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With the change of lifestyle, children are crazy in spending more time in indoor-activities and less in outdoor sports like activities. It has firmly been established that the computer games are most liked mode of entertainment for children as well as the elderly. These computers (especially the laptops) have captured our lives and made us dependent on them. Research shows that computers badly affect the brain as well as the body. Parents have noticed that their children are playing computer games for a longer period and they often complain of watery eyes, frequent headaches, back aches, emotional instability and lack of concentration in their studies.

Doctors have observed increasing incidence of worldwide Myopia (shortsightedness) with physical and emotional changes leading to moral turpitude in some cases. Reaching home after schooling the children spend most of their time in front of TV or playing SIMS—most popular series of computer games. Globally speaking, there is an alarming rise of Myopia to the extent of an epidemic form especially in countries with advanced Information Technology. For example, in Singapore and Israel, 30 years ago, the incidence of myopia in teenagers was just 30-35% which has now jumped to 80% especially in school children where the state has laid more emphasis on reading religious books. According to an unofficial study in Pakistan, most of the children involved in memorizing the books suffer from myopia. There could be other reasons like under nutrition, over-indulgence in TV and computers apart from increasing burden of studies right from the tender age which is the most vulnerable age to suffer myopia i.e., 8-12 years. No doubt, genetics is also an important factor in producing myopia. According to a study in USA, the incidence of myopia in non-myopic parents is 6%, in a single myopic parent it is 18% and in parents (both myopic) it is 33%.

The question arises, how myopia develops? What happens anatomically? According to a school of thought, the explanation appears relevant, that during the developing age, children spend more time focusing on close objects such as studying books and focusing on computers, the eye ball is thought to grow longer and longer so that less effort is needed to see near objects clearly, but an elongated eye will no longer focuses distant objects thus inducing myopia, which explains the prominence of myopic eye. On the contrary, the children who take more interest in physical activities or games are less susceptible to shortsightedness as it tend to involve more focusing on distant objects rather near objects, thus protecting the eyes from abnormal growth. The best example is that the youngsters playing Tennis are less likely to suffer from Myopia. It is also postulated that apart from myopia they get glaucoma like symptoms with field changes in the long run. In view of the changing lifestyle, as observed by Prof. Ian Morgan from the Australian National University in Canberra that the myopia is rising at a fastest rate in Far-eastern countries but the western world is equally worried about it.

Recently, a team of scientists lead by Prof. Loren Cordain of Colorado State University has found that a diet rich in sugar and refined starch including white bread and cereals can cause shortsightedness. They argue that the foods may affect the development of eyes by stimulating the production of high level of insulin and reduction of protein-3, which is thought to be responsible for growth of eyeball and lens. The evidence was well observed in North American Canadian Eskimos, where incidence of myopia is hardly 1-2%, the reason scientists believe that they eat fish, tuberous plants and coconut rather than bread and cereals. However this needs further study.

It has also been clearly demonstrated that playing video games like Medal of Honor, Pacific Assault-MOH and SIMS series induce functional plasticity and spatial resolution which improve the irreversible Amblyopia in adults as experienced by Prof. Roger W. Li, Ph.D. research optometrist from University of California. Let us see when a child should start using a computer? Is it at the age of 3 years? The fact cannot be ignored that the computer application improves children’s performance in reading, writing
and basic mathematics, but involvement at an early age may expose to the risks of:

**Physical hazards** like visual strain and obesity ii) **Emotional and social hazards** like isolation, weak relationship with teachers and lack of self-discipline iii) **Intellectual hazards** like lack of creativity to some extent, non-realistic imaginations, poor language skills, too little patience for hard work and lack of seeking knowledge iii) and finally **moral hazards** leading moral degradation.

There are many useful and positive observations, as computer games are not only a modern craze but also an effective tool to enhance the intelligence quotient (IQ) of the children from 30-35%. Even the seniors who suffer from CVA stroke may lose the skill of processing data in their field of vision. There is a dramatic impact on the skill of perception and this has lead the scientists to believe the possibilities how computer games may help to rehabilitate the stroke patients and also help the elderly to keep them sufficiently alert as safe drivers. Similarly, computers can ease the tasks faster than humans can do. It can resolve harder problems easily and remember lot of facts, while computer games enhance the capacity of human brains and visual attention skill. Regular players of computer games show dramatic perception, 20-50% better at taking in everything that happens around them.

In **Summary**, there are some useful guidelines for parents and teachers to use computers with their children as an opportunity to talk, listen and share experiences to make computer time multi-sensory with real life objectives. According to Prof. Karl Zadnick of Ohio State University, College of Optometry in Columbia, we must get the parents, cutting the time of their children spending on computer games or watching T.V. to the extent of less than an hour a day and encouraging them to spend more time in out-door activities.

In bygone days, people preferred healthy foods with energy drinks like taking grams, yams, dates and fresh fruits and not the junk foods with cokes and candies, refrigerated and micro-wave processed diet. They led a real healthy life style. In this context, the parents must ensure that the children take balanced/wholesome diet with energy drinks and have at least 8 hours continuous uninterrupted sleep increasing their perceptive ability with freshness to take more interest in their lessons in the school. A computer junkie advises while working/playing at computers one must take short breaks, walk about to relax the body.

Finally, listen to your body when it tells you ‘enough is enough’. The ancient rule seems unchanged, if you want to be smart, work hard.

**REFERENCES:**


Prof. Dr. M. Yasin Khan Durrani
Editor in Chief

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**How things have changed?**

![Before](before.png)  ![Nowadays](nowadays.png)

**Courtesy:** Dr. Arshad Mehmood, Prof. Daljit Singh & Dr Yost Lynn
INTRODUCTION

As the development of virtual reality (VR)-based treatment systems such as the Interactive Binocular Treatment (I-BiT™) system presented by Eastgate et al.¹ and the Viston-VR™ system presented by Qiu et al.² have demonstrated, the advent of VR technology has been introduced as a promising solution for the management of amblyopia. Preliminary findings imply that VR-based treatment could be effective³ and does not involve many of the numerous problems confronted in the conventional approach of occlusion or penalization. Conventional occlusion therapy, by patching the dominant eye to encourage stimulation of the amblyopic eye, is traditionally the mainstay treatment for amblyopia.⁴ Although effective,⁵,⁶,⁷ this simple intervention produces variable and unsatisfactory outcomes, long durations of treatment, high costs, negative psychological and emotional impacts, poor compliance, which may even render the treatment completely ineffective.⁸ Atropine penalization of the dominant eye is a recently developed alternative with reportedly better compliance and lower costs,⁹ and of equal efficacy.⁶,⁷,⁹ However, atropine as a medication has its side effects, ranging from the common and benign experience of light sensitivity,⁷,¹⁰,¹¹ to a large variety of less common but more serious symptoms.⁴ Although rare,⁷,¹² there have also been reports of reverse amblyopia,¹³,¹⁴ a complication in which the unaffected penalized eye becomes amblyopic due to inhibition. VR-based treatment overcomes many of these problems. VR-based treatment is interactive and adjustable for age and therefore it is enjoyable for the patients and results in excellent patient compliance.¹ It does not entail the stigmatization of patching or side effects of atropine, and has no risk of reverse amblyopia, since the healthy eye is not occluded or rendered inactive and is not deprived of stimuli. VR-based treatment is said to be successful in preliminary reports.³ In addition, while occlusion and penalization can potentially disrupt fusion, VR-based therapy encourages fusion and is expected to enhance binocular vision. On the other hand, VR-based treatment requires expensive elaborate equipment. It would be costly to implement on a large scale, and it would not be accessible or convenient for most children.

The current paper attempts to introduce a method that could encompass the advantages of VR-based treatment, at a much lower cost. The introduced system can produce an effect similar to the underlying concept...
of VR-based treatment, using simple technology and obviating the need for complex equipment. The software of this system could be installed on a personal computer at home, and conveniently operated along with a pair of special glasses.

MATERIAL AND METHODS

The essence of VR-based treatment consists of feeding the two eyes two different but related images. Instead of having the two images differ slightly in perspective, as would be intended for three-dimensional (3-D) viewing, the two images would overlap and create a single image, however some elements would be missing for each eye. In particular, there would necessarily be main active elements that would be presented to the amblyopic eye but not to the non-amblyopic eye. Thus, the amblyopic eye would need to play an active role in binocular vision in order to see the complete image, whether it be a video or a game. VR, however, is not the only method that can be used to feed two different images to the two eyes. Long before the very concept of feeding a different image to each eye was adopted for the treatment of amblyopia, it had been used to create 3-D images and movies. An older technique for creating 3-D experiences was the anaglyphic method. In this method, two images created from a slightly differing point of view were presented in two distinct colors. The viewer would wear a pair of 3-D glasses consisting of two color filters, each to filter one of the images.

Therefore, each eye would only see one of the images. This is the exact mechanism used in the current system. The system consists of a software package and a pair of glasses made of two color filters. The software is designed to be engaging and interactive, but in a manner that at least some of the main active moving components can only be seen by the amblyopic eye and are filtered out for the other eye. This is achieved by simply arranging these elements (and the corresponding backgrounds they cover) to appear in the same colors that the filters allow entry for. Some components, especially the non-mobile or background elements, would be seen by both eyes to encourage fusion. The result is, the patient must use both eyes, and specifically the amblyopic eye, to play the games (Figure 1). The glasses consisted of two blue (Wratten #47) and orange (Wratten #21) generic photographic filters. The filters Figure 1A diagram of the anaglyphic system for amblyopia treatment. The display (A) consists of elements that, based on color, may be visible by one or both eyes. The filter for the unaffected eye (B) filters out main moving elements (D), while the filter of the amblyopic eye (C) allows for the eye to see the main elements and may or may not filter out less significant features (E). An anaglyphic system for amblyopia were mounted on a frame that adequately covered the field of vision. Software of the prototype model consisted of simple modified open source Flash (Adobe, San Jose, CA) games. The games used included the open source Flash games of Ping, Xtreme Climber, Snake, and Pacman. The backgrounds of all games were changed to white, and main elements were changed to the filtered colors. The colors for two different hexadecimal codes

![Figure 1](image)
were successfully filtered out by each lens. Codes #99FFFF and #CCFFFF were filtered by the blue lens and #FFFFFF and #FFFF99 were filtered by the orange lens. This enabled us to create images with three shades (two shades of color and white), which could be filtered out for one eye.

RESULTS

A laboratory prototype of the proposed system, the ABG InSight (v1.2 β), was designed. The system was used on nine monitors, with different manufacturers and models, and complete filtering was confirmed by twelve people without history of any ophthalmologic or neurological problems. A simple calibration module could be added to the software later to guarantee consistency in filtering elements, or for the time being the monitors could be adjusted by any person without color vision deficits, to ensure correct filtering. The glasses consisted of two generic photographic filters, which were for the purpose of this study, blue and orange, but other color pairs, such as the traditional 3-D red-cyan or amber-dark blue (used in ColorCode 3-D) would presumably be equally functional. The prototype system was capable of successfully filtering out elements of a certain color and therefore, was found to be a potential alternative to VR for amblyopia management.

DISCUSSION

As mentioned, the computer-based anaglyphic system provides most of the advantages of the VR-based treatment, in addition to reduced cost and high availability.

The open source initiative allows for the modification, and in most cases, distribution, of a variety of software packages, free of charge and licensing. This creates the opportunity for researchers to gain access to libraries of software, and from the many available programs, select and use those that may suit their purpose. In this case, applying a few simple changes in the code of a game, such as changing the color of the elements, could make it completely compatible with the proposed system. For this means, many of the available games can be used, taking into consideration only the appropriateness of the game for the target age group, and complexity of the graphic interface. The license of some open source games does not allow them to be modified for commercial use. This should be taken into consideration, the license respected, and no financial gain received from such games.

