Do you regularly have a full physical examination done on your patients selected for local anaesthesia?
 Do you regularly have routine investigations [CBC, Electrolytes and E.C.G.] done on your patients selected for local anaesthesia?
 Does your anaesthetist give some of your local anaesthetics?
 Does your anaesthetist give all of your local anaesthetics?
 Do you have a pulse oximeter on when you give a local anaesthetic?
 Do you have a cardiac monitor on when you give a local anaesthetic?
 Do you have an I/V line in situ when you give a local anaesthetic?
 Do you have an I/V line in situ when you operate?
 Do you feel an anaesthetist should be present during cataract surgery done under local anaesthesia?
 Do you feel that patients selected for local anaesthesia should have routine investigations done?

retrobulbar block developed signs of CNS involvement. However, Hamilton et al⁵ reported 14 instances of CNS involvement out of 12000 blocks. It should also be noted that the majority of patients in Wittpenn et al's group³ had received sedation.

This survey reveals that even in England and Wales there is a tendency for the anaesthetist not to be present when a local anaesthetic is given in a combined general/local anaesthetic list (Fig-1). If an anaesthetist is the most suitable person to monitor the patient, should he not also administer the local anaesthetic? It would require a large amount of additional training. In the early stages this might lead to higher ocular complication rates^{6,7}.

The survey demonstrated that peribulbar block was the most commonly administered ocular block technique, possibly because it is considered safer. We could find only one report in which CNS involvement was recorded following a peribulbar block⁵. This is in contrast to retrobulbar block for which there is a plethora of reports. It is noteworthy that in the Hamilton et al series⁵, while one patient in 6765 developed signs of CNS involvement following a peribulbar block, 14 out of 5235 patients who had retrobulbar block had developed signs of CNS involvement⁹. However, local complications for peribulbar block are increasingly being reported^{6,8-11}.

Although a majority of surgeons had patient monitoring devices in place when a L.A. block was used, a significant number (105 out of 308) did not (Fig-3). They offer valuable information in times of crises but only an expert can act on that information.

It was interesting to note that an even number of surgeons (152 vs 153) did and did not have intravenous access even when the patients were being operated on. Having intravenous access is a basic resuscitative measure and should be a routine measure in all theatres.

When we looked at the practice of the 78 surgeons who reported that they had encountered life-threatening situations, we found that 40 routinely had intravenous access at the time of the administration of the local anaesthetic, while 34 did not. We can only speculate as to the reasons why some of them considered having intravenous access unnecessary. Perhaps they think that the complications are so infrequent that they do not justify more needles into the patient.

The opinion was divided on the need for the anaesthetist to be present. While a small majority (173 vs 140) thought that the anaesthetist should be present, in practice only 118 out of the 173 i.e 68% were enforcing their opinion.

In conclusion, we have found cataract surgery under local anaesthesia to be an extremely safe practice. Whether the presence of an anaesthetist to prevent and treat local anaesthetic complications is necessary or cost-effective, requires further discussion. The survey shows that a consensus of opinions has not developed yet. We suspect that it will be a matter of availability of resources and individual preferences.

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Review of 1159 Cases of Retinal Detachment Surgery

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ABSTRACT

Reported in this article is a review of 1159 cases of retinal reattachment surgeries performed by the author at "Al-Shifa Trust Eye Hospital" between the period of March 1992 and June 1997. All cases included in the study had a rhegmatogenous component.

There were 87(7.5%) children under the age of 15 years. There were 454(39.17%) females and 705(60.82%) males. Sixty-seven (5.78%) of the patients had bilateral retinal detachment. The main group comprised aphakes, 622(53.66%), 173(14.9%) were pseudophakes, 136(11.7%) had myopia of variable degree, 74(6.4%) had a history of blunt trauma, 150(12.9%) had idiopathic rhegmatogenous retinal detachment probably related to posterior vitreous detachment, 10(0.86%) patients had a corneal graft done in the past, 4 patients had a chorioretinal coloboma with a rhegmatogenous component and 23(1.98%) patients had giant retinal tears. 619(53.4%) patients underwent conventional retinal reattachment surgery, 14(1.20%) patients had pneumatic retinopathy, while the rest had a combined vitrectomy and retinal detachment surgery done. 138(11.9%) patients had primary vitrectomy done. 162(14%) patients had reattachment surgeries done elsewhere.

Silicone oil was used as internal tamponade in 315(27%) cases. Other agents used for internal tamponade were sulphur hexafluoride gas (SF₆) and air. The final anatomical success rate was around 84%. 6/12 or better vision was obtained in 212(18.3%) patients. The main cause of surgical failure in this study was proliferative vitreoretinopathy (PVR) which was present in 31% of the patients. Other pre-or postoperative poor prognostic indicators were uveitis, vitreous hemorrhage and hypotony.

The main purposes of the study were to assess the results in the light of various other studies, to identify poor prognostic factors in our setting, to touch upon the recent trends in vitreoretinal surgery and to highlight preventive measures.

PATIENTS AND METHODS

This retrospective study was done at Al-Shifa Trust Eye Hospital, Rawalpindi. All cases included in the study were operated on by the author during the period of March 1992 to June 1997. All cases with tractional retinal detachment due to diabetes and other vasculopathies and those due to perforating injuries were excluded. All the patients included in the study were either referred from other hospitals or were referred from the hospital's general outpatient departments. A detailed history regarding the eye and general problems was taken, followed by a detailed eye examination. A fundus drawing was made whenever possible. All eyes were examined using an indirect ophthalmoscope. A three-mirror lens and a wide-angle laser lens were used whenever needed. A special mention was made of the degree of proliferative vitreoretinopathy (PVR) whenever present, using the latest classification¹. Cyclopentolate 1% and Phenylephrine 10% were frequently used for

dilation. In case of previous reattachment surgery a special note was made of the location of the explant and the degree of vitreous base support along with the location in relation to the tear. All reattachment surgeries were preferably performed under general anesthesia but a significant number of cases were operated on under local anesthesia using retrobulbar/peribulbar blocks. Patients with no evidence of PVR were operated on using the standard D.A.C.E procedure (drainage, air cryo and explant), while patients with PVR and nearly all repeat surgeries underwent a three-port pars plana vitrectomy. Head positioning was done if an internal tamponade was used. The agents commonly used for internal tamponade were air, sulphur hexafluoride gas (SF₆) and silicone oil (1000 or 5000 centistokes). An inferior iridectomy was performed in cases where indicated.

Silicone oil, if used, was removed within 6-8 weeks. However, it was left for a longer period in

certain cases, e.g., those with hypotony. A segmental or complete encirclement was done depending on the underlying pathology. An ultrasound was performed in cases with hazy media or lenticular opacities. The main indications for vitrectomy in this series were:

- Significant vitreous opacities obscuring the view.
- Proliferative vitreoretinopathy Grade B or C.
- Preoperative associated vitreous hemorrhage
- Posterior retinal breaks
- Giant tears
- History of corneal graft
- Previously failed reattachment surgery.

Silicone oil was removed early when it was causing glaucoma or had corneal touch. A silicone sponge or a silicone tyre were used whenever necessary. Endolaser was used where needed.

RESULTS

The follow-up was in the range of three months to four years. Out of a total of 1159 patients there were 454(39.17%) females and 705(60.82%) males with 87(7.5%) children under the age of 15 years. The ages were in the range of 6 years to 72 years. 67(5.8%) of the patients had bilateral retinal detachments.

The main group of patients comprised aphakes, 622(53.7%). 173(14.9%) patients were pseudophakes. 136(11.73%) patients had myopia varying from -3.00 diopters to -24.00 diopters. 74(6.4%) patients had history of blunt trauma and presented with retinal dialysis, oral and pre-oral tears, giant tears and macular holes. 150(12.9%) patients had idiopathic retinal detachments, probably related to posterior vitreous detachments. 4(0.4%) patients had chorioretinal colobomas with associated retinal detachments.

619(53.4%) patients underwent conventional reattachment surgery. 162(14%) patients had retinal reattachment surgery elsewhere. 53(45.8%) cases had combined vitrectomy and reattachment surgeries. Silicone oil tamponade was used in 315(27%) of the cases. Combined vitrectomy with silicone oil tamponade without an explant was performed in 53 cases. 138 patients had primary vitrectomy procedures performed.

In repeat surgeries the buckle was revised in 17 cases (1.46%). The most common causes of detachment were inadequate support and the tear/holes being off the buckle as well as PVR.

A vitrectomy was performed in 149(91.9%) of the referred cases. Most of the patients that underwent a vitrectomy procedure had a total retinal detachment. The anatomical success rate was 84% after primary or repeated surgeries. 913(78.7%) cases required one surgical procedure. 193(16.6%) of the cases required two surgical procedures. 53(4.6%) required more than two surgical procedures. The incidence of any degree of PVR in this series was about 31%. The final visual acuity was 6/12 or better in 18.3%(212 cases). It was between 6/60 and 6/12 in 39.9% (456 cases) and between H.M. to 6/60 in 60.2% (698 cases).

The main causes of poor visual acuity postoperatively were cataracts, epiretinal membranes, cystoid macular edema and macular cysts or holes.

Silicone oil-related complications included:

- Oil in the anterior chamber
- Blocked inferior iridectomies resulting in elevated intraocular pressure.
- Corneal touch causing endothelial decompensation.
- Silicone oil-related fibrous proliferation leading to the so-called self-relieving retinotomies.
- Cataracts.

23 patients had giant retinal tears. A giant tear was defined as a circumferential retinal break of 90 degrees or more. All giant tears required vitrectomy, an explant and silicone oil tamponade. 15 of the retinas have remained attached over a follow-up period of 27 months. Silicone Oil was removed in 9 cases.

DISCUSSION

Results of retinal reattachment surgery have improved significantly since Gonin first described the pathogenesis and its treatment in 1904². However, even before his contribution towards the understanding of retinal detachment, several other theories regarding the pathogenesis had already existed, e.g., abnormal enlargement of the globe, vitreous traction, leakage from choroidal vessels, and hypotony. These theories were the result of research work of Coccius in 1853³, von Graefe 1854⁴ and de Wecker in 1870⁵. Leber was the first to implicate vitreous traction to be responsible for retinal tears.

Although Helmholtz's invention revolutionized examination of the fundus, it was not until the indirect ophthalmoscope was invented by Ruete that a fairly

detailed examination of the fundus was possible. A binocular reflex-free ophthalmoscope was introduced by Gullstrand in 1912 providing a good erect view of the retina.

Rosengren in 1938 reported that the detached retina could be put back in place with the use of intraocular air alone. This technique later lost its place to the Custodis technique of scleral buckling procedure in 1949. Machemer's approach of pars plana vitrectomy revolutionized the concept of intraocular surgery and the management of increasingly complicated cases. He first described this technique in 1971⁶.

Improvement of surgical techniques, such as refinement of buckling procedures, use of an intraocular tamponade and vitreous surgery, have made it possible to successfully treat increasingly complex retinal detachments. The anatomic success rate has improved from 49%, as first reported by Gonin in 1929, to over 90%, as reported by Lincoff⁷, Wilkinson and Bradford⁸. Proliferative vitreoretinopathy (PVR) is now considered to be the single most important factor responsible for surgical failures.

The basic theory behind all retinal detachments is to close the retinal breaks and relieve all vitreoretinal tractions. Retinal reattachment surgery, although complicated, is being performed as a routine procedure in many hospitals across Pakistan. The anatomic success rate varies from hospital to hospital and from case to case.

The present study was carried out at the "Retina Clinic" by the author at Al-Shifa Eye Hospital, Rawalpindi, with the following aims and objectives:-

- To assess the results.
- Identify poor prognostic factors in a given setting
- To highlight the basic principles of retinal surgery.
- To touch upon some preventive aspects and recent trends.

The main category of patients in the study were aphakes (622) and pseudophakes (173). This is to be expected in a country like Pakistan where about 70% of blindness is due to cataracts. It is well known that cataract extraction is associated with an increased incidence of retinal detachment, especially if an intracapsular technique has been adopted. In 1973

Scheie et al⁹ observed that this incidence ranged from 0.4% to 3.5%. In their series of 5541 cases of intracapsular cataract extraction (ICCE) the incidence was 2.2%. An incidence of 1.7% has been reported by Smith et al¹⁰ following extracapsular cataract extraction (ECCE) and posterior chamber intraocular lens implant. Studies indicate that 50% of retinal detachments occur within 1 year of cataract extraction. ICCE at present is still the commonest form of cataract surgery performed in Pakistan with a gradual transition towards ECCE.

There are several ways of fixing a detached retina and the most tried of these involves the subretinal drainage, air tamponade, cryo treatment of holes/tears and an explant procedure, also called a DACE procedure described by McLeod¹¹.

In the past few years there has been a trend towards performing primary vitrectomy. The proponents of this procedure argue that the procedure is much more controlled, allows drainage of subretinal fluid under direct vision, relieves vitreous traction on the retina, eliminates the need for an explant, allows direct visualization of the retinal pathology and allows identification of hidden/missed holes and at the same time removes the retinal pigment epithelial cells which in the future could cause PVR. The use of intraocular surgery (pars plana vitrectomy) for routine retinal detachments was first described by Kloti in 1981¹². He reported the use of vitrectomy in conjunction with internal drainage of subretinal fluid without scleral buckling. Several variations of this technique were reported. Escoffery et al reported a success rate of 79% with one operation¹³. Our standard practice has been to perform a standard drainage and cryo procedure for relatively uncomplicated retinal detachments, but there has been a trend to perform more primary vitrectomies in the unit. There was a definite increase in the number of primary vitrectomies during the period between 1995 and 1997.

Out of a total of 531 patients that underwent a vitrectomy procedure, 138 had primary vitrectomy performed. 97 of these patients had aphakic retinal detachments, while 41 were pseudophakes. Tamponade by silicone oil, SF₆ gas or air was used, depending on the nature of the pathology and compliance of the patient regarding head positioning. Performing primary vitrectomy for relatively uncomplicated retinal detachments has led to a success rate of 86% after the first operation. The follow-up of these cases has now been 4 months to 17 months.

14% of the cases that did not settle, required additional surgery.

It is interesting to note that 63(5.43%) of the aphakic eyes operated on had surgeries done in camps, followed by various complications. Although eye camp surgery has been providing a good service to the rural community, it should only be performed by surgeons well-versed in the art of intracapsular extractions and there should be a gradual shift towards microscopic surgery performed in relatively well-equipped environment.

In the past decade pseudophakic retinal detachments have posed another problem for the retinal surgeons. The management is complicated by the fact that it is sometimes difficult to examine the periphery due to reflexes from the intraocular lens (IOL), and the holes may be missed. The problem may be exacerbated by the presence of an opaque posterior capsule and the small optical size. Indentation may be a problem in such cases. We have found the wide-field laser lens to be quite useful in localizing breaks anterior to the equator, preoperatively. It alleviates the blur that occurs when viewing through the edge of the IOL and there is less interference from the lens and the capsular opacities. Removal of the lens may not be necessary in simple detachments but it may be required if PVR is present, particularly with an anterior component. 41 of the pseudophakes had primary vitrectomies performed. An internal tamponade of either SF₆ or air was used. Silicone oil alone was used in 12 cases after vitrectomy with no buckle. These were the cases with relatively large equatorial tears or multiple tears above the horizontal meridian. A buckle was used in addition to the internal tamponade in 29 cases. In these cases our indications for the use of silicone oil were largely the same as those described by the Silicone Study Group^{14,15}. However, we did use silicone oil in cases where we would have preferred to use gas but could not because of expected poor patient compliance.

136 of the patients had axial myopia with a range between -1.00 and -24.00 diopters. Nine patients had a probable Stickler's syndrome, while 4 had Marfan's syndrome.

74 of the patients gave history of blunt ocular trauma. All these patients had traumatic retinal dialyses, oral-or post-oral tears, giant tears or macular holes. In 11 of the patients no holes could be found. It is possible that the patients had oral tears, which

ultimately got sealed over a period of time or were difficult to localize because of adjacent pigmentary changes. Traumatic retinal detachments with macular holes and peripheral tears had conventional retinal reattachment surgery done as the first procedure. 23 patients had giant retinal tears. In 7 cases there was history of blunt trauma to the eye or head, while in 16 there was no history of trauma, although 11 were myopic. Four cases had bilateral involvement.

A giant tear in this study was defined as circumferential retinal break of 90 degrees or more. All giant tears required vitrectomy, along with a scleral buckle. Although removal of lenses may not be required, we did remove them in 14 cases. Anterior PVR was the main reason for lensectomies. The wide-angled viewing system was found to be quite useful during air/silicone oil exchange. Heavy liquids were quite useful intraoperatively, while silicone oil was found to be a useful tool for long-term internal tamponade in such cases. Complete retinal flattening could not be achieved in 4 cases because of extensive preretinal and subretinal membranes. 15 of the retinas have remained attached over a period of 27 months' follow-up. Silicone oil was removed in 9 of the cases.

10 patients had retinal detachment following keratoplasty. Six patients were aphakic, while 4 were phakic. The duration of grafts varied from 2 months to 21 months. According to a study the risk of developing retinal detachment after keratoplasty varies from 1.5% at 3 months to 2.1% after one year. After 3.5 years the incidence is 4.7%¹⁷. The result of surgery depends on several factors e.g., the condition of the graft, the clarity of the graft, the duration of the graft and the presence of PVR. Sternberg et al reported successful results of reattachment surgery to be 74% i.e., 17 out of 23 retinas in their study were attached¹⁸. In our study all six of the aphakic eyes and 2 of the phakic eyes underwent vitrectomy. The primary vitrectomy was performed because of vitreous opacities, varying grades of PVR and difficulty in finding the breaks. Complete flattening was obtained in 6 patients (60%). 2 patients had a partial attachment which was walled off with laser treatment. 2 cases failed to reattach. 2 of the grafts became hazy over a period of 6 months. An internal tamponade of SF₆ or air was used. A scleral explant was used in 7 cases.

Four patients had chorioretinal colobomas. A coloboma of the choroid is a condition caused by a faulty closure of the fetal fissure and is bilateral in 60% of the cases. Retinal detachment is said to occur

in 40% of the eyes. The colobomatous defect varies from a small vertically ovoid lesion just below the optic disc to an area extending from the optic nerve to the pupillary space with involvement of the inferior iris. It may also be associated with microphthalmos, cataract and myopia. Retinal detachment may be due to vitreous traction on the retina outside the coloboma or may be because of the breaks in the anomalous retinal tissue within the coloboma secondary to vitreous liquefaction allowing the fluid to enter the subretinal space. Standard buckling techniques may not be effective and modified techniques have to be used to produce chorioretinal adhesions. Vitrectomy was performed in all four cases. In three of the cases holes were found outside the coloboma, while in one case a hole was found inside the atrophic retinal tissue over the coloboma. Silicone oil tamponade was used in the case where the hole was within the colobomatous tissue. Prophylactic laser was done at the edge of the coloboma in all cases. One of the cases subsequently required another surgery but did redetach. No further surgery was attempted in this case.

Fourteen of the cases had pneumatic retinopexy. 5 cases redetached or failed to attach, while 9 were successfully attached. All the failed cases went on to have a scleral buckling procedure. Our indications for performing a pneumatic retinopexy include superior breaks with no traction, minimal lattice, no PVR, and a compliant patient. Contraindications include inferior breaks, PVR, extensive lattice, trauma, vitreous hemorrhage, poor patient compliance regarding head posturing. Cryopexy is performed on the second day after the retina is flat. 0.4-0.5 cc of 20% sulphur hexafluoride (SF₆) gas is injected after performing a paracentesis.

Factors that were found to be associated with poor anatomical and visual results were:

- Preoperative uveitis
- Choroidal detachment
- Preoperative vitreous hemorrhage
- Postoperative vitritis

Preoperative visual acuity correlates well with anatomic success and visual outcome after surgery. Visual acuity in detachments with macula "on" is better than in those with macula "off"^{19,20}.

The exact role of uveitis and choroidal detachment is not known but it is suggested that eyes with hypotony, as in uveitis and choroidal

detachment, have transudation of serum components into intraocular fluids. Serum components, like fibrin and platelet-derived growth factors, play an important role in cellular proliferation and membrane formation ultimately leading to PVR.

A similar explanation can be offered for vitreous hemorrhage and postoperative sterile vitritis. Other factors which have been implicated in the development of PVR are intraoperative hypotony and intravitreal injection of air as in drainage, air, cryo, explant (DACE) procedure. The probable explanation again is damage to blood-ocular barrier. PVR is the most common cause of failure after retinal surgery and is reported to occur in about 7% of the eyes after reattachment surgery^{21,22}. In this series the incidence of some form of PVR was especially common in cases with previous surgeries. It is difficult to predict the progression of PVR after surgery. Cases with grade A PVR may show increased progression as compared to grade C cases. It is possible that grade C represents an arrested form of disease as compared to grade A. This is the reason that it is sometimes possible to achieve good anatomic result after conventional treatment without vitrectomy in grade C cases.

We do not revise the buckle in case of failed retinal detachment if the support is adequate and if vitrectomy can be performed beyond the vitreous base. Another reason is that we have noticed an increased incidence of hypotony after buckle revision as compared to the cases in which no revision was done. Many surgeons would like to wait until the PVR process has matured before performing surgery because the membranes become more mature and are easier to remove and more or less have a stable configuration.

We preferably would like to wait but have done surgery under steroid cover in many cases. An important factor which needs consideration is the delayed presentation of such cases with fibrocellular proliferation of various degrees. One of the reasons for this was inaccurate diagnosis resulting in loss of precious time. All eyes with blurred vision not improving with glasses should have a dilated eye examination performed to exclude retinal pathology.

CONCLUSION

- Early diagnosis and treatment of retinal detachment is important.
- Posterior segment surgery should be attempted by retinal surgeons only.

- Post-fellowship training programs in vitreoretinal surgery should be commenced in teaching hospitals.
- General practitioners (GPs) and opticians should play a key role in our health system. At present many of them are unaware of the common eye diseases. It will be logical to commence training programs for GPs and opticians, or hold short refresher courses to apprise them of the common eye ailments and their proper referral.
- There is need for Pakistan Vitreoretinal Society providing a forum for positive interaction between retina surgeons.

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Corneal Ulceration

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ABSTRACT

Objective: To determine the incidence, predisposing factors and microbial etiology of corneal ulceration.

Design: A prospective study of 97 patients of corneal ulceration registered from January 1995 to December 1995.

Setting: Indoor patients of general community at the Department of Ophthalmology, Unit-I, Eye Hospital, Liaquat Medical College, Jamshoro/Hyderabad.

Subject: Corneal ulceration

Main outcome measures: Ulcerative keratitis with chronicity and previous antibiotic treatment.

Results: Ninety-seven (9.06%) patients of corneal ulceration were found in 1070 hospital admissions. Corneal ulceration was encountered in all age groups with predominance in males (66 cases, 68.04%) As predisposing factor, corneal trauma was found in 41(42.26%) patients. Of the 97 patients, 66(68.04%) had positive microbial growth, whereas thirty-nine (40.20%) had pure bacterial growth, 17(17.52%) pure fungal growth and 10(10.30%) yielded mixed growth of bacteria and fungi. The most frequent bacterial isolate was streptococcus pneumoniae (30.76%), whereas amongst fungi, the most frequent isolate (48.14%) was aspergillus species.

Conclusion: Leading predisposing factor for the development of corneal ulceration was corneal trauma (42.26%). Failure of cultures (31 cases, 31.95%) was due to the use of previous antibiotic treatment and chronicity of corneal ulcers. Streptococcus pneumoniae (12 of 39 bacterial isolates, 30.76%) and aspergillus (13 of 27 fungal isolates, 48.14%) were the most frequent causative organisms.

INTRODUCTION

Corneal ulceration is the major cause amongst blinding diseases, both in the developed and the developing countries of the world¹. In the developing countries, corneal trauma is an important predisposing factor in the development of corneal ulceration²⁻⁴, whereas in the developed countries, contact lens complications are the most common cause^{5,6}. Eyelid disease and tear film abnormalities are important associated factors worldwide⁷. Central corneal ulcerations, even of minor size, cause serious loss of vision and severe infection can penetrate the cornea with loss of the eye within 24 hours⁸. Therefore, every corneal ulcer is an emergency. Rapid identification of the causative organism by staining and culture is imperative for successful outcome.

A prospective study was conducted on patients of corneal ulceration to determine the incidence, predisposing factors and etiologic diagnosis.

PATIENTS AND METHODS

One-thousand-seventy patients were admitted from January 1995 to December 1995, in the Eye Hospital, Liaquat Medical College, Jamshoro/

Hyderabad. Of the 1070 patients, 97(9.06%) were patients of corneal ulceration.

Corneal ulceration was defined as the loss of corneal epithelium with clinical evidence of infection with or without hypopyon. The assessment protocol for every patient was:

- i. History with particular inquiry into the risk factors, such as corneal trauma and use of corticosteroids.
- ii. Assessment of visual acuity.
- iii. Testing of corneal sensitivity.
- iv. Digital tonometry.
- v. Biomicroscopic examination, noting the size, the appearance, the depth and the reaction surrounding the ulcer and in the anterior chamber.

Clinical findings, such as blepharitis, conjunctivitis, trichiasis and corneal exposure were noted. The typical viral ulcers and healing ulcers were excluded.

After detailed examination of the affected eye, the ulcer was scraped with Kimura spatula for staining and culture and sensitivity. The treatment was started on the basis of clinical diagnosis. The laboratory reports were collected after 3 to 21 days for bacterial

and fungal isolations with sensitivity results, and the treatment regime was changed accordingly. All the tests were done in one laboratory supervised by one pathologist.

RESULTS

Out of the 1070 hospital admission, 97(9.06%) were corneal ulceration patients (Table-1). Of the 97 corneal ulcer patients 66(68.04%) were male and 31(31.95%) female (Table-2). Corneal trauma as the predisposing factor was found in 41(42.26%) patients, whereas use of steroids was present in 3(3.09%) patients (Table-3). Out of the 97, 66(68.04%) patients had positive microbial growth. Thirty-nine (40.20%) had pure bacterial growth and 17(17.52%) had pure fungal growth, whereas 10(10.30%) yielded mixed growth of both bacteria and fungi. Thirty-one (31.95%) had negative cultures (Table-4).

Table 1: Incidence of corneal ulceration.

Total No. of Patients	Patients with corneal ulceration	Percentage
1070	97	9.06

Table 2: Demography of 97 corneal ulcer patients.

Age (Years)	Male	Female
01-20	12	5
21-40	24	10
41-60	23	12
61-80	7	4
Total	66(68.04%)	31(31.95%)

Table 3: Predisposing factors in 97 cases.

Factor	No. of cases	Percentage
Trauma	41	42.26
-Agricultural		
-Non-agricultural	17	
Steroids	3	03.09

Table 4: Microbial growth pattern in 97 corneal ulcers.

Growth Pattern	No. of cases	Percentage
Pure bacterial growth	39	40.20
Pure fungal growth	17	17.52
Mixed growth - bacterial & fungal	10	10.30
Cases with positive culture	66	68.04
Cases with negative culture	31	31.95
Total	97	100

Table 5: Bacteria isolated in 39 cases.