One of the limitations for such a system would be the main limitation of all anaglyphic systems: the limited use of color. Games that include color as a main theme or include color-based elements, as well as games and media with complex graphics, would be slightly restricted. Although anaglyphs can reproduce color images and to a point, color distinction and clarity, the scope of options is limited. For example, the main moving elements, as well as other components which are selected for filtering, along with the corresponding backgrounds they cover, must be invariably monochrome. For this reason, the background and main elements can only consist of white and various shades of the filtered color. In most cases, between the darkest shade of the filtered color and white, only one distinctively visible shade will be practical for use. This limits the colors for use in main elements and backgrounds to three colors; white and the two shades of the filtered color. Aside from this issue, the use of various points of view, perspectives, and movements remain unrestricted.

A minor advantage for some VR-based systems would be that they can be made to adjust for angles of strabismus, which means they can be used for untreated strabismic amblyopes and adjusted as such to provide binocular vision and fusion without requiring satisfactory alignment. Since the anaglyphic system uses a single display, its use is limited to amblyopic patients for whom the underlying condition, usually strabismus or anisometropia, has been resolved, at least to some extent, by corrective glasses or other means. A minor advantage of the anaglyphic system is that the fusion promoted for seeing the images in this system, is similar to the fusion required in the actual world, because both eyes are watching the same interface. VR-based systems may not represent the actual angles, distances, or proportions seen in the natural surroundings. This is why prolonged work with VR systems has been associated with vomiting, sweating, headaches, and drowsiness. The anaglyphic system has much potential to become a large-scale open source research project. Various open source applications could be modified by volunteers to enrich the library of software used in the project, and researchers throughout the world could use standard filters to create the glasses, and download the software free of charge.

A major concern is the actual effectiveness of the VR-based systems. Although the anaglyphic system could potentially serve as an alternative to VR-based systems by accomplishing the same objectives, the evidence supporting VR-based systems as a therapeutic intervention is limited, and the only available studies including clinical data in this regard are two case series reporting the short-term outcomes in six and twelve patients, respectively. Computer-based active vision therapy has received much attention for amblyopia and one of the recent publications by Hess et al., demonstrating success for active vision therapy in three
amblyopic patients. However, there is still not much evidence in the literature to support most modalities. Nonetheless, introducing the anaglyphic system provides an excellent opportunity to investigate the role of computer-based therapy in the management of amblyopia, by enabling researchers worldwide to evaluate its effectiveness without the need for expensive or exclusive equipment, and therefore allowing interested researchers to continue from where the previous studies were left.

**CONCLUSION**

The current lack of clinical data for the amblyopic system is a major drawback of this introductory paper. However, it has not been claimed that the anaglyphic method is an effectivetreatment for amblyopia, but rather that the system could logically be a suitable alternative to the VR systems. The cost of anaglyphic systems is much lower, therefore they may be a more viable option for research and may be ultimately, treatment. The evidence for VR-based systems could beintriguing enough for researchers to test an anaglyphic system that functions similarly, with better availability and lower costs. Future clinical trials performed on VR-based treatmentsystems can document the efectiveness of the underlying concept, on which the current system was designed. In addition, clinical trials and case series performed with the anaglyphic system itself will determine its true efectiveness and implications. In conclusion, the anaglyphic system maintains most advantages of the VR-based systems, but is less costly and more accessible. The system logically fulfills what theVR-based system was designed to achieve and therefore, warrants further investigation.

**REFERENCES**


INTRODUCTION

Cataract and refractive errors are among the commonest cause of visual morbidity all over the world. Cataract is generally defined as an opacification of the Crystalline lens of the eye. It accounts for nearly half of all the causes of blindness and is particularly common in developing countries.

In the present state of knowledge, there is no proven means of preventing cataract or halting its progression to blindness. The condition is however amenable to surgical treatment, which together with the optical correction of the ensuing refractive deficit, results in the restoration of vision.

For the last few decades, extra-capsular cataract extraction (ECCE) with the implantation of intra-ocular lens (IOL) has become the standardized surgical treatment for defective vision, caused by the opacification of human crystalline lens.

The principal cause of post-operative astigmatism was surgically induced corneal distortion. Several factors have been identified, mainly involving the incision size, wound healing, suture material and its removal all contribute to surgically induced astigmatism, thus affecting the post operative refractive status.

Conventional extracapsular cataract extraction with implantation of intraocular lens is still the most frequently performed surgical option in our part of the world. Due to lack of facilities, expenses of surgery and long learning curve, phacoemulsification and small incision cataract surgeries are the emerging forms. In conventional extracapsular cataract surgeries, astigmatism induced by sutures is the main cause of defective vision postoperatively. Site of incision, distances between the sutures all play important role in inducing astigmatism and hence causing defective
viction postoperatively. Our plan was to study the effects of suture removal two months postoperatively on refractive status of the eye and thus on overall visual outcome.

**MATERIAL AND METHODS:**

This study was conducted in Ophthalmology Department Khyber teaching Hospital, Peshawar from 15th January 2005 to 15th July 2005. This prospective comparative study was performed on 100 eyes of 100 patients who presented for their cataracts surgeries. In all patients, Keratometry readings, amount of astigmatism based on the keratometry readings, un-aided visual acuity and best-corrected visual acuity were recorded preoperatively and subsequently 2-months after sutures removal.

**Follow Up:** Follow up period was two months.

**RESULTS:**

Out of 100 patients, 46 were males and 54 were females (Figure-I). Out of operated cases, in half (50 eyes) of the patients was right eye and half (50 eyes) of left eye was operated (Figure-II). Mean age of all the patients was 58.55 years with a range from 40 years to 85 years. 23 patients were between 40 and 50 years, 48 patients were between 51 to 60 years, 18 patients were between 61 to 70 years, 9 patients between 71 to 80 years and 2 patients were more than 80 years of age (Figure-III). All the patients were admitted one day before surgery and discharge on first post op day in order to facilitate the study.

Regarding systemic co-morbidity, 3 patients were suffering from hypertension, 7 were diabetics, 3 were diabetic as well as hypertensive and one was a known case of ischemic heart disease (Figure-IV). All the patients having any ocular co-morbidity were already excluded from the study. Pre-operatively, 37 patients had un-aided visual acuity of hand movement or perception of light while postoperatively after stitch removal no patient had un-aided visual acuity of hand movement or perception of light.

Pre-operatively 48 patients had visual acuity between counting fingers to less than 6/60 while postoperatively after stitch removal 6 patients had visual acuity between counting fingers to less than 6/60. Pre-operatively 12 patients had visual acuity between 6/60 and 6/18 while postoperatively after stitch removal 22 patients had visual acuity between 6/60 and 6/18. Pre-operatively 3 patients had visual acuity better than 6/18 while postoperatively after stitch removal 72 patients had visual acuity better than 6/18.

Pre-operatively the best corrected visual acuity was hand movement/perception of light in 35 patients, while postoperatively after stitch removal no patient had the best corrected visual acuity of hand movement or perception of light. Pre-operatively 40 patients had best corrected visual acuity between counting fingers to < 6/60, while postoperatively after stitch removal 3 patients had best corrected visual acuity between counting fingers to < 6/60. Pre-operatively 16 patients had best corrected visual acuity between 6/60 to 6/18, while postoperatively after stitch removal 13 patients had the best corrected visual acuity between 6/60 to 6/18. Pre-operatively 9 patients had the best correct visual acuity > 6/18, while postoperative after stitch removal 84 patients had the best corrected visual acuity of > 6/18.

Before removal of sutures 5 patients had best corrected visual acuity of counting finger to less than 6/60 while after stitch removal 3 patients had best corrected visual acuity of counting finger to less than 6/60.

Before stitch removal 17 patients had best correct visual acuity of 6/60 to 6/18, while after stitch removal 13 patients had best corrected visual acuity of 6/60 to 6/18. Before stitch removal 78 patients had best corrected visual acuity of more than 6/18, while after removal of sutures 84 patients had best corrected visual acuity of more than 6/18.

Post-operatively, after 2 months, before sutures removal the un-aided visual acuity was HM/PL in no patient, CF to < 6/60 in 9 patients, 6/60 to 6/18 in 26 patients, and better than 6/18 in 65 patients. Similarly, post-operative best-corrected visual acuity before sutures removal was HM/PL in no patients, CF to 6/60 in 5 patients, 6/60 to 6/18 in 17 patients and better than 6/18 in 78 patients.

Post-operatively, after sutures removal, the un-aided visual acuity was HM/PL in no patients, CF to 6/60 in 6 patients, 6/60 to 6/18 in 22 patients and better than 6/18 in 72 patients. Similarly post-operatively, after removal of sutures, the best-corrected visual acuity was HM/PL in no patients, CF to 6/60 in 3 patients, 6/60 to 6/18 in 13 patients and better than 6/18 in 84 patients. Comparisons of unaided and best corrected visual acuity are given in (Figers No, V&VI).

Pre-operatively the amount of astigmatism was 0.25 to less than 1 D in 39 eyes, 1 D to 2 D in 51 eyes, and more than 2 diopters in 10 eyes.

Two-months postoperatively, before removal of sutures, the amount of astigmatism was 0.25 to < 1D in 14 eyes, 1 to 2 D in 35 eyes, and > 2 D in 51 eyes. Post-operatively, just after removal of sutures, the amount of astigmatism was 0.25 to < 1D in 20 eyes, 1 to 2 D in 55 eyes, and > 2 D in 25 eyes. (Table No, I)

Pre-operatively, there was with-the-rule astigmatism in 12 eyes, against-the-rule astigmatism in 43 eyes and oblique astigmatism in 45 eyes. Two-months post-operatively before removal of sutures,
there was with-the-rule astigmatism in 24 eyes, against-the-rule astigmatism in 23 eyes, and oblique astigmatism in 53 eyes. Just after removal of sutures, there was with-the-rule astigmatism in 17 eyes, against-the-rule astigmatism in 29 eyes, and oblique astigmatism in 54 eyes. (Table No, II). Comparison of astigmatism are given in (Table No, III).

Applying T-test in SPSS to the amount of astigmatism before and after stitch removal, the mean value was ± 2.36 before stitch removal and ± 1.64 just after stitch removal (P < 0.001), showing significant difference between astigmatism before and after sutures removal. (Table No. IV)
DISCUSSION:
In this prospective study, change in refractive status within thirty minutes after removal of sutures; assessed as change in corneal curvature measured by keratometry readings were analyzed in 100 patients who underwent conventional extra-capsular cataract extraction with intra-ocular lens implantation. Astigmatism was more than 2 diopters in about half of the patients (51%) before removal of stitches. This percentage came down to 25% just after removal of stitches. Previously conducted other studies also suggest that keratometry done just after sutures removal is significantly different from that before removal of sutures.

Potamitis and his colleagues studied 34 patients with high post-operative astigmatism following extra-capsular cataract surgery. They suggested that greatest change occurred within the first five minutes of sutures removal. The rate of decay then declined so that 15 to

| Table-I: Amount of Astigmatism |
|-------------------------------|-----------------|-----------------|-----------------|
|                               | 0.25 - < 1D     | 1D - 2D         | > 2D            |
| Pre-operative                 | 39 %            | 51 %            | 10 %            |
| Before ROS                    | 14 %            | 35 %            | 51 %            |
| After ROS                     | 20 %            | 55 %            | 25 %            |
| ROS = Removal of sutures      |                 |                 |                 |

| Table-II: Type of Astigmatism |
|-------------------------------|-----------------|-----------------|-----------------|
|                               | With the rule   | Against the rule| Oblique Astigmatism |
| Pre-operative                 | 12 %            | 43 %            | 45 %            |
| Before ROS                    | 24 %            | 23 %            | 53 %            |
| After ROS                     | 17 %            | 29 %            | 54 %            |
| ROS = Removal of sutures      |                 |                 |                 |

| Table-IV: T-Test |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Paired Differences            | Mean            | Std. Deviation  | Std. Error Mean | t               | df              | Sig. (2-tailed) |
| Astigmatism Before Stitch Removal & Astigmatism After Stitch Removal | .7260          | 1.4363          | .1436           | .4410           | 1.0110          | 5.054           | 99              | .000            |

n= Total number of patients

| Table-III: Comparison of astigmatism before and after Suture removal |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Amount of Astigmatism in diopters | Before Suture Removal | n=100 | After Suture Removal | n=100 |
| 0.00 – 1.0 | 20 | 31 |
| 1.1 – 2.0 | 28 | 46 |
| 2.1 – 3.0 | 28 | 15 |
| 3.1 – 4.0 | 16 | 05 |
| > 4.0 | 8 | 03 |
30 minutes after removal of sutures the change was again significant, but after 30 minutes the astigmatism decay was insignificant. Although not stable, it may be reasonable to offer a temporary spectacles correction about 30 minutes after sutures removal, in cases where early visual recovery is essential, such as in monocular patients.

In our study, all the incisions were given at the limbus as superior approach roughly from 10 to 2 O’clock position. According to one other study, conducted by Wong and his colleagues, the type of post-operative astigmatism depends upon the site of corneal section. They proved that the superior corneal incision causes significantly less astigmatism than the temporal incisions and that the temporal incision induces a moderate degree of with-the-rule astigmatism.

In this study, we applied four limbal sutures with 10/0 Ethilon in all the cases. All the sutures were removed in all cases after a period of two months. Previously in a study by Krishnamachary and Basti from LV Prasad Eye Institute Hyderabad India, the efficiency of selective sutures removal and all sutures removal in controlling corneal astigmatism after cataract surgery was compared. The pattern of decay of astigmatism after sutures removal was studied using computerized video-keratography. They concluded that all sutures removal technique was more predictable and less cumbersome than the selective sutures removal method.

In our study, 24 % of the eyes had with-the-rule or against-the-rule astigmatism preoperatively, which changed post-operatively from a horizontal to an oblique axis. Previously a study conducted by Luntz and Livingston showed that in forty percent of the eyes the axis of the cylinder changed from a horizontal to an oblique axis but did not change from a with- to against-the-rule axis. In our study we removed the sutures two months post-operatively. Previously a study conducted by Stanford and his colleagues from Department of Ophthalmology, King’s College Hospital London showed that after uncomplicated extracapsular cataract extraction with a corneal section and 10/0 Nylon sutures; patients with more than 3 diopters of cylinders were allocated to have their sutures removed at 6, 9, or 12 weeks post-operatively. Visual and optical outcome were assessed after one week after sutures removal and at 6 months post-operatively. Although the time of removal did not affect the change in cylindrical power, the subsequent refraction was more stable when the sutures were removed at 12 weeks.

CONCLUSION:
There was a significant change in the refractive status in respect of the amount of astigmatism, after removal of sutures in eyes undergone conventional extracapsular cataract extraction with intra-ocular lens implantation.

REFERENCES
ABSTRACT

Objectives: To study the results of intraocular pressure control following primary Trabeculectomy with Mitomycin-c in patients of Primary Open Angle Glaucoma.

Material and Methods: This study was conducted on patients presenting to the Department of clinical ophthalmology, Khyber Institute of Ophthalmic Medical Sciences, HMC, Peshawar from 7th October 2005 to 8th October 2006.

Results: The results of primary Trabeculectomy with MMC were studied in term of lowering of IOP in POAG. The mean age of the patients was 54 years with standard deviations of 12.90. There were 12 male and 18 female in our study. The success rate of surgery in term of intraocular pressure control of 20 mmHg or less without medication in primary Trabeculectomy with MM-C was 94%.

Follow Up:
The follow up period were 3 months.

Conclusion: Trabeculectomy with intraoperative use of Mitomycin-C gives better control of IOP.

INTRODUCTION

Primary open angle glaucoma (POAG) is the most prevalent type of glaucoma, affecting approximately 1% of the general population over the age of 40 years.1 Glaucoma is considered as the second leading cause of blindness after cataract1 and fourth commonest cause of blindness in Pakistan.2 Trabeculectomy is the standard surgical procedure of choice if the medical therapy fails. It lowers the intraocular pressure by creating a fistula, which allows aqueous outflow from the anterior chamber to the sub-tenon space.3 It is successful between 86% and 90% of the cases of primary open angle glaucoma.4

Antiproliferative agents such as Mitomycin-c (MMC) and 5-fluorouracil (5-FU) have markedly improved the success rate of glaucoma filtering surgery and are widely used to treat glaucomatous eye with a poor surgical prognosis.5 The success rate of Mitomycin-c is 85%.6 The use of this agent results in better control of postoperative intraocular pressure with less antiglaucoma medication.5 Mitomycin-c is a naturally occurring antibiotic-antineoplastic compound that is derived from Streptomyces ceasipitosus. It acts as a alkylating agent after enzyme activation resulting in DNA cross linking and is a strong antifibrotic agent.7 The concentration in current usage is typically 0.2mg/ml with duration of application for 3 minutes.8 5-fluorouracil (5-FU) inhibit fibroblast proliferation and has proven useful in reducing scarring after filtration surgery.6 Mitomycin-c is more effective than 5-fluorouracil in improving the success rate of IOP control with trabeculectomy.9

Trabeculectomy is not free of postoperative complications but if managed properly, visual acuity in majority of cases is shown to be good.10 The complication of trabeculectomy with antimetabolite are avascular cystic bleb, persistent wound leakage, shallow anterior chamber, possibility of hypotony, endophthalmitis, superficial punctate keratopathy, corneal epithelial defect, choroidal detachment and maculopathy.11
female were selected for the study. All the patients had symptoms of POAG with elevated IOP, enlargement of the optic nerve head and visual field defects. The mean age was 54 Years, most of the patients being above 40 years of age.

Gonioscopy were performed in every case with Goldmann three mirrors and IOP were measured by Goldmann tonometer. Visual field examination was done preoperatively for every case.

Operative Procedure: A fornics based conjunctival flap was made by cutting conjunctiva along with Tenon’s capsule about 2.0mm from the limbus with the help of scissors. The conjunctiva and Tenon’s capsule were separated from the episcleral tissue through blunt dissection about 8-10mm from the limbus. Bleeding points were cauterized with wet field bipolar cautery upto this point. Mitomycin-C was applied on the scleral bed in a dose of 0.2mg/ml for 2 minutes. The sponge was removed and the area was thoroughly rinsed with balanced salt solution. A limbal based scleral flap about 3×4 mm two-thirds of scleral thickness was dissected upto the clear cornea. Paracentesis was performed through superotemporal clear corneal incision. Anterior chamber was entered and a block of scleral tissues about 1×2mm was excised and peripheral iridectomy was performed. A scleral flap was secured by applying two stitches of 8/0 vicryl at the two corners of the flap. Conjunctival flap was sutured by the same 8/0 vicryl by applying continuous stitches, making sure that the wound was water tight. Anterior chamber and bleb was formed with balance salt solution through Paracentasis port.

Data Collection Procedure: The procedure done under local anesthesia. Thirty patients underwent standard trabeculectomy with Mitomycin-C as Mitomycin-C applied on the scleral bed and under surface of the conjunctiva before making an opening into anterior chamber. The contact time of Mitomycin-C was 2 minutes and the dose was 0.2 mg / ml. All surgeries done by single consultant. The procedure was defined as successful if the intraocular pressure was below 20mmHg without any antiglaucoma medication in our study and follow up period were 3 months.

RESULTS

The results of trabeculectomy with Mitomycin-C were studied in term of lowering of IOP in POAG. In 30 patients, 11 were male and 19 were female shown in Figure No. 1. Mean age of the patients were 54 years with standard deviation of ±12.90 given in Table No. 1. The preoperative IOP was given in Figure No: 2. The success rate of surgery in intraocular pressure control of 20 mmHg or less without medication in primary trabeculectomy with MM-C was 94% which is given in Figure No: 3. The incidence of complications is given in Figure No: 4. Patients using post op antiglaucoma medication are given in Figure No. 5. The visual acuity returned to the normal within one month after surgery. The higher incidence of complications was due to higher incidence of flat anterior chamber. The flat anterior chamber was treated by double padding to which the response was seen in 24 to 48 hours. There were 2 cases in which the pressure remained above 20mmHg mark. They were given the option of using antiglaucoma medication initially up to the follow up period but later on they refused the option of repeat surgery.

Table 1: Age of the patients

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<tr>
<th>Number of patients</th>
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Glaucoma is a progressive optic neuropathy with characteristic changes in the optic nerve head and corresponding loss of visual field. It is considered as the second leading cause of blindness after cataract worldwide and fourth commonest cause of blindness in Pakistan. Amongst the glaucomas, primary open angle glaucoma (POAG) is the most prevalent type of glaucoma, affecting approximately 1% of the general population over the age of 40 years.

In this study, we selected uncomplicated cases of primary open angle glaucoma with achievement of target pressure of 20 or less without medication in 93.3%. The numbers of patients included in this study were 30 with primary open angle glaucoma, which is consistent with other studies carried out abroad. O’Brart et al conducted a study which included 50 eyes of 45 and 48 patients respectively and they included patients suffering from open angle glaucoma and they compared trabeculectomy with MMC and viscocanalostomy respectively. Beatty et al conducted a study comprising of 69 high risk patients whose glaucoma were not controlled medically. Work done by Hye included 9 patients with POAG including young patients ranging in age from 24 years to 50 years. Adeqbehinqbe conducted a study, which consisted of 53 primary open angle glaucoma patients. Study done by Babar TF included 81 patients of POAG and all these above studies consistent with our study. In our study, 16 (53.3%) patients were using glaucoma medications respectively, while 14 (46.7%) patients were not using medicines. This observation in our study is in sharp contrast to the study carried out by Casson et al and Hye in which all patients were using glaucoma medications. Our study is also inconsistent with that one conducted by Dandona et al, in which only 2 patients out of 27 with POAG were using glaucoma medications. Our study is consistent with Edmunds et al in which 50% patients were on glaucoma treatment. While Adeqbehinqbe noted success of glaucoma drugs in lowering IOP in 13% patients. In this study, 16 patients each had a preoperative IOP of 20 mm Hg or less with glaucoma medications and 14 patients had preoperative IOP of 20 mm Hg or less without glaucoma medications.