Isolates	No. of cases	Percentage
Streptococcus pneumoniae	12	30.76
Staphylococcus aureus	06	15.38
Staphylococcus epidermidis	05	12.82
Pseudomonas species	05	12.82
Streptococcus viridans	04	10.25
Streptococcus pyogenese	03	7.69
Aerobacter species	02	5.12
Proteus species	01	2.56
Escherichia coli	01	2.56
Total	39	100

In 39 patients with positive bacterial cultures the most frequent isolated pathogen was streptococcus pneumoniae (30.76%), followed by staphylococcus aureus (15.38%), staphylococcus epidermidis (12.82%), pseudomonas species (12.82%) and streptococcus viridans (10.25%) in the series (Table-5).

In 27 fungal isolates, which included pure and mixed growths, the most frequent isolate was aspergillus species (48.14%), followed by candida species (29.62%), fusarium species (11.11%), penicillium species (7.40%) and curvularia (3.70%) in the series (Table-6).

DISCUSSION

Corneal trauma and ulceration are the leading causes of unilateral blindness^{2,9,10}. In contrast to the visual loss from cataract which affects mainly the older age groups, corneal ulceration was encountered

Table 6: Fungal isolates (pure and mixed)

Fungal isolates	Pure	Mixed	Total	Percentage
Aspergillus species	8	5	13	48.14
Candida species	5	3	8	29.62
Fusarium species	2	1	3	11.11
Penicillium species	1	1	2	7.40
Curvularia species	1	-	1	3.70
Total	17	10	27	100.00

in all age groups. This pattern was similar to that reported by other authors^{11,12}.

Corneal trauma is one of the important and leading predisposing factors for the development of corneal ulceration^{2,4,13}. It was found in 41(42.26%) patients. Agents responsible for trauma were mainly organic materials, including grass, wood, sticks, stalks of wheat or rice, dust and animal products, whereas inorganic materials were stone and iron particles. Incidence of corneal ulceration was more frequent in males, (66 cases or 68.04%) than in females (31 cases or 31.95%), perhaps due to greater involvement of males in agricultural work. Similar finding was reported by other workers^{13,14}.

Microorganisms were isolated from 66(68.04%) of the 97 corneal ulcers. The recovery rate of the organisms/pathogens was low as compared to other studies^{3,15,16}. In this study all the patients had previous antibiotic treatment for corneal ulceration and reported to the outpatient ophthalmology department very late, when the ulcer did not respond to treatment or the patient developed complications. The previous antibiotic treatment and chronicity of the ulcer were significant factors for failure of culture growth in 31 patients (31.85%). Low rate of microbial isolation for the same reasons have been reported by many workers. Dunlop et al reported 62.6% positive cultures in 142 cases of suppurative keratitis¹⁷. Ammous and Noor-Sunba obtained 57% positive cultures in 83 patients with corneal ulcerations¹⁸. Wahl et al found 40% positive microbial growths in 130 corneal ulcers¹⁹.

Of the 66(68.04%) positive cultures, 39(59.09%) isolates were bacterial and 27(40.90%) were fungal. William et al found 66.66% bacterial

and 33.33% fungus isolates in 33 cases of corneal ulceration²⁰. Dunlop et al found 53.% bacterial and 35.9% fungal pathogens in 142 cases of suppurative keratitis¹⁷. In the present study, among the 39 bacterial isolates, the most frequent pathogen was streptococcus pneumoniae, 12 cases (30.76%), followed by staphylococcus aureus, 6 cases (15.38%), staphylococcus epidermidis, 5 cases (12.82%), pseudomonas species, 5 cases (12.82%), streptococcus viridans, 4 cases (10.25%), and streptococcus pyogenes 3 cases (7.69%). In the United States, the incidence of streptococcus pneumoniae has fallen, whereas pseudomonas species has become the most frequently isolated pathogen in several studies²¹⁻²³.

The increase in the frequency of pseudomonas corneal ulceration has led to the false assumption that pseudomonas species is the most frequent cause of ulceration worldwide. In the developed countries use of contact lens is common and pseudomonas is the predominant isolate in contact lens wear-induced ulcerations. In our study there was no antecedent history of contact lens wear. Streptococcus pneumoniae has been reported as the most frequent isolate in other studies²⁴⁻²⁶. The other most frequent isolated pathogens reported by other workers are staphylococcus aureus^{26,27} staphylococcus epidermidis^{19,27} and streptococcus²⁵. This shows regional differences in pathogens most frequently isolated from ulcerative keratitis.

Of the 27 fungal cultures, the most frequently isolated pathogen was aspergillus species, 13 cases (48.14%), followed by candida albicans, 8 cases (29.62%) and fusarium species, 3 cases (11.11%). Aspergillus was the most frequent pathogenic isolate found by other workers^{2,10,18}.

CONCLUSION

The leading ocular predisposing factor for the development of corneal ulceration in our study was corneal trauma, 41 cases (42.62%). In 39(40.20%) positive bacterial cultures, the most frequent isolate was streptococcus pneumoniae, 12 cases (30.76%). Therefore, the first-line treatment of corneal ulceration with aminoglycoside antibiotics is inappropriate in our country where streptococcus pneumoniae is the predominant pathogen. Fungal isolate was found in significant numbers, (27 cases or 27.83%). Clinically, it is difficult to differentiate bacterial and fungal ulcers at an advanced stage of ulceration. Therefore, antifungal therapy along with antibiotic treatment may be considered in areas where culture isolation is not feasible.

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Case Report

Macular Hemorrhage: An Unusual Complication of Nd: YAG Laser Capsulotomy

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ABSTRACT

We present a case report of a patient with macular hemorrhage following Nd: YAG laser capsulotomy in a pseudophakic eye. Known complications of Nd: YAG laser capsulotomy are briefly described. Macular hemorrhage following Nd: YAG laser capsulotomy is seen for the first time. Importance of proper focusing of Nd: YAG laser is emphasized to prevent this complication.

INTRODUCTION

Nd: YAG laser is a photodisruptive laser. It produces extreme heat by producing optical plasma at about 10,000 degrees centigrade along with an acoustic shock wave at the site being focused on. This combination disrupts the tissues and this property is used to perform capsulotomy, peripheral iridotomy and to cut vitreous bands in ophthalmology¹. Nd: YAG laser is most commonly used to perform capsulotomy in the management of posterior capsular thickening, a common complication of extracapsular cataract extraction (ECCE).

Known complications of Nd: YAG laser capsulotomy include mild anterior uveitis, transient rise in intraocular pressure (IOP)², damage to intraocular lens (IOL)^{3,4} and corneal endothelium. Cystoid macular edema (CME) may develop at a later stage particularly if Nd: YAG laser capsulotomy is done within six months of cataract surgery^{5,6}. Rarely, rhegmatogenous retinal detachment (RD) is seen with holes or tears in the peripheral retina particularly in myopic patients and those where capsulotomy is done within one year of cataract surgery^{5,7}. However, the number of laser pulses and the amount of energy applied has not been found to play any role in the development of these complications¹.

CASE REPORT

A 65-year-old lady reported with dense cataracts in both her eyes in January 1997. She was

hypertensive for the last 15 years, controlled with medicines, was non-diabetic and not a myope. Cataract extraction with posterior chamber IOL implant was performed in her left eye (LE) in January 1995 and in the right eye (RE) in February 1995.

Postoperative corrected visual acuity was 6/6, partial, in the RE and 6/6 in the LE. Funduscopy revealed drusen in both her eyes. Vision in both eyes started falling gradually after two months, reaching 6/60 in the RE and 6/36 in the LE after about two years. Slit-lamp biomicroscopy revealed posterior capsular thickening in both her eyes due to dense fibrosis (Rt > Lt). In addition, Elschnig's pearls were seen at the periphery of the capsule. IOP was normal and fundus view was not clear at this stage.

Nd: YAG laser capsulotomy (2 milli Joules energy, 5 pulses, in each eye) was carried out in both her eyes on 18th Jan 1997. The next day, the patient reported visual improvement in the LE but further visual loss in her RE.

On examination, vision was 6/6 in the LE and counting fingers (CF) at 1 meter in the RE the day after Nd: YAG laser capsulotomy. Slit-lamp biomicroscopy revealed adequate holes in the opaque posterior capsule, clear IOL implant and normal IOP in both her eyes. Funduscopy revealed preretinal hemorrhage obscuring the fovea and the perifoveal area of macula of her RE only. Hemorrhage cleared gradually, leaving behind residual brownish white

patches over the right macula. Foveal reflex was absent, however. The vision returned to 6/12, partial, in the RE three months after Nd: YAG laser capsulotomy (Figs: 1 & 2)

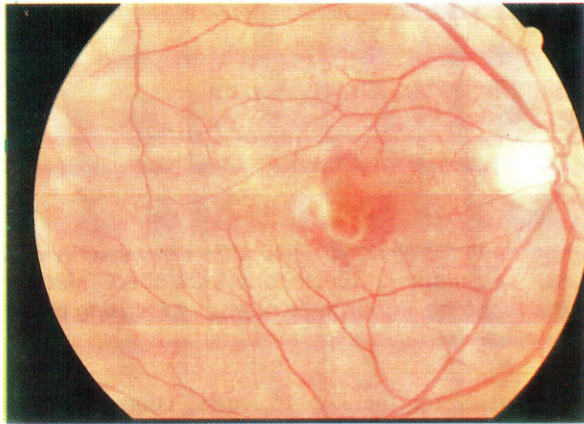


Fig-1: Color photograph of fundus of right eye

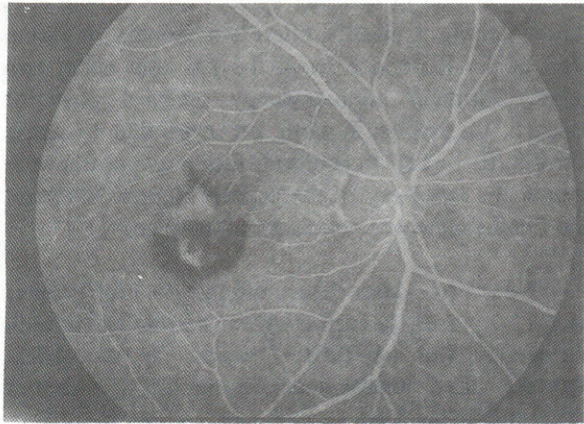


Fig-2: Fluorescein angiogram of right eye.

Fundus fluorescein angiography (FFA) and fundus photography confirmed the findings of funduscopy. No leakage was seen in the foveal or parafoveal area of macula. Early age-related macular degeneration (AMD) in the LE was also confirmed (Fig: 3 & 4).

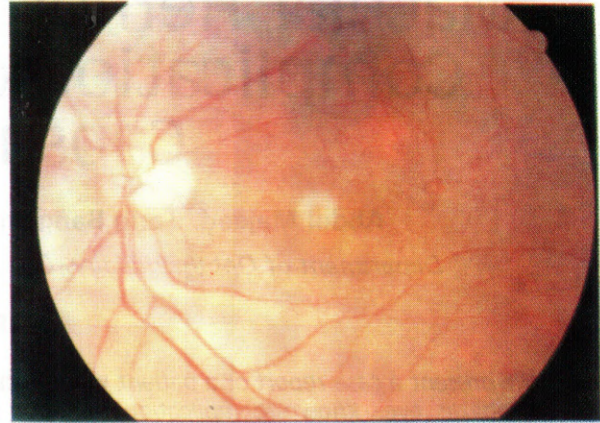


Fig-3: Color photograph of fundus of left eye.



Fig-4: Fluorescein angiogram of left eye.

DISCUSSION

Nd: YAG laser capsulotomy is a standard and universally accepted treatment for after-cataract (posterior capsular thickening). None of its known complications (anterior uveitis, rise in IOP, CME or RD) were seen in our patient since Nd: YAG laser capsulotomy was carried out about two years after surgery and the patient was not a myope. Instead, macular hemorrhage in one eye was the only

complication in our case which has not been described in the literature previously. Etiology remains an enigma. Possible explanations appear to be accidental too posterior an application of Nd: YAG laser on the macula, or shock waves of concussion traveling posteriorly which might have damaged some microvessel in the macular area^{1,8}.

To conclude, it is suggested that extreme care needs to be exercised while focusing the Nd: YAG laser on the opaque posterior capsule. It should not be focused too anteriorly to avoid damage to the IOL implant and not at all posterior to the capsule to avoid such a serious complication as macular hemorrhage.

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Role of Debridement and Acyclovir in Herpes Simplex Dendritic Keratitis

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ABSTRACT

To clarify the role of debridement in the optimal management of herpes simplex dendritic keratitis, we conducted a randomized study comparing treatments with acyclovir alone and debridement followed by acyclovir. Forty patients were randomized into two treatment categories, twenty patients in each group. No statistically significant difference was observed between acyclovir treatment alone and debridement combined with acyclovir treatment with regard to healing time. Our results suggest that debridement combined with acyclovir appears to offer no advantage over acyclovir alone.

INTRODUCTION

The availability of effective antiviral agents has diminished the role of debridement in the management of herpetic dendritic keratitis and the latter modality is open to question. Debridement has been shown to be an effective therapy and acceptable treatment of herpetic dendritic keratitis¹. Although debridement leads to more rapid healing of an epithelial ulcer than antiviral medication alone, focal lesions recur in up to 60% of patients necessitating additional antiviral therapy². Standard teaching favors mechanical debridement combined with antiviral treatment³. However, in clinical practice, antiviral therapy is frequently used without debridement with considerable success. Acyclovir (9-[2-hydroxymethoxymethyl] guanine) is currently the most effective available antiviral agent⁴. Because the ideal treatment should promote rapid, uneventful healing with a minimum of adverse effects, we have conducted a randomized clinical trial comparing the combination of debridement and 3% acyclovir ointment (Zovirax), with acyclovir without debridement in the treatment of dendritic keratitis.

MATERIALS AND METHODS

Patients

Forty-five patients with clinical diagnosis of herpes simplex dendritic keratitis were enrolled in the study between December 1995 and December 1997, after informed consent was obtained. Forty patients (88.9%) completed the study. All patients in the study had typical dendritic keratitis, according to the

classification of McKinnon et al⁵, except for five patients who had dendritico-geographic ulcers. Fifteen of forty-five patients (33.3%) had known history of herpes simplex keratitis. Patients aged 20 years or above were included, in order to facilitate debridement. The following criteria excluded patients from the study:

- visual acuity of 6/60 or worse in the fellow eye.
- antiviral treatment within the preceding 2 weeks
- ocular or systemic corticosteroids within the previous 2 weeks
- coexisting ocular disease
- pregnancy and breast-feeding.

Clinical Evaluation

Patients participating in the study had data recorded according to the following scheme:

1. History

- Complete history of attack with respect to symptoms, onset, duration, recurrence and triggering factors.
- History of previous medication, particularly corticosteroids.

2. Examination

- Visual acuity
- Corneal sensitivity
- IOP (evaluated digitally)
- Slit-lamp examination to evaluate the extent of corneal involvement and anterior chamber reaction.

The lesions were stained with fluorescein, measured with slit-lamp and accurately drawn in the record. All signs and symptoms were graded 0-3 (0-normal; 1-mild; 2-moderate; and 3-severe).

3. Follow-up

Follow-up was done for a period of 6 months. Each patient was examined on days 4,7,10,14 and 21 until the ulcer was healed. Then the patients were instructed to visit after every month. The following points were re-evaluated: previous signs and symptoms, visual acuity, healing of the ulcer, antiviral drug toxicity, complications of HSV keratitis, and compliance with the treatment.

Healing was defined as the disappearance of dendritic staining despite the occasional persistence of fine superficial punctuate staining.

Treatment Regimens

Patients were randomly divided into the following two treatment groups; Group-A received only 3% acyclovir (Zovirax) five times a day. Group-B received initial simple mechanical debridement followed by 3% acyclovir (Zovirax) five times a day.

In both groups when the ulcer was judged to be healed, antiviral medication was continued for further seven days and then stopped. The patients stopped using all other topical medications during the period of the trial.

Statistical Analysis

Chi-Square test (X^2 test) and Standard error of means were used as tests of significance.

RESULTS

Forty patients completed the study. The two groups of patients were similar with regard to sex, age, duration of symptoms, history of ocular herpes and history of ocular corticosteroid therapy (Table-1).

Five of 45 patients (11.1%) who were enrolled did not complete the study and were excluded in data analysis.

All patients in group-A and Group-B healed within 14 days (Table-2). In Group-A, the mean healing time was 6.5 days and in Group-B, the mean healing time was 7.7 days. Group-A and B were also compared with regard to the percentage of patients healed at days 4,7,10 and 14 (Fig-1). At no time

Table 1: Demographics.

Variables	Treatment Groups	
	Group-A	Group-B
No. of patients	20	20
Sex. Male:Female	15:5	13:7
Median Age (range)	48 (20-80)	46(20.78)
H/o HSV keratitis, No. (%)	7/20(35%)	6/20(30%)
H/o topical steroids, No. (%)	5/20(25%)	4/20(20%)
Duration of symptoms (Days)	5	3

Table 2: Results

Variables	Treatment Groups	
	Group-A	Group-B
Mean healing time in days (Range)	6.5(2-14)	7.7(4-14)
Stromal edema No. (%)	3/20(15%)	5/20(25%)
Uveitis, No. (%)	1/20(5%)	2/20(10%)
New stromal opacities, No. (%)	5/20(25%)	3/20(15%)
Recurrent disease, No. (%)	3/20(15%)	1/20(5%)

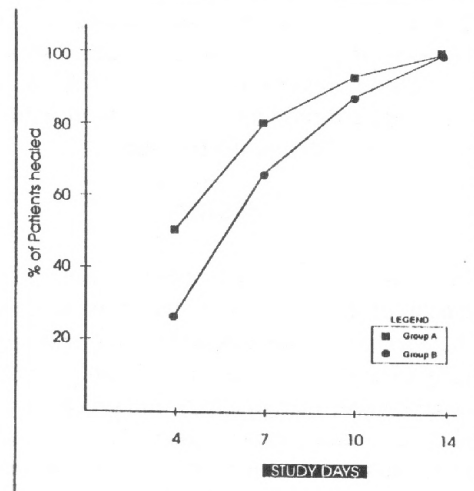


Fig: Cumulative Percentage of Patients Healed in Group A (Acyclovir alone) and Group B (Acyclovir + debridement)

was there a statistically significant difference in the healing rates between these two treatment categories ($p > 0.05$). However, at each of these times there was a trend toward delayed healing time in Group-B as compared with group-A. The history of ocular herpes or topical corticosteroid use also had no statistically significant effect on the rates of healing.

Significant stromal edema with or without uveitis was an infrequent problem (Table-2). In Group-A, three of the 20 patients (15%) had edema when enrolled in the study and no one developed it during the study. After the dendritic ulcer healed, one of these patients was treated with topical corticosteroids under cover of Zovirax ointment for stromal edema and uveitis. In Group-B, two patients had mild stromal edema at the outset and three developed edema (two with uveitis) during the study period. The two patients with uveitis were then treated with corticosteroids under cover of Zovirax ointment after the dendritic ulcer was healed.

After one month, in Group-A, five patients (25%) developed new corneal opacities. In Group-B, 3 patients (15%) developed new opacities. The differences was insignificant ($p > 0.05$). After healing, 3 patients in Group-A and 1 patient in Group-B developed recurrent dendritic keratitis within 2 months. No other complication was seen during this period.

The final visual acuity was very good in all patients. Despite history of ocular herpes in 13 of our patients (32.5%) and more than one previous episodes in a few patients, visual acuity ranged from 6/6 to 6/12. The only adverse symptom related to topical acyclovir was a mild transient stinging sensation immediately after application in five (12.5%) patients. Mild to moderate discomfort, that resolved within 12 to 24 hours, occurred after debridement.

DISCUSSION

The current role of debridement in the management of herpes simplex keratitis is open to question. Mechanical debridement used prior to the availability of antiviral drugs in the 1960s continues to be an acceptable therapy. Now in clinical practice, antivirals are used alone successfully, although standard teaching advocates debridement followed by antiviral treatment³. Whitcher¹ reported faster healing with simple mechanical debridement and patching, compared with idoxuridine alone. Jones⁶ reported, however, that debridement resulted in initial healing

within several days, but that about 50% of patients had evidence of new lesions within a week. Wilhelmus⁷ reported a statistically significant, more rapid healing rate, in patients treated with a combination of debridement and acyclovir, compared with patients treated with acyclovir alone. In his study, the method of minimal wiping debridement used was similar to the one in our study.

In another study, carried out by Parlato⁸, trifluridine instead of acyclovir was used. There was no statistically significant difference in the rate of healing between the two groups.

In our study, debridement combined with acyclovir treatment offered no advantage over acyclovir treatment alone. Combined treatment was associated with a tendency towards slower healing, which was not statistically significant. But the development of new corneal opacities was more frequent in the group treated with acyclovir alone than in the one treated with combination treatment as also stated by Foster⁹.

CONCLUSIONS

1. Effective antiviral agents have diminished the role of debridement in the management of herpes simplex keratitis.
2. Mechanical debridement may not enhance the efficacy of acyclovir.
3. Debridement has a role in the management of herpes simplex keratitis when antiviral therapy is inadequate, or when the patient is non-compliant, has drug allergy, is resistant to drugs¹⁰ or when antiviral treatment is not available.

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Ophthalmic "Pastpourri"

"De Oculis" by Benvenuto Grassus

"De Oculis" by Benvenuto Grassus is credited to be the first ophthalmic book ever printed. Grassus was "The most famous non-Muslim oculist of medieval times". He was probably a baptized Jew and was born or lived in Jerusalem for a time. Though it is not known when the material was actually written, apparently the initial version was in Arabic and was deemed so important that it was translated into a number of languages. The first Latin edition was published in 1474.

The following few "Ophthalmic Pastpourri" entries are derived from Grassus.

Jehangir Durrani
MD, FACS, FRC OPHTH.

From: Henkind P. Introduction (of): (translated by Casey A. Wood)
Stanford University Press, Stanford University,
California. 1929

OSP Research Foundation

Muhammad Daud Khan

Department of Ophthalmology, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar

PREAMBLE

Scientific research is the spring that nourishes the Applied Science and Technology. After the Second World War, it became generally understood that scientific research offers immense possibilities for economic development of all countries of the world¹.

Currently it is estimated that there are 38 million people blind in the world. A further 100 million people have low vision and are at great risk of becoming blind². Two-thirds of these blind people are in Asia and Africa².

These global estimates are likely to get worse because:

- a. the population is increasing, especially in the developing countries.
- b. longevity is increasing.
- c. the available eye care services are less than desired and not equitable in distribution.
- d. the demand for early visual rehabilitation is increasing.
- e. the quality of surgical outcome is increasing at the cost of quantity.

In Pakistan the blindness prevalence rate is 1.78% as compared to the global figure of 0.7%³. The common causes of blindness globally are cataract, glaucoma, trachoma, vitamin A deficiency and onchocerciasis⁴.

The key to the problem of global, regional and national blindness lies in systematic research, which will enable us to (a) identify the risk factors of various disorders and (b) to intervene to either prevent, postpone or even cure the disease. It is suggested that if we could find a drug which could slow down the development of cataract by 10 years, there would be reduction of approximately 45% in the number of cataract operations needed to be performed⁵. This will save us millions of dollars in terms of expenditure on surgery and elimination of sickness-related time off. Similarly, epidemiological research in such common causes of blindness, like

trauma, xerophthalmia, glaucoma and diabetic retinopathy, will enable us to formulate intervention strategies, which in turn will significantly improve our presently alarming blindness statistics.

Realizing the importance of fundamental research in relation to technological advancement and the socioeconomic development of any nation, it is high time that we prepared a workable National Plan for Research in all disciplines of sciences.

But before we could think of such a plan we need a commitment from the country's top politicians, bureaucrats and professionals. Once these essential ingredients are in place, we then need to identify and utilize:

- a. All available resources.
- b. Ensure adequate physical infrastructure and healthy surroundings.
- c. Put the right people in the right jobs and train more individuals.
- d. Ensure their physical and financial security.
- e. Ensure availability of essential equipment, instruments and supplies.
- f. Ensure proper scientific management with in-built mechanisms for monitoring and evaluation along with acceptable levels of financial and administrative autonomy.

The next phase will be to identify the important national research needs, prepare projects, prioritize them, approve them, fund them, monitor them and finally evaluate them to ensure that the desired national goals and objectives are achieved.

The fast developing field of ophthalmology, both in technology and knowledge, is now going to face the challenge of the changing needs and aspirations of the community in the 21st century. It is only possible to meet this challenge if we take a timely action with all necessary steps to encourage research in ophthalmology.

Keeping this in view, I, as the current president of the Ophthalmological Society of Pakistan (OSP)

pledged in my inaugural speech at the annual Congress of the Ophthalmological Society of Pakistan in 1996, to establish a research foundation under the auspices of the Society. This foundation would be a national body for issuing guidelines for the national needs in ophthalmic research, will offer financial grants, coordinate all research efforts, create linkages, and monitor and evaluate the ophthalmic research to be outlined.

This preliminary working paper highlights the various committees that need to be constituted and their functions towards providing state-of-the-art ophthalmic research in Pakistan outlined.

OPHTHALMOLOGICAL SOCIETY OF PAKISTAN RESEARCH FOUNDATION: EXECUTIVE COMMITTEE

Chairman

Prof. Raja Mumtaz

Executive Secretary

Prof. Dr. M. Daud Khan

Members

Prof. Lateef Chaudhry
Dr. Mukhtar Ahmed
Prof. Ziauddin Sheikh
Dr. Muhammad Yaqin
Dr. Sharif Hashmani

TERMS OF REFERENCE FOR O.S.P. RESEARCH FOUNDATION EXECUTIVE COMMITTEE

1. Issue National Guidelines for Research in all aspects of Comprehensive Eye Care.
2. Generate, utilize and audit funds.
3. Create National and International linkages in Ophthalmic Research and other related matters.
4. Coordinate the activities of the foundation with OSP Central Council.
5. Periodically evaluate all the activities of the foundation.

O.S.P. RESEARCH FOUNDATION TECHNICAL COMMITTEE

Chairman

Prof. Jehangir Durrani

Secretary

Dr. Haroon Awan

Members

1. Dr. Tariq Aziz
2. Dr. Mohammad Babar Qureshi
3. Dr. Asad Aslam Khan
4. Dr. Aziz Baloch

TERMS OF REFERENCE FOR O.S.P. RESEARCH FOUNDATION TECHNICAL COMMITTEE

1. Identify National Research needs in Comprehensive Eye Care.
2. Plan and prioritize research projects.
3. Advertise research projects.
4. Evaluate, select and recommend for grant approval.
5. Implement and regularly monitor the research activity.
6. Consolidate the reports and ensure their publication.
7. Submit annual performance report to the Executive Committee.

O.S.P. RESEARCH FOUNDATION ADVISORY COMMITTEE

1. Executive Secretary, OSP Research Foundation-Chairman
2. Chairman, Ophthalmic Instrument Industry
3. Haji Aliuddin
4. Remington Representative
5. Alcon Representative
6. M.S.D. Representative
7. Pharmacia UpJohn Representative
8. NGOs Representatives:
 - a. Representative, Layton Rehmatullah Benevolent Trust (LRBT)
 - b. Representative, Prevention of Blindness Society of Pakistan
 - c. Representative, Blind Union of Pakistan
 - d. Representative, Isra Islamic Foundation
 - e. Representative, Khyber Eye Foundation
 - f. Representative, Sight Savers International
 - g. Representative, Christoffel Blindenmission
 - h. Representative, WHO

TERMS OF REFERENCE FOR ADVISORY COMMITTEE

- Advise on:
- a. Identification of important research needs
 - b. Identification and prioritization of research projects.