In study carried out by Dandona et al, 66.7% patients had an IOP less than 22 mm Hg and 33.3% had an IOP of more than 22 mm Hg. Edmund et al showed that POAG patients had a mean IOP of 29.5 mm Hg at diagnosis and 26.5 mm Hg at the time of listing for surgery. Mean preoperative IOP recorded by Hye was 26.43 mmHg. Mean preoperative IOP recorded by Adeqbehinqbe et al was 35.5 mm Hg of 6.2 mmHg. In our study, operative complications included shallow A/C in 30% patients, hypHEMA in 10.3%, choroidal detachment, cataract formation, hypotony maculopathy, hyphema in 6.6% of cases. Casson et al noted that 10% patients required another surgery in the first year, hypotony maculopathy in 5% and cataract in 35%. There was blebitis / endophthalmitis at 4 years.
in 4% and hypotony maculopathy in 4% in study done by Betty et al.4 O’Brat et al noted hypotony in 52% cases at one week and 8% needed another trabeculectomy.13 Hyphema was the main complication in 15.3% patients.16

Post operative IOP in our case series was 20 mmHg or less in 93.3% patients without medication and 20mmHg or less in 6.66% patients with medication. Postoperative IOP in Betty series was 16.63mm Hg. Hye noted an average postoperative reduction in IOP of 14.04 mm Hg. His mean postoperative IOP was 13.3mm Hg.15 O’Brat et al noted a mean IOP was 7.3mm Hg at 1st post operative day, 8.3mm Hg at one week.12 In another study they noted a mean IOP of 7mm Hg and 7.88mmHg at one week.13 Mean post operative IOP recorded by Adeqbehinqbe et al was 10.6mm Hg ? 2.3 mmHg.16 Mean preoperative IOP at 3 months was 14.6mmHg ? 4.2 mm Hg.16 All these studies were consistent with our study. In our study, 6.66% operated patients required glaucoma medications. Betty et al reported that 11.1% patients required topical antiglaucoma medications postoperatively.14 None of the patients operated by Adeqbehinqbe et al required postoperative medication.16 Karger and Basel reported in their study that the target pressure was achieved in 73% with MM-C and 68% with out MM-C20. It showed that our results were satisfactory. S. Beatty et al reported in their study that the success rate of achieving target IOP was 83.3% in MM-C group.18 Babar TF reported in their study that the target pressure of 21 mmHg was achieved in 91.3 %.10 This study is also consistent with our study. Mandal et al reported a success rate of 94.7% with trabeculectomy supplemented with antimetabolites in older children.21 So in comparison with other studies our results for augmented trabeculectomies regarding intraocular pressure control in POAG were satisfactory.

CONCLUSION:

Trabeculectomy with intraoperative use of Mitomycin-C gives better control of IOP because Mitomycin-C (MMC) is an antimetabolite used during the initial stages of a trabeculectomy to prevent excessive postoperative scarring and thus reduce the risk of failure.

REFERENCES
Concussional Injuries of the Eye

Sofia Iqbal MRCPophth (Lond), FRCS1, Mushtaq Ahmad FCPS,2 Naz Jehangir3
Prof. Zafar ul Islam FCPS4

ABSTRACT

Purpose: The aim of the study was to determine the incidence of concussional eye injuries presenting to Hayatabad Medical Complex, Peshawar, its common causes, and the extent of damage it does to the eye.

Material and Methods: This prospective study was conducted from 1st January 2009 to 31st December 2010 in the department of ophthalmology Hayatabad Medical Complex Peshawar. Six hundred and thirty five patients presented with ocular trauma. Among them 90 patients had concussional injuries and they were thoroughly analyzed.

Results: A total of 635 patients presented during the 24 months period with ocular injuries. Among them 90 (14.17%) had concussional injuries. Males female ratio was 8:1. Children under 15 years of age were most commonly involved especially during play and sports activities as the most incriminating factor.

Conclusion: Concussional injuries form a significant part of ocular trauma and can lead to permanent visual disability. Preventive measures and education at school level is of utmost importance in preventing such injuries. Media should be used to create public awareness and education.

INTRODUCTION

Injury to the eye is one of the most common cause of ophthalmic morbidity and monocular blindness in the whole world. Ocular trauma has always been and will be a challenge to the Ophthalmologists. In this violent and sophisticated age of communication, increased industrialization, heightened interest in sports activity and urban guerrillas, both the number and severity of these injuries are increasing. Eye injuries have a significant impact not only in terms of suffering and medical costs but also in terms of lost productivity. Eye is vulnerable to any type of trauma in spite of the fact that it is protected anatomically by being placed in a cavity with its overhang bony projections, and physiologically by blink reflex and copious lacrimation. Eyes are injured in 10% of all body injuries which is a disproportionately high percentage, keeping in mind that the front surface of the eye constitutes about 0.27% of the body surface. The incidence of blindness resulting from trauma has a worldwide variation. In developing countries the problem of eye trauma is much more severe because of lack of awareness, poverty and paucity for eye care and traveling long distances to obtain appropriate treatment.

Mechanical injuries to the eye are mainly of two types, concussions and contusions caused by blunt objects and perforating injuries with or without retained foreign bodies caused by sharp objects. The blunt trauma can be divided into three types in terms of severity. Concussions are due to moderate blunt trauma to the eye, and causes changes that are barely visible to the eye, and are reversible. Contusions are produced by severe blunt trauma presenting with tissue damage without disruption of surface layers of the eye. In laceration the tissue integrity is completely lost and there is disruption of the surface layers of the eye. In this study we have studied the blunt injuries causing concussion and contusion and have excluded blunt injuries with disruption of the eye ball.

MATERIAL AND METHODS

A total of 635 patients who sustained injuries to the eye were admitted to the eye unit of Hayatabad Medical Complex, Peshawar during a period of 24 months from 1st January 2009 to 31st December 2010. Out of these 90 patients (14.17%) had concussional injuries to the eye. At the time of admission detail history of the patient including date, time and location of accident, whether the injury occurred at work, during play or some other activity. A detail description of the object, distance traveled to the eye and direction was noted. A special check into pre-existing diseases of the eye was also made.

The examination of the injured eye included visual acuity measurement using Snellen’s chart, intraocular
pressure measurement using Goldmann tonometer, Slit lamp biomicroscopy, Direct and Indirect ophthalmoscopy, examination under anesthesia (when needed), x-rays of the orbit, CT Scan orbit and ophthalmic ultrasound. A quantitative grading system for the amount of blood in the anterior chamber was devised as reported by Kennedy and Brubaker. Patients were keenly observed during their stay in the hospital including daily visual acuity measurement, intraocular pressure measurement and slit lamp biomicroscopy.

The treatment regimen included bed rest, analgesia and sedation as required, patching of the involved eye, local antibiotics, local steroids, cycloplegics and intraocular pressure lowering drugs as and when required. Traumatic cataract was removed by lens matter aspiration and phacoemulsification. Secondary hyphemas aspirated when the eyes were endangered by raised intraocular pressure and corneal staining. 65 patients came for follow up examination and a complete examination including gonioscopy was performed.

RESULTS:

A total of 90 cases of Concussional eye injury were studied, representing 14.17% of all ocular injuries (total 635) in 24 months duration. Males were affected more than females, and male to female ratio was 8:1. Children were most frequently affected (Table 1). The incidence in age group 0-15 was 58.88%. However the ratio of males was greater than females, and male to female ratio was 8:1. Children affected in ocular trauma as a whole, was comparatively less, and this was because of higher incidence of perforating and penetrating injuries in adults which is not included in this study. The right eye was affected slightly more often (54.44%) than the left eye. One eye of each patient was affected.

The most common cause of injury to the eye was sports and play (Table 2). There were 55 patients (61.11%) in this group. Out of 55 patients, 51 were under 15 years of age. The second major group fell into the category of fight and assault (14.45%). Injuries during occupational activities and road traffic accidents accounted for 10% and 5.58% of total injuries respectively. Domestic and firearm injuries fell into the last group, each accounting for 3.33% of all the concussional injuries to the eye.

43 (47.77%) eyes showed damage to the cornea (Table 3). Corneal edema was seen in 35 (38.88%) patients. Folds in the Descemet’ membrane in 21 (23.33%) patients. All were associated with corneal edema. Corneal abrasions were present in 11(12.22%) cases. In one case there was corneal edema with tears in the Descemet’ membrane.

Hyphema which occurred in 63 (70%) patients, was the commonest mode of presentation. Regarding age and gender traumatic hyphema was highest among children and young adults, and males were at greater risk than females (Table 4) A quantitative grading system for the amount of blood in the anterior chamber was devised as reported by Kennedy and Brubaker. (Table 5). Highest number of patients (42.86%) presented with grade 5 hyphema. grade 1 and grade 3 hyphema each was seen in 7 (11.11%) patients. grade 2 in 19 (30.16%) cases. grade 4 hyphema was observed in 3 (4.76%) cases.

Connal staining occurred in 4 (6.35%) patients. All had grade 5 hyphema with raised intraocular pressure. Gonioscopy was routinely performed on follow up examination. 65 patients came for follow up and gonioscopy was performed on 58 patients. 12 eyes (31.60%) showed recession of angle. All the cases were associated with hyphema. 62 (68.88%) eyes had iris or pupillary abnormalities. Traumatic mydriasis was the most common presentation and was seen in 54 (60%) patients. Traumatic iritis in (2.22%) cases and posterior synechiae in 3 (3.33%) patients. Spastic miosis was observed in 3 (3.33%) cases.

Out of the 90 patients 17 (18.89%) developed traumatic cataract. Ten eyes had total opacification, five eyes had rosette located in the posterior cortex and two eyes had posterior sub-capsular cataract. 17 (18.89%) eyes had subluxation of the lens, while dislocation was not observed in any case in our study. A total of 34 (37.78%) cases developed vitreous haemorrhage. In 19 eyes the vitreous haemorrhage was associated with total hyphema. Retinal and macular damage occurred in 35 (38.89%) eyes. 24 (26.66%) had commotio retinae. Out of these 13 had mild retinal edema with no other changes in the retina. The remaining eleven eyes had other changes including macular edema (3 eyes), retinal or macular hemorrhages (3 eyes), retinal tear (2 eyes) and pre-retinal haemorrhages (3 eyes). Among the rest of eleven patients (12.22%) the following changes were observed. 5 patients had extensive chorio-retinal tears with massive vitreal hemorrhages (chorioretinitis sclopetaria), four patients had retinal detachment, one patient had retinal dialysis, which was infero-temporal and was associated with shallow Retinal detachment. One patient presented with optic nerve avulsion.

Table 1: Age and gender distribution

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Table 2: Etiology of injury with regards to age and gender

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Table 3: Concussion effects on the cornea

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<th>% age</th>
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<tr>
<td>Descemet's folds</td>
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<tr>
<td>Corneal abrasion</td>
<td>11 12.22</td>
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<td>Corneal staining</td>
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<td>Tears in descem't membrane</td>
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Table 4: Hyphema: Age and gender distribution

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<th>Male</th>
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<td>0-15</td>
<td>33</td>
<td>6</td>
<td>39</td>
<td>61.91</td>
</tr>
<tr>
<td>16-30</td>
<td>18</td>
<td></td>
<td>18</td>
<td>28.57</td>
</tr>
<tr>
<td>More than 30</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>9.52</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>8</td>
<td>63</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5: Extent of Hyphema at presentation

<table>
<thead>
<tr>
<th>Extent of hyphema</th>
<th>No of patients</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1 Microscopic</td>
<td>7</td>
<td>11.11</td>
</tr>
<tr>
<td>Grade 2 Microscopic to 1/3</td>
<td>19</td>
<td>30.16</td>
</tr>
<tr>
<td>Grade 3 1/3 to 1/2</td>
<td>7</td>
<td>11.11</td>
</tr>
<tr>
<td>Grade 4 1/2 to ≥ total</td>
<td>3</td>
<td>4.76</td>
</tr>
<tr>
<td>Grade 5 Total</td>
<td>27</td>
<td>42.88</td>
</tr>
<tr>
<td>Overall</td>
<td>63</td>
<td>100.0</td>
</tr>
</tbody>
</table>

DISCUSSION:

Ocular trauma is the most frequent cause of monocular blindness. It occurs most frequently in the active years of life and is associated with economic losses, pain and psychological upsets which may be severe and persistent. A total of 90 cases of concussional eye injuries were studied representing 14.17% of all ocular injuries (total 635) in 24 months duration. The
incidence of concussional eye injuries was much higher in a study reported from Nigeria (37.4%)\textsuperscript{12}, while the incidence was only 1.56% in a study conducted in USA\textsuperscript{13}. The reason for this decrease incidence is due to seat belt legislation and other preventive measures in the developed countries.