- c. Fund generation
- d. National and International Networking
- e. Implementation of research recommendations in Comprehensive Eye Care.

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Ophthalmic "Pastpourri"

"De Oculis" by Benvenuto Grassus:

IXVI: The Paniculi or Forms of Granular Conjunctivitis. The First Variety

LET US with God's help first speak of the paniculi¹ that are generated in the eye from excess of blood or from some other of the many causes that may produce it. Sometimes these ailments are the result of ill-advised treatment; or they may arise from pains in the head, as from a migraine that spreads from the top of the head to the temples and superciliary regions and involves the eye. Paniculi appear as grains of millet on the outer tunic. In many localities they are called drop-like;² in others, *pidatelle* or *pictacollae*; in Apulia, *carraturae*. These are correct names because the eyes are congested with blood and there is much pain.

1. Paniculus cannot, as we know from the context, properly be translated by "Pannus". Our author is vague in his concepts of the disease. Perhaps a nearer approach to his meaning would be "granular" or "follicular" conjunctivitis.
2. *Gutatici*

Jehangir Durrani
MD, FACS, FRC OPHTH.

From: De Oculis (translated by Casey A. Wood)
Stanford University Press, Stanford University,
California. 1929;p45.

Prevention of Perioperative Miosis by Combination of Three Drugs in Low Concentrations

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PURPOSE

To determine whether the use of topical flurbiprofen (ocufen) in combination with tropicamide and phenylephrine (all in lower than standard concentrations) improves the maintenance of perioperative mydriasis during routine extracapsular cataract extraction (ECCE) or phacoemulsification, with intraocular lens (IOL) implantation.

In modern-day cataract surgery with smaller incision and a lot of handling, complications can be reduced by maintenance of maximal pupillary dilatation^{1,2}. The preoperative mydriasis for cataract extraction is usually achieved by application of a topical adrenergic agonist, e.g., phenylephrine in combination with a cholinergic antagonist, such as tropicamide or cyclopentolate. Adrenaline has been shown to help maintain mydriasis during extracapsular cataract surgery, when used in irrigation solutions, by directly stimulating the dilator pupillae³. Surgical trauma during phacoemulsification or ECCE, with manipulation of iris, both mechanically and with irrigation solution, leads to release of prostaglandins and miosis (Fig-1).

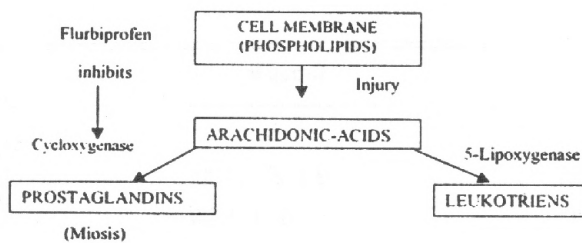


Fig. 1: Synthesis of prostaglandins & their inhibition by flurbiprofen

These reactions are independent of cholinergic and adrenergic receptors. Flurbiprofen sodium is a powerful inhibitor of prostaglandin biosynthesis through its action on cyclo-oxygenase enzyme⁴⁻⁶. It also decreases the cataract-induced blood-aqueous barrier breakdown⁷.

PATIENTS AND METHODS

Seventy-two patients were enrolled into the study who were due for either routine ECCE+IOL or phacoemulsification + IOL. Patients were excluded if they had history of:

1. Previous ocular injury.
2. Surgery on the affected eye.
3. Taking miotic drops for glaucoma.
4. Herpes simplex keratitis.
5. Use of anticoagulants.
6. Past inflammatory eye diseases.

The three drugs (from manufacturers' packs) mostly used to dilate the pupil were combined in group I & II after confirmation from the Pharmacology Department of Shaikh Zayed Postgraduate Medical Institute, Lahore, that these drugs mixed in the proportions given in Table-1 did not alter their pharmacodynamics (personal communication).

The patients were recruited into one of the two groups at random (nearly in equal numbers in each group).

The patients received one drop every 10 minutes for one hour (6 drops in total) from one of the premixed prepared squeeze bottles marked as No. I & II. The total quantity of medications used is much reduced (Table-2) in the mixture and with it the safety margin improves appreciably. Concentration of each drug per drop is further reduced as shown in Table-1. All cases were done under local anesthesia with van Lint and retrobulbar block by two surgeons (MSA, HM). The two groups were statistically similar in age and sex.

Table 1: Concentration of various drops individually and in mixture.

Drugs		Qty	Conc/Drop (original)	Conc/Drop in mixture
Group-I	Tropicamide	1%	7.5ml	0.67mg
	Phenylephrine	10%	2.5ml	6.7mg
	Flurbiprofen	0.03%	2.5ml	0.021mg
	Total		12.5ml	
Group-II	Tropicamide	1%	7.5ml	0.67mg
	Phenylephrine	10%	2.5ml	6.7mg
	Total		10.0ml	

Table 2: Total quantity of medication used.

Drugs	Drugs used un-mixed			Drugs used in mixture			
	Conc/drop	No. of drops	Total drug used	Conc/drop	No. of drops	Total drug used	
Group-I	Tropicamide	0.67mg	3	2.01mg	0.402mg	3	1.206mg
		0.67mg	6	4.02mg	0.402mg	6	2.412mg
	Phenylephrine	6.7mg	3	20.1mg	0.75mg	3	2.25mg
		6.7mg	6	40.2mg	0.75mg	6	4.50mg
	Ocufen	0.021mg	3	0.63mg	0.00042mg	3	0.00126mg
		0.021mg	6	1.26mg	0.00042mg	6	0.00252mg
Group-II	Tropicamide	0.67mg	3	2.01mg	0.50mg	3	1.5mg
		0.67mg	6	4.02mg	0.50mg	6	3.0mg
	Phenylephrine	6.7mg	3	20.1mg	1.67mg	3	5.01mg
		6.7mg	6	40.2mg	1.67mg	6	10.02mg

Table 3: Mean pupillary diameter.

	Group-I	Group-II
Before corneal section	7.93mm (± 1.00)	7.7mm (± 1.00)
Post lens delivery	7.2mm (± 1.00)	6.5mm (± 1.00)
After I/A	6.3mm (± 1.00)	5.1mm (± 1.00)
After injection of miostat	2.5mm (± 0.50)	2.6mm (± 0.50)
Mean changes from incision to post I/A	1.63mm (± 1.00)	2.6mm (± 1.00)

The horizontal pupillary diameters were measured with squint calipers viewed under the operating microscope at various stages i.e., presclerotomy, after lens delivery and after irrigation/aspiration and after injection of miostat.

RESULTS

The mean presclerotomy pupillary diameters were 7.93mm (± 1.00) in group I and 7.7mm (± 1.00) in group II. The mean post-lens delivery (ECCE or phacoemulsification) diameters were 7.2mm (± 1.00) in group I and 6.5mm (± 1.00) in Group II. The mean diameters after I/A were 6.3mm (± 1.00) in Group I and 5.1mm (± 1.00) in group II.

Table-3 summarizes the results. There is not much difference in the pupillary diameters between the two groups at the start of surgery, but the pupil constriction continued more in group II (not given ocufen) and there was a significantly larger pupil in group I (given ocufen) at the end of I/A, thereby facilitating the lens implantation with better visualization. Following injections of acetylcholine or carbachol (Miostat-0.5ml) there was no significant difference in the absolute pupil size at the end of the procedure, so ocufen does not interfere with reaction to acetylcholine or carbachol^{7,8}.

DISCUSSION

Following tissue injury, phospholipase A2 is activated, that leads to the breakdown of cell membranes phospholipids by cyclo-oxygenase to prostaglandins or to leukotriens by 5-lipoxygenase. Cataract extraction is associated with increased prostaglandin levels in the aqueous. Surgery also leads to the breakdown of blood-aqueous barrier and thus protein influx into the anterior chamber and miosis by constricting the iris sphincter, independent of cholinergic mechanisms. These changes are mediated in part by prostaglandins. Flurbiprofen sodium is one of the series of phenylalkanoic acids. Its mechanism of action is believed to be through the inhibition of cyclo-oxygenase enzyme that is essential in the biosynthesis of prostaglandins⁹⁻¹¹.

Using three drugs in combination gives better pupillary dilatation and reduces total amount of individual drug intake, thus enhancing safety in susceptible patients e.g acceleration of hypertension in the elderly or induction of psychosis in children.

Flurbiprofen has been demonstrated and

documented to be effective in maintaining mydriasis even in low concentrations with ease of instillation. This study shows that in the presence of irrigating solution containing adrenaline, topical ocufen in combination and in small dosage has a significant effect in maintaining peroperative mydriasis.

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Ophthalmic "Pastpourri"

"De Oculis" by Benvenuto Grassus: [XVII: The Second Panaculus]

THE second form of panaculus appears on the eye tunics like an opacity or speckled like a fish-scale. The third variety when observed in some parts of the eye looks like a snowflake. The fourth panaculus is seen when the whole eye turns white and a dark color is noticeable about the tunic or the pupil. Having described the different panaculi I shall now discuss their treatment in accordance with the approved canons of our art.

Jehangir Durrani
MD, FACS, FRC OPHTH.

From: De Oculis (translated by Casey A. Wood)
Stanford University Press, Stanford University,
California. 1929;p45.

Intraocular lenses in Children: Complications and Their Management

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ABSTRACT

We report the complications and management of Intraocular Lens Implantation (IOL) in 35 eyes of 27 children under 12 years of age, observed over 10 years (1988-98). These cataracts were visually significant, i.e. reducing vision to less than 6/60. 27 of these were unilateral (Table-1) (traumatic 20, developmental 4, congenital 3) and 8 were bilateral, in four patients (2 developmental and 2 congenital cataracts) (Table-2). Ages at the time of operation ranged from 3 to 12 years for unioocular cataracts and 2 to 7 years in bilateral cases. Follow-up period was 1 to 10 years for unioocular cases and 3 months to 5 years for bilateral cases.

Most significant complications were fibrinous uveitis and capsular thickening. Both were worse in younger patients (Age 2 to 5 years). Uveitis became less virulent with subconjunctival injection of depomedrol and vigorous mydriasis.

The marked capsular thickening in extracapsular cataract extractor (ECCE) + IOL required capsulotomy in almost 90% of the cases, mostly within six months of the operation. To counter capsular thickening, later cases were operated on by a modified technique of ECCE + IOL + posterior capsulotomy and anterior vitrectomy where possible. This showed a significant decrease in capsular thickening requiring capsulotomy and much clearer media and visual rehabilitation, with better results.

Visual outcome was excellent in 30% (VA 6/12 or better), good in 33% (VA 6/24 to 6/12), fair in 15% (VA 6/60 to 6/24) and poor in 22% of cases (VA less than 6/60). The patients in the last group were cases with macular damage, corneal scarring and amblyopic eyes. Contact lenses were tried in a few patients with poor compliance. Recurring cost, extra care, lack of education, unfavourable climatic conditions, with heat and dust and poor socioeconomic status were the main factors for failure of contact lenses. Four patients required anterior chamber lenses (ACLs): two after poor compliance with contact lenses and two with posterior capsular rupture.

INTRODUCTION

Unioocular traumatic or developmental cataract in children has till recently been a problem for the parents, ophthalmologists and allied specialties^{1,2}. Left alone, the child ends up with unioocular vision, leucocoria (cosmetically unacceptable) and a psychological burden on the child and the parents, with added risk of developing squint sooner or later in the poorly seeing eye, the risk being proportionately worse in those with earlier onset of cataract³. Bilateral congenital or developmental cataracts, when dense enough, lead to poor sight development in the vision formative period (the first 17 months of life have the best prospects; up to 27 months somewhat less; the prospects are least by 3-5 years). Untreated, they develop bilateral amblyopia and nystagmus⁴. Earlier, rather than later, removal of lens by aspiration followed by aphakic correction with glasses or contact lenses is usually recommended⁵, but the results are not uniformly good because of the extended periods of uncorrected aphakia which is usually the case, i.e. the child not wearing correction because of broken

glasses, lost contact lenses, waiting for replacements. Intraocular lens implantation in the young patients with bilateral cataracts is an excellent way of overcoming the above mentioned problems and enhancing their chance of binocular single vision development^{6,7}.

MATERIALS AND METHODS

35 eyes of 27 children under 12 years were operated on under general anaesthesia (G.A.) by the author (MSA). Of these, 27 were unilateral cataracts and 8 were bilateral. The technique used was ECCE + PC IOL in 18 cases. ECCE with ruptured posterior capsules had ACLs in 5 cases. Two among the latter were secondary ACLs after intolerance to contact lens. 4 cases underwent scleral fixation of PC IOL along with anterior vitrectomy after posterior capsular rupture and moderate vitreous loss (Table-1).

Eight bilateral cases were congenital or developmental, aged 1 to 7 years. One eye of each patient was operated on by ECCE + PC IOL + primary capsulotomy and anterior vitrectomy and the other eye with ECCE + PC IOL only.

The power of IOL was calculated mostly with SRKII formula and in a few cases it was guess work with retinoscopic refraction of the fellow eye taken as a guide. The aim was to have emmetropia by the age of five years. Patients had A + B scan done in most of the cases.

Pupils were dilated with 1% tropicamide and 5% isonephrine in most cases. A few needed 1% atropine eye ointment (stopped 24 hours before surgery). A standard ECCE was aimed for with fornix-based conjunctival flap and bipolar cautery to the limbal blood vessels. Partial-thickness grooved posterior limbal incision from 10 to 2 O'clock was made. The anterior chamber was entered with a 23 gauge needle tip. Some aqueous was allowed to leak out and viscoelastic material (Healon, Coatel, Adatocel or Visilon) injected to fill the AC. Posterior and peripheral anterior synechiae when present were separated with the cannula and home-made irrigating cystitome from 27 G needle. Anterior capsulotomy was done in a can-opener technique, taking with it as much of the anterior capsule as possible without damaging the zonular attachment. The idea was to leave as few active epithelial cells as possible to reduce the chance of after-cataract developing. Corneal section was completed with the corneal scissors. The lens delivery was mostly easy, excepting a few times, when the pupil came down. Two interrupted sutures of 10/0 perlon were placed at 11 and 1 O'clock position. The anterior chamber was maintained and the remaining lens matter was meticulously cleared with irrigation - aspiration cannula using BSS or BES, with adrenaline (1:1000, 0.5cc in 500 ml). Posterior capsule was polished, where needed, with I/A cannula tip. More viscoelastic was injected into the AC and the PC inferiorly; PC IOL was slipped behind the iris into the ciliary sulcus. No attempt was made for it to go into the capsular bag.

When the posterior capsule got ruptured or was found already damaged badly and unable to support the PC IOL, after liberal anterior vitrectomy an AC IOL was inserted. In 4 cases with ruptured PC and moderate loss of vitreous, a liberal anterior vitrectomy was done to clear the AC and PC of vitreous and then scleral fixation of a PC IOL was done under partial-thickness scleral flap, with buried knots of 10/0 perlon suture and separate conjunctival coverings (During the procedure the shape of the eyeball and its volume were maintained by liberal filling of AC and PC with viscoelastic material). Towards the end, nearly all viscoelastic material was washed out by gentle irrigation-aspiration. The wound was secured water-tight by more interrupted buried 10/0 perlon

sutures. During the last 5 years, 4 cases of bilateral (two developmental and 2 congenital) cataracts were managed. One eye of each patient had standard ECCE + PC IOL, while in the other eye after ECCE + IOL, anterior vitrectomy and primary posterior capsulotomy (4-5mm) were done through the peripheral iridectomy (PI) to remove the scaffolding for after-cataract formation. Miostat was used to miose the pupil. Injection depomedrol (20mg), injection decadron (1mg) and injection genticyn (20mg) were given subconjunctivally into the inferior fornix. Antibiotic ointment was instilled and the eye padded till the following day. Patients were kept on mydriacyl 1%, cyclopentolate 1% once or twice a day and maxitrol eye drops QID. Follow-up was after one week, two weeks, four weeks, and eight weeks and then 3-6 monthly. Sutures were removed after 3 months in all cases.

Visual acuity was measured and glasses given after refraction where needed. For posterior capsular thickening Yag laser or surgical capsulotomy of 4-5mm was performed after 3 to 6 months. Amblyopia therapy was given to the patients with variable compliance and results.

COMPLICATIONS

Peroperative - Transient bleeding occurred in cases with posterior synechiae during separation. It settled down quickly.

Postoperative complications are listed in Table-3. Most significant were fibrinous uveitis - worse in 2-to 5-year-old patients. We think it was at least partly due to poor compliance of these smaller kids to topical drops which are difficult to instill and are then promptly squeezed out. The severity of this complication reduced tremendously when a mixture of Injection decadron (1mg) genticyn (20mg) and depomedrol (20mg) was given subconjunctivally at the end of the operation to provide constant supply of steroids. Visually significant posterior capsular thickening needing capsulotomy occurred in 94% of the cases with intact posterior capsule, mostly within 6 months of the operation (Table-3). Nd:YAG laser capsulotomy was done in cooperative 8-to 12-year-olds and surgical capsulotomy in younger noncooperative children. Only one patients (25%) with PC IOL + anterior virectomy + primary capsulotomy required secondary capsulotomy. Iris-Implant synechiae formed in 39% of PC IOLs and in 20% of AC IOLs. No case needed IOL removal or replacement. Glaucoma developed in 11% of PC IOL cases and 20% of AC IOL cases needing further management.

Table 1: Patient data of unilateral cataracts.

Age at IOL surgery (Years)	Follow-up (Years)	Etiology of cataract	Type and power of IOL	Surgical technique	Pre-operative VA	Post-operative VA	Other procedure	Final refraction (sph. Eq) & remarks
5	10	Develop.	ACL 19D	ECCE+IOL	HM	6/9	Yag Cap	+1.00D
8	9½	Traumatic	PCL 21D	ECCE+IOL	HM	6/60	Yag Cap	Corneal opacity + mac. scar
10	9½	Traumatic	ACL 19D	ECCE+IOL	HM	6/12	-	-0.50 D
3½	9¼	Develop.	PCL 21D	ECCE+IOL	6/60	6/18	Yag Cap
12	9	Traumatic	ACL 18D	ECCE+IOL	HM	6/60	-	-0.75D + Glaucoma + PAS
5	9	Traumatic	PCL 23D	ECCE+IOL	CF	6/12	Yag Cap	-1.00 D
3	8½	Traumatic	PCL 24D	ECCE+IOL	HM	6/60	Surg. Cap	Macular scar
5½	8½	Develop.	PCL 21D	ECCE+IOL	PR +ve	6/24	Yag Cap	-1.00D
6	8	Traumatic	ACL 19D	PC damaged	PL +ve	3/60	-	Macular scar
		(2 years ago)						
4	8	Traumatic	ACL 19D	Sec. ACL	PL +ve	CF	Yag Cap	Squint. Poor orthoptic response
2	6½	Congenital	PCL 21D	ECCE +IOL	PR +ve	6/12	Surg. Cap	+0.50D
6	6	Develop.	PCL 20.50D	ScI Fix	CF	6/12	-	+1.50D
3	6	Traumatic	PCL 22D	ECCE + IOL	PR +ve	6/60	Surg. Cap	+1.00D
4	5½	Traumatic	PCL 22D	ECCE + IOL	HM	6/12	Surg. Cap	-0.50D
6	5½	Traumatic	PCL 23D	ECCE + IOL	6/60	6/9	Yag Cap	-1.00D
3	5	Traumatic	PCL 22D	ECCE + IOL	PL +ve	HM	Surg. Cap	Damaged macula
2½	5	Congenital	PCL 23D	ECCE + IOL	PL +ve	6/60	Surg. Cap	Amblyopia

Cont.....

Age at IOL surgery (Years)	Follow-up (Years)	Etiology of cataract	Type and power of IOL	Surgical technique	Pre-operative VA	Post-operative VA	Other procedure	Final refraction (sph. Eq) & remarks
4	4½	Traumatic	PCL 22D	ECCE + IOL	CF	6/18	Yag. Cap	+0.75D
6	4	Traumatic	PCL 21D	ECCE Scl. fix.	HM	6/12	.	-1.00D
8	3	Traumatic	PCL 20.50D	ECCE + IOL	PL +ve	HM	.	Corneal scarring + PAS + Glaucoma
12	3	Traumatic	PCL 20D	ECCE Scl. fix	PL +ve	6/24
4	3	Traumatic CL intolerance	ACL 18D	Sec. ACL	PL +ve	4/60	Surg. Cap	Squint needing surgery
7	2½	Traumatic	PCL 20D	ECCE + IOL	PL +ve	6/24	Surg. Cap	.
2½	2	Congenital	PCL 22D	ECCE + IOL	PL +ve	2/60	Surg. Cap	Amblyopia
11	2	Traumatic	PCL 19D	ECCE Scl. Fix	PR +ve	6/24
6½	1½	Traumatic	PCL 20D	ECCE IOL	HM	6/24	Surg. Cap	...
4	1	Traumatic	PCL 20D	ECCE IOL	CF	6/18	Surg. Cap	...

Yag Cap
Surg Cap
Scl Fix
Develop.
PAS
CL

Yag capsulotomy
Surgical capsulotomy
Scleral fixation
Developmental
Peripheral anterior synechiae
Contact lens

PC
Sec.

Posterior capsule
Secondary

RESULTS

The level of pre and postoperative visual acuity is shown in Table-1. Final visual acuity in unilateral cases was excellent (VA 6/12 or better) in 30% of the eyes, good (VA 6/24 to 6/12) in 33% of the cases, fair (VA 6/60 to 6/24) in 15% and poor (VA less than 6/60) in 22% of cases, mostly with damaged muculae, scarred corneas and amblyopia in early onset cataracts. (Table 5 and 6). Postoperative refraction varied from zero to $\pm 1.50D$ spherical equivalent. No patient developed diplopia.

DISCUSSION

The management of unocular cataract in children had, till recently, been a difficult and controversial issue both for the ophthalmologists and the parents. For quite some time, the debate had been

as to what will happen (size-wise and related stability) to the IOL as the child's eye will grow; would it become loosened from ciliary sulcus and dangle about/dislocate? According to the embryologists the anterior segment (cornea and sclera up to the insertion of the recti muscles) attains its near-dult size just before the age of 2 years^{8,9}. It is the posterior segment that enlarges in the remaining years. Refraction is stable almost to the emmetropic level by the age of 4 years or so, as far as the cornea and the lens are concerned¹⁰. Axial myopia (where bound to occur) should therefore be no contraindication to IOL¹¹. IOLs do not lead to any change in the axial length of the host eyes by themselves.

The fibrinous uveitis associated with IOLs was almost similar both in ACLs and PCLs apart from the previous trauma that produced the cataract and uveitis now reactivated with exaggerated response. Children do not open their eyes properly for the instillation of

Table 3: Postoperative complications in unilateral cataracts (Total eyes: 27).

	PCL	ACL	SCLERAL FIXATION
No. of Cases	18	5	4
COMPLICATIONS			
Fibrous uveitis	12(66%)	3(60%)	2(50%)
Post cap. thickening	17(94%)	1(20%)	.
Iris - IOL synechiae	7(39%)	1(20%)	.
Iris sphinter erosion	6(33%)	1(20%)	.
Posterior capture	4(22%)	.	.
Glaucoma	2(11%)	1(20%)	.

Table 4: Postoperative complications in bilateral cataracts (Total eyes: 8)

	ECCE + IOL	ECCE + IOL + Post cap Ant. vit
No. of cases	4	4
COMPLICATIONS		
Fibrous uveitis	1(25%)	1(25%)
Post cap thickening	4(100%)	1(25%)
Iris - IOL synechiae	2(50%)	.
Iris sphinter erosion	2(50%)	1(25%)
Posterior capture	1(25%)	.
Glaucoma	1(25%)	1(25%)

Ant vit. - Anterior vitrectomy

Post cap. - Posterior capsulotomy

drops and rather squeeze them out too quickly for these to be effective enough to combat uveitis. We found that a mixture of short-and long-acting steroids (decadron 1mg and depomedrol 20mg) by subconjunctival injection provided an adequate quantity of steroids to reduce this complication drastically.

The posterior capsular thickening needing a capsulotomy (Nd:YAG laser/surgical) remains a problem. Cooperative patients were treated with Yag laser on the slit-lamp as we do not have Nd:YAG that can be used on recumbent patients in the operation theater under G.A¹². Thus most of those who needed capsulotomy ended up with surgical capsulotomy.

With the primary capsulotomy and limited anterior vitrectomy as part of the primary procedure, the incidence of posterior capsular opacification needing a second procedure (YAG laser or surgical capsulotomy), has come down tremendously (25%, Table-4) in this series, as has been reported by others^{13,14}.

Table 5: Final VA - unilateral group (27 eyes).

VA	Eyes	Percentage
6/12 or better	8	30
6/24 to 6/12	9	33
6/60 to 6/24	4	15
Less than 6/60	6	22

Table 6: Final VA - bilateral group (8 eyes).

VA	Eyes	Percentage
6/12 or better	2	25
6/24 to 6/12	3	38
6/60 to 6/24	1	12
Less than 6/60	2	25

Correcting unioocular aphakics part time i.e 2-4-6 hours per day with glasses to keep the macula stimulated, while occluding the good eye, is not the ideal solution as the child soon gets fed up with aphakic lens induced magnification and distortions.

Extended wear contact lens is an excellent way of correcting aphakia in children¹⁵ but has proved a failure in our country due to its recurring costs, maintenance, climatic and other socioeconomic factors. Epikeratophakia as an alternative to contact lens and IOLs in young patients gave us hope but the initial cost was prohibitive in our country. It has been shown that compliance by patients in accepting best optical correction is better in those who have intraocular lens, compared to those with the contact lens^{7,17}.

This study shows that IOL in children 2-12 years of age is a genuine attempt to restore good binocular vision in a fair number of cases (Tables 5 and 6).

Even in bilateral cases early IOL implantation with primary posterior capsulotomy and limited anterior vitrectomy is much better in clearing the media and restoring the refractive mechanism without undue associated complications in this short period of study which definitely needs further evaluation. One worry remains as the long-term (60-70 years) effect on the stability, trauma and biodegradation of the material used for IOLs¹⁸.

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Ophthalmic "Pastpourri"

"De Oculis" by Benvenutus Grassus: [XVIII: Treatment of The First Panaculus]

WHEN you see deposits in the eye that resemble millet seeds, do not prescribe either local or general remedies alone, because this form of the disease can not be cured by laxatives, powders, or eyewaters, nor by cauterants; they are all harmful. Instead of these use a renowned cure, my alabaster ointment, compounded as follows; Take forty fresh and tender grapevine leaves, onion tops, or leaves of a tree such as the sloe or blackberry. Bruise them thoroughly in a mortar with two measures of the best white wine. Then take either dry or fresh camomile, four ounces; the stone called alabaster and fennel seeds, of each half an ounce; oil of roses, one pound; and wax, two ounces. All these, except the camomile and the wax, are to be thoroughly pounded and mixed together before adding them to the vinous mixture. Then the ingredients are to be well stirred in a large pot and boiled over a slow fire until all the fluid is evaporated. Now add the well-beaten whites of seven eggs, and stir until thoroughly mixed. Strain through a linen cloth. With the resulting precious ointment anoint the temples and forehead down to the eyebrows. With this unguent alone you can cure patients with a panaculus in the form of grains of millet.