Children were most frequently affected. The incidence in age group 0-15 years was 58.88%. This higher incidence is mainly because of children being engaged in aggressive games and lack of awareness and supervision of parents in low and middle class families. Similar situation has been observed in a study from India\textsuperscript{14}. The right eye was affected slightly more often (54.44%) than the left eye. Similar right eye preponderance was reported in a study from USA\textsuperscript{15}. Male to female ratio was 8:1, such statistics have been reported by other studies\textsuperscript{24,26}. This may be due to the fact that young boys are more actively involved in sports.

In our study the most common cause of injury to the eye was sports and play (55 patients, 61.11%). This correlates with a studies from India and Australia.\textsuperscript{17,18}

The second major group fell into the category of fight and assault (14.45%). The reason for this incidence may be due to the aggressive nature of a particular tribal culture and the cross border terrorism. This figure coincides with a study from USA, where 14.3% of eye injuries were inflicted during fight and assault\textsuperscript{13}.

Injuries during occupational activities and road traffic accidents accounted for 10% and 5.56% of total injuries respectively. These figures are relatively less than what might be, keeping in mind that this study includes only non-perforating injuries while most of the injuries occurring during road traffic accidents are associated with perforation. In developing countries like Pakistan, the industrial accidents are mostly due to poor working conditions with minimal safety measures. Long working hours and little leisure time also increase accidents due to fatigue. Domestic and firearm injuries fell in the last group, each accounting for 3.33% of the concussional eye injuries.

Hyphema which occurred in 63 patients (70%) was the commonest mode of presentation. This was similar to studies from Nigeria and Ireland\textsuperscript{12,19}. Traumatic hyphema was most commonly observed in children and young adults and males were at a greater risk. Similar findings were noted in a number of other studies\textsuperscript{24,26}. 27 patients (42.86%) presented with total hyphema. Similar higher ratios were observed by studies of Pizzarello and Witteman\textsuperscript{21,22}. This higher incidence can be explained by the fact that most of the patients having lesser degree of hyphema do not seek medical advice. Gonioscopy was performed in 58 patients. Twelve eyes (31.60%) showed angle recession. The incidence of angle recession matches closely with that found by Kennedy and Brubaker\textsuperscript{11} who found 28.6% incidence of angle recession in a series of 248 eyes.

62 eyes 68.88 had iris or pupillary abnormalities. Traumatic mydriasis was observed in 54 (60%) patients. This figure is very similar to a study from Ireland\textsuperscript{19} and is higher than a study conducted in Nigeria\textsuperscript{12}. Out of the 90 patients, 17 eyes (18.89%) developed traumatic cataract. The incidence of traumatic cataract in the blunt trauma to the eye may range from 2.7% to 37%\textsuperscript{12,14,23}. Seventeen eyes (18.89%) had subluxation of lens. This correlates well with a study from Belfast\textsuperscript{19}, while in another study there was not a single case of subluxation\textsuperscript{24}.

CONCLUSION

Concussional injuries form a significant part of ocular trauma. Children are at high risk and sports is the most common incriminating factor. Preventive measures must form the cornerstone of management regardless of the cause. Prevention of ocular trauma pose a great challenge and justifies our priority attention.

REFERENCES


Complications of Intravitreal Injections of Bevacizumab

Mushtaq Ahmad FCPS1, Sofia Iqbal MRCOphth FRCS2, Nazullah FCPS3
Muhammad Naeem4

ABSTRACT
Objective: To evaluate the short term complications after intravitreal injection of Bevacizumab (Avastin).
Materials and Methods: The clinical interventional case-series study included 100 intravitreal injections of about 1.25mg bevacizumab, performed in the period from August 2010 to August 2011 by three surgeons at their private clinics for patients who were diagnosed to have macular oedema or retinal neovascular disease. Patients were followed for 3 months after injection.
Results: One patient got endophthalmitis (1/100 or 1%) with hypopyon but resolved after one intravitreal injection of vancomycin and ceftazidime. Painless vitreous haze was observed in one eye (1/100 or 1%) from the bevacizumab injection. Chemosis in 4 cases (4/100 or 4%) and one eye (1/100 or 1%) showed rapidly progressive lenticular changes. The total rate of these complications was 7/100 (7.00%).
Conclusion: Injection-related complications such as infectious endophthalmitis, Painless vitreous haze, Chemosis and traumatic cataract may occur after intravitreal injections of bevacizumab the beneficial effectiveness of the drug overwhelms these adverse effects. These injection-related risks compare favourably with the therapeutic benefit by the intravitreal therapy.
Keyword: Bevacizumab, intravitreal injection, Vitreous

INTRODUCTION
Bevacizumab (Avastin Genetech Inc, South San Francisco, California, USA) is a humanized vascular endothelial growth factor (VEGF) antibody used for metastatic colorectal carcinoma.1 Recent reports have described the application of Bevacizumab to treat ocular neovascular disorder including proliferative diabetic retinopathy.2,5 More recently intravitreal injection of Bevacizumab (IVB) before PRP has been reported to be effective also in preventing PRP induced visual dysfunction and foveal thickening6,7 and promoting greater reduction in the area of active leaking of (new vessels) NV in Proliferative Diabetic Retinopathy (PDR) patients.8,9 Nowadays intravitreal Bevacizumab is used to treat following disorders:
1. CNV caused by age related macular degeneration
2. Retinal vein occlusion
3. Proliferative diabetic retinopathy
4. Iris neovascularization with proliferative diabetic retinopathy
5. CNV caused by pathological myopia and idiopathic CNV10

Regarding the safety use of intravitreal injection of bevacizumab many studies have been done and still other are under progress to determine the effectiveness versus complications of this drug. Ocular adverse effects like chemosis, corneal abrasion, inflammation, cataract formation, retinal pigment epithelial tear and endophthalmitis after intravitreal injections of bevacizumab11 have been reported but the frequency rate of these adverse effects is so low that the benefits overwhelms them.

MATERIALS AND METHODS:
The clinical interventional case-series study included 100 intravitreal injections of about 1.25mg bevacizumab, performed in the period from August 2010 to August 2011 by three surgeons at their private clinics for patients who were diagnosed to have macular oedema or retinal neovascular disease. Patients were followed for 3 months after injection.

Before disinfecting with povidone iodine, topical propracaine 0.5% was applied to anesthetize the eye. About 3.5mm from the lumbus in the supero-temporal site of the eye injection 1.25mg bevacizumab was injected intravitreally via 29g needle. Pressure was applied at injection site with tying forceps to avoid
reflux for 30 seconds. Antibiotic drops (vigamox) prescribed 4 hourly for one week. Patients having macular oedema and retinal neovascularization due to several causes were included in this study. Only those patients were excluded from the study who did not gave consent for the injection and who rejected to comply for the follow up visits. Patients were followed at 1st post operative day four weeks and then after three months. The examination at each follow up was done to measure visual acuity, intraocular pressure, detailed anterior segment and fundus examination.

RESULTS

A total of 100 eyes of 78 patients with various intraocular edematous and neovascular diseases (Table 1) given single dose of intravitreal bevacizumab were evaluated.

Table 1. Patients treated with Bevacizumab

<table>
<thead>
<tr>
<th>Indication for Inj.</th>
<th>No. of Pt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet AMD</td>
<td>15</td>
</tr>
<tr>
<td>CRVO</td>
<td>20</td>
</tr>
<tr>
<td>Diabetic macular oedema</td>
<td>29</td>
</tr>
<tr>
<td>Proliferative diabetic ret.</td>
<td>33</td>
</tr>
<tr>
<td>NVG</td>
<td>3</td>
</tr>
</tbody>
</table>

One patient got endophthalmitis (1/100 or 1%) with hypopyon but resolved after one intravitreal injection of vancomycine and ceftazidime. Out of 100 eyes 4 cases developed conjunctival chemosis (4%), one case developed traumatic cataract (1%) and one developed vitreous haze (1%). chemosis was of early onset and subsided soon, cataract was of iatrogenic trauma origin and treated successfully with Phacoemulsification. The painless vitreous clouding subsided after intensified topical antibiotic therapy (Table 2).

Table 2. Post intravital injection

<table>
<thead>
<tr>
<th>Name of Complication</th>
<th>No. of Pts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endophthalmitis</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Chemosis</td>
<td>4 (4%)</td>
</tr>
<tr>
<td>Corneal abrasion</td>
<td>0</td>
</tr>
<tr>
<td>Cataract</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Uveitis</td>
<td>0</td>
</tr>
<tr>
<td>Raised IOP</td>
<td>0</td>
</tr>
<tr>
<td>Vitreous haze</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Since 2000 to 2005, the intravitreal applications of bevacizumab have markedly increased in frequency as therapy of diabetic macular oedema, exudative age-related macular degeneration and other intraocular neovascular or oedematous diseases. Ischemic diseases of eye like central retinal vein occlusion and diabetic or hypertensive retinopathy causes microangiopathies at tissue level. The resultant hypoxia leads to release of vascular endothelial growth factor (VEGF). VEGF has dual actions, one it causes neovessels formation other it increases vascular permeability which leads to retinal edema. Bevacizumab is a monoclonal antibody that was first used in the treatment of colorectal cancer. The mode of action of this drug is to inhibit the increased activity of VEGF. This in turn will reverse the phenomena of neovascularization and oedema formation. Other uses of intravitreal Bevacizumab are retinopathy of prematurity (ROP), pseudophakic macular edema, central serious chorioretinopathy (CSCR) and radiation retinopathy. Despite the beneficial effects, one should remember that intravitreal injections of Bevacizumab carries the risk of traumatic cataract, endophthalmitis and retinal detachment.

Our study sample of 100 eyes for the intravitreal injection of bevacizumab yielded adverse events in seven eyes. This was comparable with other studies where there were multiple complications. It was therefore presumed that the complications were not associated with chemical composition of Bevacizumab but with the route of injection. The use of intravitreal bevacizumab is still limited in our area of study because of the cost effectiveness and availability. It is therefore expected that with the passage of time the beneficial effects of this drug will make it freely available and price reduction to patient’s range so that a large sample of study will be available to determine the injection related risks versus therapeutic benefits.

CONCLUSION:

Injection-related complications such as infectious endophthalmitis, Painless vitreous haze, chemosis and traumatic cataract may occur after intravitreal injections of bevacizumab, the beneficial effectiveness of the drug overwhelms these adverse effects. These injection-related risks compare favourably with the therapeutic benefit by the intravitreal therapy.

REFERENCES:


An audit of Neonatal Services in Khyber Pakhtunkhwa Province (KPK), Pakistan to identify Implications for screening ‘Retinopathy of Prematurity’

Sadia Sethi,1 Haroon Awan,2 Niaz Ullah Khan3

ABSTRACT:

Aims and Objectives: To identify nurseries / neonatology units where underweight / premature babies were born and subsequently treated in Khyber Pakhtunkhwa. To determine the extent of neonatal services available / developed in different hospitals all over the province. To suggest policy guidelines for screening of low birthweight and premature babies.

Study Period: 2005 - 2006

Methodology A standard questionnaire was designed by International Center for Eye Health London and all neonatal units of Khyber Pakhtunkhwa were visited. Information was obtained from files of all neonatal units covering a two year period (2005 and 2006) except two hospitals Naseer Teaching Hospital and Health Care Center where information was obtained from hospital record and data was manually compiled.

Results: In year 2007, there were 74 neonatal units in Pakistan (30 neonatal units in Sindh, 27 in Punjab, 15 in KPK and 2 in Baluchistan). There were 28,738 babies admitted over a two year period preceding the study in neonatal units in different hospitals in KPK excluding CMH Peshawar and CMH Nowshera. There 1411 were very low birth weight babies, 6182 Low birth weight babies (LBW), 4623 premature babies (PB) in different neonatal units in KPK. There were two neonatal units where neonatologists were available. These included Khyber Teaching Hospital and Kuwait Teaching Hospital, Peshawar. Full time anesthetists were not available in any neonatal units in KPK. 62 incubators were present in 13 neonatal units in KPK.

Discussion: In this study a total of 28738 babies were admitted in 13 neonatal units of KPK in year 2005-2006. Low birth weight babies accounted for 21.19% of total admissions. In our study there were 4623 (16.60%) premature babies, 3258 survived (survival 70.47%). Khyber Teaching Hospital had maximum number of premature babies (1931) that were admitted during the study period. Lady Reading Hospital had second highest number of babies, where 1806 babies were admitted. The survival percentage of Mardan Medical Complex was best among neonatal units in the province where out of 341 premature babies, 323 survived survival (94.72%).

Conclusion: In our study 664 (2.3%) babies had weight <1500gm, while in 639 (2.2%), the babies had gestational age <31 weeks requiring ROP screening. Ventilation was not available anywhere Khyber Pakhtunkhwa except at CMH Peshawar. There were 99 medical personnel and 53 nursing personnel involved in Khyber Pakhtunkhwa in providing services to neonates. No regular screening for Retinopathy of Prematurity was done anywhere in Khyber Pakhtunkhwa.

Key words: Prematurity, low birth weight, retinopathy of prematurity, neonatal units.

INTRODUCTION

Neonatology is a branch of Pediatrics which is rapidly emerging as a sub specialty and in near future it is expected to expand further as a result of neonatal screening programs and the availability of resources for managing different neonatal problems. A large majority of newborn babies do not develop any serious problem or difficulties and require only minimal care, which can be provided by the mother if properly supervised by a health worker. High-risk mothers are likely to give birth to preterm or low birth weight babies who suffer a large number of problems1. Majority of the causes of neonatal morbidity in Pakistan are prevalent2. Some of the newborns in developing countries have impaired growth right during their intrauterine life, reflecting the nutritional status of the mother3. Almost half of the infant deaths in Pakistan occur within first 28 days of life4. Pre-maturity accounts for majority of high risk newborns as they face a large number of problems5. Recent advances in neonatal care have improved survival rates for premature infants6 and this has been accompanied by an increase in incidence of Retinopathy of Prematurity7-9.
Neonatal audit is carried out in Pakistan from time to time in order to create awareness regarding pre-term babies and other neonatal problems which they face and their management in an effective way. For better neonatal care and prevention of the preventable causes of neonatal morbidity and mortality, there is a need to be continuously reporting the audit of neonatal admissions to neonatal units all over the country. The purpose behind such types of audits in neonatal units should be for the identification of various deficiencies in the management of these neonates and also to assist the health workers specially those at the community level for better understanding and effective management of various neonatal problems in Pakistan.

AIMS AND OBJECTIVES

1. To identify nurseries / neonatology units where underweight / premature babies were born and subsequently treated in KPK.
2. To determine the extent of neonatal services available / developed in different hospitals all over KPK.
3. To determine type of training / qualification of staff.
4. To formulate a policy for screening of low birth and premature babies.

METHODOLOGY

A consultation workshop was organized at the College of Ophthalmology and Allied Sciences, (previously Punjab Institute of Preventive Ophthalmology-PIPO) on 12th October 2006, to develop a joint course of action by the ophthalmologists, pediatricians and neonatologists for the early detection and control of retinopathy of prematurity in children and to collect data regarding prevalence of prematurity / low birth weight babies born at all hospitals across the country as well as concentration of oxygen given to them was recommended. A questionnaire was designed by International Center for Eye Health London and information about the neonatal units all over Pakistan was obtained with the help of the Pakistan Pediatric Association KPK. Four Focal Persons were identified, one for each Province. They provided us with the list of hospitals in all the four provinces of Pakistan. We selected KPK as a sample and conducted a situation analysis of KPK.

All the hospitals of KPK where neonatal units exist were visited in year 2007 and available data was retrieved in all hospitals through files of year 2005 and 2006 with the help of a pediatrician in Health Care Center and Naseer Teaching Hospital, though it was difficult to obtain the files in these two hospitals.

Constraints. Due to reasons of official clearance, we were unable to obtain any data from the Combined Military Hospitals in Peshawar. Photographs of the peripheral hospitals were not feasible.

RESULTS

In year 2007 there were 30 neonatal units in Sindh, 27 in Punjab, 15 in KPK and 2 in Baluchistan. There were 28738 babies admitted in year 2005-2006 in different neonatal units in Khyber Pakhtunkhwa excluding CMH Peshawar and CMH Nowshera. There were 4 private hospitals where neonatal services were provided to babies while 11 government hospitals had neonatal units; 5 were university hospitals (Fig. 1). 4656 (16.2%) neonates in 2005-2006 were treated in private hospitals while 24082 (83.7%) were treated in government hospitals. Table:1 shows the hospitals in KPK and number of neonatal admissions. There were 13930 (46.59%) admissions in year 2005 and 15348 (53.41%) of admissions in year 2006. (Table 1)

Facility of Endotracheal intubation was available only in CMH Peshawar. Ventilation and surgery was unavailable to babies anywhere in KPK, while no ventilation was given in 14 hospitals visited in KPK. Table:2 shows that 1411 babies of very low birth weight were admitted during the study period. They had mean survival rate of 48.48%. Table: 3 shows that 6182 low birth weight babies were admitted in the study period with a mean survival rate of 62.97%. Table: 5 shows that 646 (2.3%) babies were less than 1500gms who needed ROP screening. Table: 6 shows that 639 (2.2%) babies were born premature (<31 weeks) and needed ROP screening.

There were only two neonatal units where neonatologists were available. These included the Khyber Teaching Hospital and Kuwait Teaching Hospital Peshawar. There were 31 pediatricians, 19 resident, and 47 medical officers in different neonatal units in KPK. A total of 97 medical personnel were involved in providing neonatal services. There were

Figure 1: Types of Hospitals in Khyber Pukhtoonkhwa where Neonatal Units were present
Table 1. Admissions of children in nursery in different hospitals in Khyber Pukhtunkhwa, Province in year 2005-2006.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Neonatal Unit admissions of two years in nursery - year 2005</th>
<th>Number of total neonatal admission of two years in nursery - year 2006</th>
<th>Number of total neonatal admissions of 2005 and 2006</th>
<th>Total of year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rehman Medical Institute Peshawar</td>
<td>222</td>
<td>281</td>
<td>503</td>
</tr>
<tr>
<td>2.</td>
<td>Saidu Teaching Hospital Swat</td>
<td>1850</td>
<td>2286</td>
<td>4136</td>
</tr>
<tr>
<td>3.</td>
<td>Naseer Teaching Hospital Peshawar</td>
<td>000</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>4.</td>
<td>Lady Reading Hospital Peshawar</td>
<td>2759</td>
<td>2822</td>
<td>5581</td>
</tr>
<tr>
<td>5.</td>
<td>Kuwait Teaching Hospital Peshawar</td>
<td>275</td>
<td>206</td>
<td>481</td>
</tr>
<tr>
<td>6.</td>
<td>Khyber Teaching Hospital Peshawar</td>
<td>1694</td>
<td>2206</td>
<td>3900</td>
</tr>
<tr>
<td>7.</td>
<td>Health Care Center Peshawar</td>
<td>1737</td>
<td>1922</td>
<td>3659</td>
</tr>
<tr>
<td>8.</td>
<td>Hayatabad Medical Complex Peshawar</td>
<td>899</td>
<td>906</td>
<td>1805</td>
</tr>
<tr>
<td>9.</td>
<td>Fauji Foundation Hospital Peshawar</td>
<td>000</td>
<td>245</td>
<td>245</td>
</tr>
<tr>
<td>10.</td>
<td>Lady Reading Hospital Peshawar</td>
<td>1600</td>
<td>1832</td>
<td>3432</td>
</tr>
<tr>
<td>11.</td>
<td>Health Care Center Peshawar</td>
<td>425</td>
<td>456</td>
<td>881</td>
</tr>
<tr>
<td>12.</td>
<td>Refused to provide statistics</td>
<td>Refused to provide statistics</td>
<td>Refused to provide statistics</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>CMH Kohat</td>
<td>421</td>
<td>845</td>
<td>1266</td>
</tr>
<tr>
<td>14.</td>
<td>Ayub Teaching Hospital Abbottabad</td>
<td>1508</td>
<td>1328</td>
<td>2836</td>
</tr>
<tr>
<td>15.</td>
<td>CMH Nowshera</td>
<td>Refused to provide Statistics</td>
<td>Refused to provide Statistics</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13390</td>
<td>15348</td>
<td>28738</td>
<td></td>
</tr>
<tr>
<td>Percentage of total admissions in nursery of two years</td>
<td>46.59%</td>
<td>53.41%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Very low birth weight in different hospitals in KPK Pakistan in year 2005-2006.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>Very low birth weight</th>
<th>Status at birth</th>
<th>Survival %age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehman Medical Institute, Peshawar</td>
<td>12</td>
<td>9</td>
<td>75%</td>
</tr>
<tr>
<td>Saidu Teaching Hospital, Swat</td>
<td>115</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Naseer Teaching Hospital, Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Lady Reading Hospital, Peshawar</td>
<td>526</td>
<td>155</td>
<td>29.46%</td>
</tr>
<tr>
<td>Kuwait Teaching Hospital, Peshawar</td>
<td>2</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Khyber Teaching Hospital, Peshawar</td>
<td>496</td>
<td>335</td>
<td>67.5%</td>
</tr>
<tr>
<td>Health Care Center, Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Hayatabad Medical Complex, Peshawar</td>
<td>104</td>
<td>76</td>
<td>73.0%</td>
</tr>
<tr>
<td>Fauji Foundation Hospital, Peshawar</td>
<td>25</td>
<td>17</td>
<td>68%</td>
</tr>
<tr>
<td>District Hospital Dera Ismail Khan</td>
<td>20</td>
<td>11</td>
<td>55%</td>
</tr>
<tr>
<td>District Hospital Mardan</td>
<td>20</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>CMH Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>CMH Nowshera</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>CMH Kohat</td>
<td>51</td>
<td>43</td>
<td>84.3%</td>
</tr>
<tr>
<td>Ayub Teaching Hospital, Abbottabad</td>
<td>40</td>
<td>18</td>
<td>45%</td>
</tr>
<tr>
<td>Total</td>
<td>1411</td>
<td>684</td>
<td>48.47%</td>
</tr>
</tbody>
</table>
Table 3. Low birth weight in different hospitals in KPK Pakistan in year 2005-2006.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>Low birth weight</th>
<th>Status at birth</th>
<th>Survival %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehman Medical Institute, Peshawar</td>
<td>48</td>
<td>38</td>
<td>79.1%</td>
</tr>
<tr>
<td>Saidu Teaching Hospital, Swat</td>
<td>570</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Naseer Teaching Hospital, Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Lady Reading Hospital, Peshawar</td>
<td>1963</td>
<td>897</td>
<td>45.6%</td>
</tr>
<tr>
<td>Kuwait Teaching Hospital, Peshawar</td>
<td>60</td>
<td>57</td>
<td>95</td>
</tr>
<tr>
<td>Khyber Teaching Hospital, Peshawar</td>
<td>2124</td>
<td>1747</td>
<td>82.25%</td>
</tr>
<tr>
<td>Health Care Center, Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Hayatabad Medical Complex, Peshawar</td>
<td>461</td>
<td>357</td>
<td>77.4%</td>
</tr>
<tr>
<td>Fauji Foundation Hospital, Peshawar</td>
<td>135</td>
<td>109</td>
<td>80%</td>
</tr>
<tr>
<td>District Hospital Dera Ismail Khan</td>
<td>133</td>
<td>105</td>
<td>78.9%</td>
</tr>
<tr>
<td>District Hospital Mardan</td>
<td>161</td>
<td>140</td>
<td>86.9%</td>
</tr>
<tr>
<td>CMH Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>CMH Nowshera</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>CMH Kohat</td>
<td>268</td>
<td>229</td>
<td>85.4%</td>
</tr>
<tr>
<td>Ayub Teaching Hospital, Abbottabad</td>
<td>259</td>
<td>214</td>
<td>82.6%</td>
</tr>
<tr>
<td>Total</td>
<td>6182</td>
<td>3893</td>
<td>62.97%</td>
</tr>
</tbody>
</table>