Jehangir Durrani
MD, FACS, FRC OPHTH.

From: *De Oculis* (translated by Casey A. Wood)
Stanford University Press, Stanford University,
California. 1929;p46.

Abstracts

Edited by Ajmal Nisar

Aqueous Humor Flow in Human Eyes Treated With Dorzolamide and Different Doses of Acetazolamide.

Larsson L-I, Alm A.

Arch Ophthalmol 1998; 116: 19-24.

The study was done to measure the effect of topically applied 2% dorzolamide hydrochloride (Trusopt, Merck & Co Inc, Whitehouse Station, NJ) and different doses of orally administered acetazolamide (Diamox, Lederle Ophthalmic pharmaceuticals, Pearl River, NY), alone and in combination, on aqueous humor flow.

A randomized, double-masked, placebo-controlled study of 20 human subjects was carried out. Aqueous humor flow was measured by clearance of topically applied fluorescein. Serum standard bicarbonate and serum acetazolamide levels were analyzed.

Treatment with dorzolamide reduced aqueous flow by 17%, and a maximum dose of acetazolamide alone reduced flow by 29%. Increasing doses of acetazolamide alone gradually decreased flow, while small doses of acetazolamide did not suppress flow further when dorzolamide was already applied topically. Serum acetazolamide concentrations rose with increasing doses of acetazolamide. Serum standard bicarbonate levels were all in the normal range.

Treatment with dorzolamide reduced aqueous humor flow statistically significantly (2.50 uL/min vs 3.00 uL/min; $p=.001$) compared with placebo, but less than a maximum dose of acetazolamide. Small doses of acetazolamide added to dorzolamide treatment did not further enhance the decrease in flow. Since there was no metabolic acidosis as measured by plasma levels of standard bicarbonate, the decrease in aqueous flow could be attributed to the direct action of the carbonic anhydrase inhibitors on the carbonic anhydrase enzymes. It was concluded that the smaller effect of dorzolamide, as compared with acetazolamide, was due to insufficient inhibition of at least 1 of the 2 carbonic anhydrase isozymes involved in aqueous humor production.

Effect of Cataract Extraction on the Results of Automated Perimetry in Glaucoma.

Smith SD, Katz J, Quigley HA.

Arch Ophthalmol 1997; 115: 1515-9.

The study was done to investigate the effect of cataract extraction on the results of automated perimetry in persons with glaucomatous visual field loss.

Subjects from a retrospective study of visual field progression who underwent cataract extraction during follow-up were identified. Subjects came from the glaucoma service of a hospital-based tertiary referral center.

Subjects had at least 7 Humphrey 24-2 or 30-2 visual fields over 5 years or more, with an abnormal glaucoma hemifield test result on the first 2 examinations. Visual field data were transferred to a microcomputer and comparison of the visual fields immediately before and after cataract extraction was performed.

Sixty-five eyes of 50 subjects (mean age 71.8 years) were included in the analysis. A mean improvement in mean deviation (MD) of 1.68 dB ($p<.001$), and a mean worsening in corrected pattern SD (CPSD) of 0.54 dB ($p=.09$) was observed. The mean unweighted change in threshold in the 52 points of program 24-2 was 1.58 dB, corresponding to a 43.9% increase in sensitivity. A significant correlation between improvement in visual acuity and improvement in MD was also found. A mean increase in CPSD of 1.61 dB ($p=.005$) occurred in subjects with dense scotomas (minimum threshold value ≤ 5 dB) and preoperative CPSD of 8 dB or less.

It was concluded that in persons with glaucomatous visual field defects, cataract extraction produces only a modest improvement in MD. After cataract surgery, the CPSD index worsened in many subjects with dense scotomas. This suggests that the development of cataract can mask progressive glaucomatous visual field loss in such persons.

Visual function 5 Years After Optic Neuritis Experience of the Optic Neuritis Treatment Trial. The Optic Neuritis Study Group
Arch Ophthalmol 1997; 115: 1545-52

The study was done to assess the 5-year visual course, including the incidence of recurrent optic neuritis, in 454 patients enrolled in the Optic Neuritis Treatment Trial.

Five-year follow-up vision testing, which included measures of visual acuity, contrast sensitivity, visual field, and color vision, was completed for 397 (87%) of the 454 patients.

Visual function test results in the eyes that experienced optic neuritis at study enrollment (affected eyes) were normal or only slightly abnormal after 5 years in most patients; the results did not significantly differ by treatment group ($p=.37$ for visual acuity). The visual acuity in the affected eyes was 20/25 or better in 87%, 20/25 to 20/40 in 7%, 20/50 to 20/190 in 3%, and 20/200 or worse in 3%. The recurrence of optic neuritis in either eye occurred in 28% of the patients and was more frequent in patients with multiple sclerosis ($p=.001$) and in patients without multiple sclerosis who were in the prednisone treatment group ($p=.004$). Most eyes with a recurrence retained normal or almost normal visual function.

Most patients retained good to excellent vision in the 5 years following an attack of optic neuritis, even if the optic neuritis recurred. Recurrences were more frequent in patients with multiple sclerosis and in those treated with oral prednisone alone. The completion of the 5-year follow-up by the Optic Neuritis Treatment Trial cohort has not altered their management recommendations based on the results reported earlier by the authors.

Comparison of Dorzolamide and Timolol as Suppressors of Aqueous Humor Flow in Humans.

Wayman L, Larsson L-J, Maus T, Alm A, Brubaker R.
Arch Ophthalmol 1997; 115: 1368-71.

The study was done to measure the effectiveness of topical 2% dorzolamide hydrochloride (Trusopt, Merck & Co Inc, Whitehouse Station, NJ) as a suppressor of aqueous humor flow in the human eye as compared with the effectiveness of 0.5% timolol maleate (Timoptic, Merck & Co Inc) and to measure the additivity of the 2 drugs.

A randomized, double-masked, placebo-controlled study of 40 human subjects was carried out in 2 academic centers (Mayo Clinic, Rochester, Minn. and University of Uppsala, Uppsala, Sweden). The rate of aqueous flow was measured from 8 AM to 4 PM by means of fluorophotometry after administration of doses of each drug singly and both drugs together.

Dorzolamide reduced aqueous flow from 3.07 ± 0.63 uL/min (mean \pm SD) to 2.53 ± 0.60 uL/min, a reduction of 18% ($p<.001$). Timolol reduced aqueous flow from the same beginning rate to 1.64 ± 0.35 uL/min, a reduction of 47% ($p<.001$). The inhibitory effect of timolol was 2.6 times the inhibitory effect of dorzolamide ($p<.001$). The 2 drugs were almost completely additive, and together reduced the flow to 1.37 ± 0.33 uL/min, a reduction of 55%. Consistent effects were observed on intraocular pressure.

Timolol was seen to be more effective than dorzolamide as a suppressor of aqueous humor flow in the normal human eye. Timolol and dorzolamide were additive in their effects, both on aqueous flow and intraocular pressure.

Botulinum Toxin Management of Essential Infantile Esotropia in Children.

McNeer KW, Tucker MG, Spencer RF.
Arch Ophthalmol 1997; 115: 1411-8.

Infantile esotropia has an onset during early infancy when visual cortical connections are established for binocular fusion and stereopsis. The goal of early treatment is to achieve normal binocular alignment and a favorable sensory outcome.

To determine the long-term effects of the use of botulinum toxin for the management of infantile esotropia in children, seventy-six neurologically normal children ranging from 4 to 48 months of age were entered consecutively into the study after being given the initial diagnosis of infantile esotropia with a mean strabismic angle of 33 prism diopters.

Simultaneous bilateral injections of 2.5 U of botulinum toxin type A were made into the medial rectus muscles under nitrous oxide and ethrane anesthesia. Patients were followed up for 12 to 95 months after the last injection. Forty patients required one bilateral injection and 36 patients required multiple bilateral injections to achieve a favorable motor outcome.

Bilateral medial rectus muscle injections of botulinum toxin were effective in reducing the mean preinjection deviation of 33 PD to an average esotropic angle of 2 PD. Binocular alignment (± 10 PD) was achieved in 68 patients (89%). Boys required significantly fewer injections than did girls. The secondary incidence of overacting inferior oblique muscles was significantly greater in boys, while girls had a significantly greater incidence of late-onset refractive errors.

Botulinum toxin was considered an effective treatment modality for the management of infantile esotropia in infants and children, producing binocular alignment of the visual axes.

Corneal Transplantation in Children with Peters Anomaly and Mesenchymal Dysgeneses.

Dana MR, Schaumberg DA, Moyes AL, Gomes JAP, for the Multicenter Pediatric Keratoplasty Study. Ophthalmology 1997; 104: 1580-6.

The purpose of the study was to describe graft and visual outcomes of penetrating keratoplasty among young children with Peters anomaly and associated mesenchymal dysgeneses.

The records of all children aged 12 years and younger who underwent penetrating keratoplasty for mesenchymal dysgenesis between January 1975 and May 1993 at the participating centers were reviewed.

The data were analyzed regarding graft survival and postoperative visual acuity.

Forty-seven corneal transplants in 36 eyes of 29 patients with mesenchymal dysgenesis were studied. The majority of eyes operated on (30) had Peters anomaly (83%). Patients' mean age at the time of keratoplasty was 7 months. After a mean follow-up period of 38 months, 61% of eyes retained full graft clarity. One and 3-year survival rates were 79% (95% confidence interval [CI]=65%-93%) and 62% (95% CI=45%-79%), respectively. Postoperative corneal ulcers/nonhealing epithelial defects ($P=0.03$), and additional noncorneal surgical procedures at the time of transplantation ($P=0.05$) were associated with graft failure. Provision of postoperative optical aids ($P=0.01$) was associated with better postoperative visual acuity levels.

Penetrating keratoplasty for Peters anomaly and related mesenchymal dysgeneses in young children has

a reasonable chance of success during the critical years of visual maturation and is associated with satisfactory visual results in one third to half the cases. The data suggest that complicated cases requiring additional surgical procedures have a worse prognosis.

Implications of Early Systemic Therapy on the Incidence of Endogenous Fungal Endophthalmitis.

Scherer W J, Lee K.

Ophthalmology 1997; 104: 1593-8.

In the past, evidence of endogenous fungal endophthalmitis has been used as a guide to initiating potentially toxic antifungal therapy in patients with systemic fungal infections. Recently, however, a trend has developed to provide patients with antifungal therapy at the first evidence of fungal infection. The authors' study evaluates the incidence of endogenous fungal endophthalmitis in this setting.

The design was a retrospective review of the medical records of patients examined by the inpatient ophthalmology consultation service to rule out endogenous fungal endophthalmitis between January 1994 and April 1996 at the University of Michigan Hospitals, Ann Arbor, Michigan.

A review of medical records of 107 patients (214 eyes) with a diagnosis of systemic fungal infection was performed.

The findings of the ocular examination, the presence of risk factors for disseminated fungal infection, the type of antifungal therapy, and the source and identity of the isolated fungus were recorded.

The majority of patients examined had either fungal growth from blood cultures or evidence of deep tissue fungal infection. All patients in the study were at risk for fungal disease with each having at least one risk factor for disseminated fungal infection. Of the patients examined, 93.4% already were receiving systemic antifungal therapy at the time of ophthalmologic consultation. Only 3 (2.8%) of the 107 patients examined had chorioretinal findings consistent with early endogenous fungal endophthalmitis. None had intravitreal involvement, and the ocular findings did not change the course of therapy.

Early systemic treatment of deep tissue fungal infection appeared to dramatically decrease the incidence of endogenous fungal endophthalmitis.

Conjunctival Autograft Versus Topical Mitomycin C in Treatment of Pterygium.

Mahar PS.

Eye 1997; 11: 790-2

A prospective study was carried out to assess the recurrence rate of pterygium with conjunctival autograft versus the use of topical mitomycin C. In 27 eyes undergoing pterygium excision with conjunctival autograft, the recurrence rate was found to be 25.9% after 1 year mean follow-up. In the second group of 32 eyes, pterygium was removed using the bare sclera method. All these patients received post-operatively 0.2 mg/ml (0.02%) topical mitomycin C twice a day for 5 days. At 1 year mean follow-up, the recurrence rate in this group was 9.4%. Although the difference was not statistically significant, the number of recurrences was lower in the mitomycin C-treated group than in patients undergoing conjunctival autograft.

Paediatric Cycloplegia: A New Approach.

Shah P, Jacks AS, Adams GGW.

Eye 1997; 11: 845-6

Cycloplegia is a traumatic experience for most children, as guttae cyclopentolate stings on instillation into the conjunctival sac. This may result in inadequate cycloplegia, difficulty in further examination and a child who is scared of both the doctor and the ophthalmology department. Guttae proxymetacaine hydrochloride 0.5% (Ophthaine, Proparacaine) is a topical local anaesthetic that does not sting on instillation.

Eighty-eight consecutive children in the pediatric clinic were assessed. The response of the patient to previous use of cyclopentolate alone was assessed by the parents of the child using a grading scheme. The use of proxymetacaine prior to instillation of cyclopentolate was then assessed using the same grading system.

Seventy per cent of the children who received cyclopentolate alone were assessed to have cried and been unhappy. Ninety-one per cent of the children who received cyclopentolate after proxymetacaine were assessed to have shown no adverse reaction to the cycloplegia and remained happy.