Table 4. Premature births in different hospitals in KPK Pakistan in year 2005-2006.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>Gestational age</th>
<th>Premature Birth</th>
<th>Status at birth</th>
<th>Survival %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehman Medical Institute, Peshawar</td>
<td>38</td>
<td>35</td>
<td>92.11%</td>
<td></td>
</tr>
<tr>
<td>Saidu Teaching Hospital, Swat</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Naseer Teaching Hospital, Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Lady Reading Hospital, Peshawar</td>
<td>1806</td>
<td>834</td>
<td>46.25%</td>
<td></td>
</tr>
<tr>
<td>Kuwait Teaching Hospital, Peshawar</td>
<td>52</td>
<td>47</td>
<td>90.38%</td>
<td></td>
</tr>
<tr>
<td>Khyber Teaching Hospital, Peshawar</td>
<td>1931</td>
<td>1663</td>
<td>86.12%</td>
<td></td>
</tr>
<tr>
<td>Health Care Center, Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Hayatabad Medical Complex, Peshawar</td>
<td>371</td>
<td>319</td>
<td>85.98%</td>
<td></td>
</tr>
<tr>
<td>Fauji Foundation Hospital, Peshawar</td>
<td>55</td>
<td>24</td>
<td>43.63%</td>
<td></td>
</tr>
<tr>
<td>District Hospital Dera Ismail Khan</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>District Hospital Mardan</td>
<td>341</td>
<td>323</td>
<td>94.72%</td>
<td></td>
</tr>
<tr>
<td>CMH Peshawar</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>CMH Nowshera</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>CMH Kohat</td>
<td>18</td>
<td>11</td>
<td>61.11%</td>
<td></td>
</tr>
<tr>
<td>Ayub Teaching Hospital, Abbottabad</td>
<td>11</td>
<td>2</td>
<td>18.18%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4623</td>
<td>3258</td>
<td>70.47%</td>
<td></td>
</tr>
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</table>
two trained neonatal nurses in Khyber Teaching Hospital, one in Hayatabad Medical Complex and other in CMH Peshawar. A total of 53 nurses were working in different neonatal units in KPK. There was no full time anesthetist specifically for any neonatal unit in KPK. In 5 units, full time anesthetists were available in the hospital and were readily available to the neonatal unit. 8 neonatal units had difficulty in accessing the anesthetist. Sixty two incubators were present in 13 neonatal units of KPK. Out of these, 37 were intermediate dependency and 25 were high dependency. In 2 hospitals, 95-100% of babies were estimated to be on oxygen that was continuously monitored, while in 4 hospitals it was 75-94%, in one hospital 50-74%, and in other hospital 25-49%, and in 6 hospitals 0-24%.

Screening for retinopathy of prematurity was not done in any hospital in KPK.

DISCUSSION

In this study a total of 28,738 babies were admitted in 13 neonatal units of KPK over a two-year study period (2005-2006). 6122 low birth weight babies were admitted in neonatal units in KPK. They accounted for 21.199% of the total admissions in neonatal units in KPK. In South Asia, the incidence of LBW is 36%, 30% in Bangladesh and India, and 19% in Pakistan. In Pakistan, the LBW rate varies from 5% to 23% in different parts of the country. The overall incidence of LBW in a study at Peshawar was half that of recent studies in Lahore and Karachi and overall national average.

In our study, there were 4623 (16.08%) premature babies, of which 3258 survived (survival 70.47%). In Khyber Teaching Hospital had maximum number of premature babies (1931) that were admitted during the study period. Lady Reading Hospital had the second incidence, where 1806 babies were admitted. The survival percentage of Mardan Medical Complex was best among neonatal units in province, where out of 341 premature babies, 323 survived (94.72%). In Rehman Medical Institute, reputed to be one of the better private hospitals in KPK, the survival of premature babies was (92.11%). In Ayub Teaching Hospital, only 11 premature babies were admitted and out of which 2 survived having a survival of (18.18%). In our series, 664 (2.3%) babies had a birth weight < 1500gm, while 639 (2.2%) babies had a gestational age < 31 weeks requiring ROP screening. In a retrospective study done in Karachi in 2003 on premature infants admitted in tertiary hospital in Karachi, 32.4% developed ROP.

Retinopathy of prematurity is a condition which is preventable and treatable in middle income countries and in urban centres in developing countries. ROP develops in 16% of all premature births, the figure rising to over 65% of infants weighing less than 1250 gms at birth. Some studies suggest that as more and more smaller and younger babies are surviving, its incidence is increasing. However, others say that better understanding of screening and management of these babies has resulted in a decrease in its incidence. Risk factors include prematurity (particularly less than 32 weeks of gestational age), low birth weight (< 1500gms and particularly if < 1250gms), oxygen therapy (hypoxaemia and hypercarbia also increase the risk), and co-morbidity. The goal of an effective screening programme must be to identify the relatively few preterm infants who require treatment for ROP from among the much larger number of at risk infants while minimizing the number of stressful examinations required for these sick infants.

There is no agreed policy on the screening of babies larger than 1250g. The American screening guidelines for ROP suggest that babies d” 1500 g birth weight or d” 32 weeks gestational age must be screened, while those infants > 1500 g or > 32 weeks be screened at the discretion of the attending neonatologist. However, developing countries may require

<table>
<thead>
<tr>
<th>Babies</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1500g</td>
<td>360</td>
<td>2.6%</td>
<td>304</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Babies</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 31 weeks</td>
<td>322</td>
<td>2.4%</td>
<td>317</td>
<td>2.2%</td>
</tr>
</tbody>
</table>
modification of these screening guidelines. ROP was a major cause of blindness in children in Europe and North America during the late 1940s and 1950s with unmonitored supplemental oxygen being the major risk factor. This was called the first epidemic and during this blindness occurred in larger more mature babies from retrolental fibroplasias (this terminology being used earlier for the same). At that time, the mean birth weight (BW) of affected babies in the United Kingdom was 1370g (range 936-1843g) and in the United States of America was 1354g (range 770-3421g). By the mid 1950s, abundant clinical and experimental data had accumulated and it was concluded that retrolental fibroplasias was due to overuse of oxygen. Since then, careful curtailment of oxygen has resulted in a lower incidence. At present, in developed countries the majority of babies getting severe ROP weigh less than 1000g at birth. This has been termed the “second epidemic”. India and other developing countries are now facing what is termed the “third epidemic” which is a mixture of the first two epidemics. This “third epidemic” is characterized by severe ROP in both relatively mature as well as immature babies reflecting varying levels of neonatal care. Even larger and mature babies are developing severe ROP in South India than in industrialized countries. The characteristics of babies affected are similar to those seen during the first epidemic of ROP which occurred during the 1950s in Europe and North America. Guidelines on oxygenation and screening policies should be jointly developed by pediatricians and ophthalmologists to end this epidemic of avoidable blindness.

CONCLUSIONS:

684 very low birth weight babies survived with a survival rate was 48.48%. 3893 low birth weight babies survived with a survival rate was 62.65%. 3258 premature babies survived with a survival rate was 70.47%. In our study, 664 (2.3%) babies had weight <1500gm. while in 639 (2.2%), the babies had gestational age < 31 weeks requiring ROP screening. Ventilation was unavailable anywhere in KPK except CMH Peshawar. There were 99 medical personnel and 53 nursing personnel involved in KPK in providing services to neonates. No screening for Retinopathy of Prematurity was done anywhere in KPK.

Recommendations

1. All neonatal units should improve their neonatal care facilities if we want more babies to survive. All units should have facilities for endotracheal intubations.
2. All babies on oxygen should be properly monitored.
3. There should be trained neonatal nurses, neonatologists and fulltime anesthetists available for neonatal units.
4. More incubators should be available in neonatal units.
5. Proper documentation of all admissions, survivals and discharges, and deaths should be done.
6. A counselor should be available, who could guide the parents for proper follow up and vaccination of babies.
7. A formal screening protocol for ROP for babies < than 1750gms and gestational age < 35 weeks should be adopted.
8. Proper feeding and waiting area for parents of babies should be available in neonatal units.

REFERENCES

16. Bhutta ZA, Khan I, Salat S, Raza F, Ara H. Reducing length of stay in hospital for very low birthweight infants by involving mothers in a stepdown unit: an experience from
A Review of Microbial Keratitis

Sofia Iqbal MRCOphth (Lond) FRCS¹, Mushtaq Ahmad FCPS²
Prof. Zafar ul Islam FCPS³

ABSTRACT
Background: This study was conducted at Khyber Institute of Ophthalmic Medical Sciences, Hayatabad Medical Complex, Peshawar from 1st January 2009 to 31st December 2009. The objectives were to identify common etiological organisms in microbial keratitis, to identify predisposing risk factors, discuss best treatment protocol, and to recommend preventive measures.

Method: It was a prospective study of 112 patients suffering from Microbial Keratitis who presented over a period of one year. A detailed history and clinical features of the patients were noted down on a predesigned proforma. Culture and sensitivity was done, and patients were followed for a period of three weeks.

Results: The Risk Factors identified were: Trauma in 41.96% and pre-existing ocular, lid and adnexal disease in 57.14%. There were 54.46% culture positive cases. The organisms isolated were: Staphylococcus aureus in 36.06%; Staphylococcus epidermidis in 26.22%; Streptococcus Pyogenes in 19.67%; Aspergillus in 13.11%; Candida in 03.27% and Fusorium in 01.63%. Most of the organisms showed higher sensitivity to Quinolones than the other drugs. 53.57% patients had a final Visual Acuity of 6/18-6/60 or better and 14.28% patients ended up with a Visual Acuity of 3/60 or worse.

Conclusions: This study indicate that Quinolones appears to be the therapy of choice for Bacterial Keratitis and Itraconazol seems to be the therapy of choice for Fungal Keratitis in our set up. Approximately one third cases had chronic Dacryocystitis. 66.96% had received some kind of treatment at the time of presentation. Early detection, early referral, proper management of pre-existing ocular and adnexal diseases and effective treatment will bring a significant change in the final outcome of corneal ulcers in KPK, Pakistan.

Key Words: Microbial Keratitis, Culture and Sensitivity, Corneal Scrapping.

INTRODUCTION
Ocular infections are one of the leading causes of blindness in the world in general and in developing countries in particular. Certain features of microbial keratitis are more prevalent in some countries than others. This may be related to nutritional factors, economic factors, environmental factors, illiteracy, poor hygiene, concurrence of other infections such as trachoma or herpes, trauma, temperature, humidity and other seasonal variations and general health. Environmental influences dictate the pattern of external eye diseases. In dry hot deserts, where flies abound and personal hygiene is poor, blinding trachoma is prevalent, while in rain forests ridden with parasite laden black fly, people face the challenge of Onchocerciasis. The general environment in the cities of the developed western world is less hostile. In such conditions, suppurative keratitis resulting from
diabetic retinopathy, cataract, age related macular degeneration, myopia and glaucoma. Microbial keratitis is more severe in the underdeveloped world, probably due to delayed attendance. The objectives of this study are:

- To identify common etiological organisms in microbial keratitis in KPK Pakistan.
- To identify predisposing risk factors.
- To identify and recommend best treatment protocols.
- To identify and recommend preventative measures.