This study shows that use of proxymetacaine prior to cyclopentolate results in atraumatic cycloplegia in children. This can confer multiple benefits on the doctor-patient relationship.

Discharging Routine Phacoemulsification Patients at One Week.

Edwards M, Rehman S, Hood A,

Stirling R, Noble B.

Eye 1997; 11: 850-3

The reduction of surgically induced astigmatism and rapid refractive stabilisation after phacoemulsification have been well studied and often lead to reduced follow-up. In this prospective study we reviewed a cohort of 100 patients discharged with a refractive prescription at their 1 week post-operative appointment following routine sutureless phacoemulsification through a corneal or scleral section. The aim was to assess the incidence of late pathology and need for review. Eighty-eight patients attended for review between 3 and 4 months post-operatively, of whom 8 (9.1%) who had been symptomatic had already visited ophthalmic casualty. Nine (10.2%) benefited from the follow-up appointment: 4 were given a new refractive prescription that increased their Snellen visual acuity by 1 line; the other 5 were all symptomatic or had incidental findings. The authors felt that provided there was easy access to the eye department, early discharge with or without refraction was justifiable as those with surgically related pathology at any stage were symptomatic.

Capsulorhexis Phymosis Following Uncomplicated Phacoemulsification Surgery.

Zambarakji HJ, Rauz S, Reynolds A, Joshi N, Simcock PR, Kinnear PE.

Eye 1997; 11: 635-8

The aim of the study was to assess and compare the degree of capsulorhexis phymosis following uncomplicated phacoemulsification cataract surgery in polymethylmethacrylate (PMMA) and silicone lens implants.

Sixty-four patients were evaluated 1 day, 6 weeks and 6 months following phacoemulsification cataract extraction. The anterior capsular diameters were measured with the illuminated beam of the slit lamp at 45 degrees and 135 degrees and the surface area of the opening calculated. They measured and compared the change in the capsulorhexis size for both lens types and assessed its statistical significance with a paired Student's *t*-test.

A statistically significant contraction of the capsulorhexis was noted in all patients within the first 6 weeks ($p < 0.001$). Capsular contraction continued between 6 weeks and 6 months post-operatively but to a lesser extent ($p < 0.05$). The difference in the degree

of phymosis between the first period (1 day to 6 weeks) and the second (6 weeks to 6 months) was statistically highly significant for all patients ($p < 0.001$). The capsular areas for the silicone lens implants were significantly smaller than for the PMMA implants at 6 weeks and 6 months. None of the patients had a clinically significant capsular contracture requiring Nd:YAG laser capsulotomy.

Anterior capsular contraction is commonly observed following capsulorhexis in phacoemulsification surgery. This study demonstrated that the maximum rate of contraction occurred in the first 6 weeks following surgery and was more pronounced with silicone lens implants.

Variation in Astigmatism Following the Single-step, Self-sealing Clear Corneal Section for Phacoemulsification.

Rauz S, Reynolds A, Henderson HWA, Joshi N. Eye 1997; 11: 656-60

In this study a single-step, self-sealing, 3.2 mm clear corneal section is described and the incidence and variation of surgically induced astigmatism following phacoemulsification over a period of 3 months was determined.

Twenty-two patients who underwent uncomplicated 3.2 mm clear corneal phacoemulsification with foldable Allergan silicone intraocular lens implantation were autorefracted pre-operatively and on day 1, week 1, week 6 and at 3 months. The variation in induced astigmatism was analysed using the subtraction method and vector analysis. The change in direction of the cylindrical axis was examined.

The induced astigmatism represented by the total vector on day 1 was 1.17 D and vector decomposition ratio, ATR:WTR (against-the-rule:with-the-rule), was 21.05:78.95. The total vector increased by 0.5 D in the first week and then stabilised. Vector decomposition showed an against-the-rule astigmatic drift so that by 3 months the ATR:WTR was 40.49:51.91. There was a tendency of the axis of the negative cylinder to swing towards the corneal section meridian on day 1 and to oscillate around that meridian at week 1 and week 6. By 3 months the direction reverted to that pre-operatively, in most cases.

The single-step, self-sealing clear corneal section was considered mechanically stable and, though there

was some variability in the measured astigmatism, there was an acceptable functional result throughout the post-operative period.

Sulphur Hexafluoride in the Treatment of Flat Anterior Chamber Following Trabeculectomy.

Beigi B, O'Keefe M, Algawi K, Acheson R, Burke J. Eye 1997; 11: 672-6

The efficacy and side effects of sulphur hexafluoride (SF_6) in the reformation of the flat anterior chamber (AC) after standard trabeculectomies were studied. Ten patients with lenticulocorneal touch following trabeculectomy were enrolled. All had water-tight conjunctival wounds with overflowing fistulas. In 5, one to four surgical attempts to reform the AC were unsuccessful. Two to seven days after trabeculectomy, the AC was reformed by a single injection of SF_6 /air mixture (20-40%). Gas was injected through the limbus at 3 or 9 o'clock. The AC remained deep after absorption of the gas in 2-7 days. All patients had stromal oedema in the first 4 days. This resolved and specular microscopy did not show any abnormality. After a mean follow-up of 2.5 years, all had normal intraocular pressure, 3 with one topical antiglaucoma treatment. Three patients developed cataracts before and 3 after reformation of the AC. The latter 3 were not anterior capsular cataracts as induced by gases. SF_6 /air mixture (20-40%) was found to be inert and kind to the cornea and, as it was absorbed in less than 7 days, it exerted minimal damage to the crystalline lens. It was effective in the reformation of flat ACs.

Surgical Results in Malignant Glaucoma Refractory to Medical or Laser Therapy.

Tsai JC, Barton KA, Miller MH, Khaw PT, Hitchings RA. Eye 1997; 11: 677-81

The authors investigated the surgical results in 25 patients identified with malignant (ciliary block) glaucoma. Four of these patients (16%) had successful outcomes following laser treatment alone. Nineteen patients (76%) underwent microsurgery for glaucoma refractory to conventional medical and/or laser therapy and were the subjects of this study. Core vitrectomy was successful in 4 of 6 pseudophakic patients (67%) and in 1 of 4 aphakic patients (25%). Combined cataract extraction and vitrectomy had a higher success rate in patients undergoing posterior capsulectomy at the time of surgery (5 of 6 patients; 83%) compared with those patients left with an intact

posterior capsular bag (1 of 4 patients; 25%). Intracapsular cataract extraction was successful in 1 of 2 patients (50%). The authors concluded that surgical vitrectomy in the presence of an intact posterior capsule may preclude the surgical resolution of

aqueous misdirection. In eyes with pre-existing cataract, they recommend combined lens extraction, primary posterior capsulectomy and surgical vitrectomy for the surgical management of phakic malignant glaucoma.

SAARC NEWS

Vth Ophthalmological Congress of SAARC Countries 25-27th September, 1998 Ahmedabad, INDIA

The purpose of this conference is "TEACHING AND INSTRUCTING". The main objective of the meeting would be "TEACHING" and for this the main theme is "Cataract Surgery- Adaptation to Change". Some part of the program would also be allocated to cornea, retina, community ophthalmology and glaucoma. The main thrust would be toward motivating the ophthalmologists to change to the extracapsular and phaco surgery. It is targeted at young residents, junior doctors and ophthalmologists who find it difficult to travel to major international meetings for updating their knowledge and skills. **To encourage their participation, the organizers have decided to waive the registration fee for the congress for them. Appropriate accommodation facilities are also being organized at no or minimal cost for these groups.**

Certificate of enrollment in training program from the Head of the Department, or a letter from a senior ophthalmologist should be sent along with the Registration Form (printed in the Journal elsewhere), or its photocopy, to the Editor-in-Chief of the Pakistan Journal of Ophthalmology.

Others may send their Registrations either directly to Dr. A.R. Vasavada, Organizing Secretary of the Congress, Ahmedabad, India, or to the Editor-in-Chief of the Journal.

The organizers will help in obtaining entry visas for India if they get the registrants' particulars by July 15th, 1998, directly or through the Editor-in-Chief.

The deadline for submission of papers, posters and film festival entries has been extended from April 30, 1998 to July 31, 1998.

SAARC Registration Form

5th Ophthalmological Congress of SAARC Countries
25 - 27 September, 1998
Ahmedabad, INDIA

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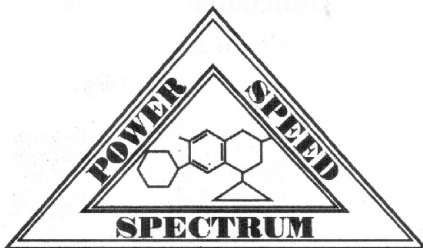
	Before August 30		On-site Registration	
Ophthalmologist	Rs.800	US\$ 25	Rs.1100	US\$ 35
Resident/Fellow	Rs.500	US\$ 15	Rs.1100	US\$ 35
Spouse/Guest	Rs.500	US\$ 15	Rs.1100	US\$ 35

Demand Draft (DD) should be payable in Indian currency to Ahmedabad and drawn in favour of 'Ahmedabad Academy of Ophthalmology'.

For Ophthalmologists from Pakistan: Please send the details including the copy of your passport to help us to get you the entry visa to attend the meeting.

Mail to:

Dr. Abhay R Vasavada
 Iladevi Cataract & IOL Research Centre, Raghudeep Eye Clinic
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MILDOPRED	Ophthalmic Suspension	Prednisolone Acetate 0.12%	5 ml
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BIOPRED	Ophthalmic Suspension	Prednisolone Acetate 0.5% Neomycin Sulphate 0.5% (equivalent to Neomycin base 0.35%) Polymyxin B Sulphate 10,000 units.	5 ml
MYDOSONE	Ophthalmic Suspension	Prednisolone Acetate 0.25% Sulphacetamide Sodium 10%	5 ml
STERIODS + DECONGESTANT			
FEMICON	Ophthalmic Suspension	Fluorometholone 0.1% Tetrahydrozoline HCl 0.025%	5 ml
ANTI-INFECTIVES			
BACTINOR	Ophthalmic Solution	Norfloxacin 0.3%	5 ml
BIOSTAT	Ophthalmic Solution	Chloramphenicol 0.5% Boric Acid 0.15%	15 ml
NEBRA	Ophthalmic Solution	Tobramycin 0.3%	5 ml
NEBRA	Ophthalmic Ointment	Tobramycin 0.3%	5 gm
ROCIP	Ophthalmic Solution	Ciprofloxacin 0.3%	5 ml
ANTI-ALLERGIC/MAST CELL STABILIZER + DECONGESTANT			
DECON-A	Ophthalmic Solution	Pyrimamine Maleate 0.1% Phenylephrine HCl 0.12% with Antipyrine	15 ml
HISTALYN 2%	Ophthalmic Solution	Sodium Cromoglycate 2%	5 ml
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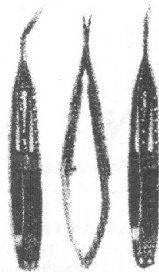
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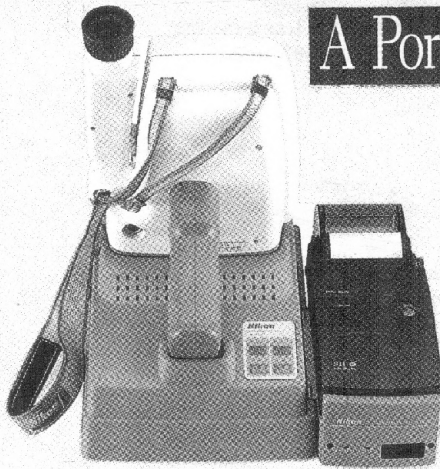
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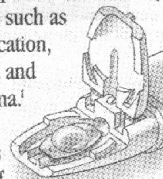
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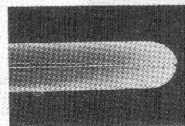
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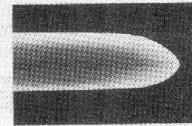
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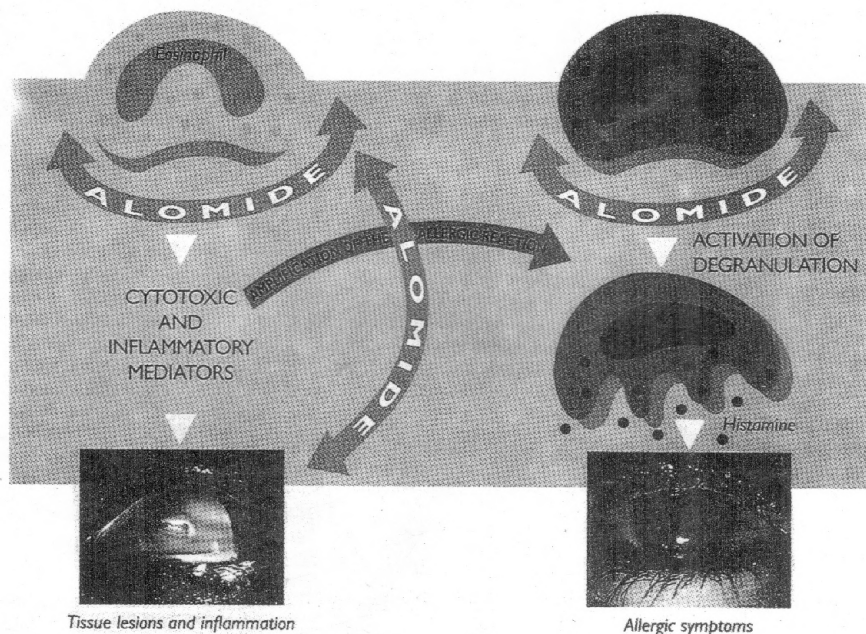
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