**MATERIALS AND METHODS**

A total of 112 patients admitted to the eye unit of Hayatabad Medical Complex from 1st January 2009 to 31st December 2009 were recruited in this prospective study. Patients with clinically diagnosed viral corneal ulcers were excluded from the study. A detailed history and a complete ocular examination was done according to a predesigned proforma. After a detailed examination on a slit lamp, corneal scraping was obtained and was sent for culture and sensitivity (C/S). Most of the time, it was performed under a Topcon slit lamp or under a Topcon Operating Microscope. The cornea was anaesthetized using a topical anesthetic (Proparacain Hydrochloride) while children were given general anesthesia. Most of the time, a disposable syringe needle, bent at its tips, was used as described by Smith et al. Scalpel blade was used in some cases for getting the corneal scraping. Scrape was taken from the edges of the ulcer all around and from the base of the ulcer.

Four types of growth media were used routinely for inoculating the material taken from the cornea. A blood Agar plate was inoculated first followed by Chocolate agar plate, Sabouraud’s agar plate and Thioglycolate broth. Sabouraud’s agar plate was cycloheximide free and in some cases, gentamicin 100umg/ml was added to it to suppress bacterial growth. Four slides were prepared for Microscopic examination. Half of the slides were stained with Gram’s method; other slides were treated with 20% Potassium Hydroxide (KOH). In few cases, the slides treated with KOH were further treated with Lactophenol Blue to facilitate the identification of fungal elements. In few cases Zeil-Neilson stain was also performed. All the slides were examined by the same microbiologist. Blood Agars were incubated at 37°C. Usually Bacterial growth occurred within 24 hours. However, if no growth occurred, the specimen was kept for another 3 weeks at 37°C for the growth of any slow growing bacteria or fungi. If still no growth the culture specimen was discarded as culture negative. Chocolate agar plates were incubated at 37°C for a minimum period of 72 hours before discarded for no growth. Sabouraud’s agar plates were incubated at 25°C. They were examined daily for any growth and were discarded if no growth took place in 3 weeks time. Thioglycolate broth was heated for 5 minutes in a boiling water bath before incubation at 37°C. It was kept for 7 days before they were discarded for no growth. The organism’s sensitivity to the antibiotics was determined with the disc diffusion method of Kirby-Bauer.

After comparing the size of inhibition zones with the standard, the antibiotic sensitivity was recorded as:

- Very sensitive (+ + + )
- Moderately sensitive (+ + )
- Mildly sensitive (+ )
- Resistant (- )

Every patient was put on the following treatment after corneal scraping and before the laboratory results. Frequent use of ciprofloxacin/ ofloxacin eye drops. This can be used as a mono-therapy (12) but we often added a second antibiotic (tobramycin ) to the regimen to ensure adequate antibiotic coverage.

- Atropine eye drops twice a day.
- Syrup / Tablets Brufen (400mg) according to the weight and age of the patient twice a day.
- Tablets Diamox (250mg & 500mg ) were used in cases of raised Intraocular Pressure.
- Itraconazole (Sporanox) Tablets as antifungal agents in patients with suspected Fungal corneal ulcers as twice a day regimen.

The initial therapy was changed only when the sensitivity report showed another medicine to be more appropriate. The patients were examined on a slit lamp twice a day, paying due attention to the site, size and depth of the ulcer. Anterior chamber reaction was recorded, and any vascularization of the ulcer was noted. Patients were discharged only when the ulcer showed signs of healing. All the patients were followed for 3 weeks. If the ulcer was large initially and there was a fear of perforation, a surgical modality, most of the time, a conjunctival flap was chosen. In cases of predisposing factors amenable to surgery like trichiasis, entropion, chronic dacrocystitis, lagophthalmos, were treated with appropriate surgical interventions. A final record of the eye was made after a follow up of 3 weeks. This included, visual acuity, corneal condition, and condition of the eye as a whole.

**Table 1: Culture Reports**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Cases</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total</td>
<td>40</td>
<td>21</td>
<td>61</td>
<td>54.46</td>
</tr>
<tr>
<td></td>
<td>Positive Cases</td>
<td>(65.57%)</td>
<td>(34.42%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Total</td>
<td>11</td>
<td>30</td>
<td>51</td>
<td>45.53</td>
</tr>
<tr>
<td></td>
<td>Negative Cases</td>
<td>(21.56%)</td>
<td>(58.82%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
RESULTS

Corneal ulcer patients comprised 3.689% of the total admissions. (112/3028). Male patients were 74 (66.07%) and female patients were 38 (33.92%). Most of the patients (56.24%) were between the ages 31 and 50 years. Total number of patients receiving treatment before presentation were 75 (66.96%). 52 (69.34%) of the patients were on antibiotic treatment while 10 (13.34%) patients were using topical steroids. Total number of patients with a history of trauma were 47 (41.96%), out of which agricultural trauma was responsible in 59.57% cases. Patients with ocular and lid diseases at the time of presentation were 64 (57.14%). Chronic dacryocystitis was present in 37.50% cases, while 23.88% had an old herpetic scar, who presented with secondary corneal infection or a flare up of old herpetic infection. The complaints of the majority (93.74%) of the patients were redness, dimness of vision and photophobia. In 93 (83.03%) patients the ulcer was central, while in 19 (16.96%) it was marginal in location. In 50 (44.64%) patients hypopyon was present. The culture and sensitivity reports of 61 (54.46%) patients were positive while in 51 (45.53%) patients it was reported as Negative. Staphlococcus aureus was the most common bacterial isolate accounting for 22 (36.06%) cases, while Aspergillus was the most common fungus isolated which accounted for 72.72% of mycotic ulcers. The presenting visual acuity in 94.63% patients was less than 6/60, only 5.35% patients had a presenting Visual Acuity of better than 6/60. The final visual acuity of 53.57% patients was better than 6/60, while 46.41% ended up with a visual acuity less than 6/60.

DISCUSSION

This prospective study at KIOMS looked at the profile of corneal ulcers which consisted of predisposing factors, causative agents, age, sex, and the final visual outcome. In this study corneal ulcer patients comprised 3.689% of the total admissions during the year 2000. This is comparable to the figure reported by Dr Nasir13 who conducted a similar study in 1989. However, it is lower than the prevalence reported by Haider et al7 from Larkana & Khan and Baig et al from Nawbshah (14.5%). It also corresponds well to a study by Omerod et al from South Africa (5%). The figure obtained by us might be lower as viral corneal ulcer diagnosed on clinical grounds were excluded from the study.

Corneal ulcers in our study were found to be more common in males (66.07%) than in females (33.92%), which correspond well with similar studies.5,13,14,15,16 The

<table>
<thead>
<tr>
<th>Table 2: Etiology of micro-organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.No</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
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<tr>
<td>2</td>
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<tr>
<td>6</td>
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</table>

<table>
<thead>
<tr>
<th>Table 3: Culture and sensitivity results (bacterial)</th>
</tr>
</thead>
<tbody>
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<td>------</td>
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</tr>
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<td>6</td>
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<table>
<thead>
<tr>
<th>Table 4: Culture and sensitivity results (fungi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.No</td>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5: Final visual outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Acuity</td>
</tr>
<tr>
<td>6/12-6/18</td>
</tr>
<tr>
<td>6/18-6/60</td>
</tr>
<tr>
<td>6/60-3/60</td>
</tr>
<tr>
<td>3/60-HM</td>
</tr>
<tr>
<td>HM-PL</td>
</tr>
<tr>
<td>NPL</td>
</tr>
</tbody>
</table>

A Review of Microbial Keratitis
reason for male preponderance may be due to more exposure of the male patients to ocular trauma. More than half of the patients (66.96%) were already on medications at the time of presentation, out of which 13.34% were on steroid eye drops. These patients probably got their medications from quacks, hakims, or from drug stores without a prescription (self-medication). Microbial keratitis is rare in the absence of predisposing factors. 41.96% of the patients gave a history of ocular trauma, this is in accordance with the similar studies from Bangladesh and India. It is however higher than that reported by Coster et al from London and Coster and Badenoch from Australia. In this study, agricultural trauma was responsible in 59.57% cases, whereas contact lens trauma accounted for 2.12% cases only. This figure is much less than that reported by Fredric Schaffer et al which is 36%. Pakistan is a low-income country which depends mostly on Agriculture for employment, This accounts for the higher frequency of agricultural trauma and lower frequency of contact lens trauma. 57.17% of the patients were having an ocular surface and lid disease at the time of presentation. This is higher than that observed by Bennett et al and Nasir, but it is much lower than that reported by Ormerod from South Africa. In the latter study they considered topical steroids and trauma among the local predisposing factors while we have considered them separately. 7.50% of the patients had chronic dacryocystitis, which is very high as compared to that reported by Nasir. Most of the patients with chronic dacryocystitis had come from the hilly areas like Chitral, where trachoma had been very common until recently. Whether there is a correlation between trachomatous scarring and chronic dacryocystitis in these hilly areas need to be investigated further. 83.03% of the ulcers located centrally, whereas 16.96% were marginally located. This corresponds well with other studies. 54.46% cases in our study had a positive culture which is in accordance with studies reported by Nasir and Bennett. Ormerod in his two series reported a positive culture in 75% and 82% of the cases.

Staph. aureus was the most common bacterial isolate and accounted for 36.06% of the pathogens isolated. Staph. aureus, which was previously considered to be an opportunistic organism, is now becoming the most common cause of corneal infection. It may be due to the fact that it is not uncommonly found in the conjunctival bacterial flora and can easily cause infection if the local situation becomes less favorable. Another important factor may be the Antibiotic resistance of many strains of Staphylococci.

Aspergillus was the most common fungus isolated and accounted for 72.72% of the Mycotic ulcers. Fusarium was responsible for 9.09% of the Mycotic ulcers in this study. Similar figures are reported from India and Nepal. Candida accounted for 18.18% of the mycotic ulcers but this figure is much lower than that reported by Nasir (13) and other studies.

Fungal infections are considered to occur in immune-compromised hosts. Any injury with vegetable matter, an occupation like Farming and previous treatment with broad spectrum antibiotics and steroids are strong predisposing factors. All these factors were frequently seen to be involved in patients in this study. The cultures of all the patients were tested with the antibiotic prescriptions currently available at the medicine stores. This was done mainly to come to a common conclusion about the sensitivity of the most common accessible medicine available at the drug stores.

The results of this study showed that all the Bacteria (87%) were very sensitive to ofloxacin and ciprofloxacin whereas sensitivity to tobramycin was 80% and chloramphenicol and gentamycin 46.5% only. Tobramycin was found to be more effective than gentamycin and even more effective than chloramphenicol. This was probably the result of resistance developed to these antibiotics due to their wide spread and indiscriminate use. The trend showing resistance was also reported by other Authors.

It was observed that on presentation, 94.63% of the patients had a visual acuity worse than 6/60 while 5.35% of the patients had a visual acuity of better than 6/60 on the Snellen’s chart. With effective management, 53.57% patients had a final visual acuity of better than 6/60 and 46.41% ended up with a visual acuity of worse than 6/60 which is much lower than that observed by Nasir (73%). This is probably due to the fact that we now have access to much effective drugs than 10 years ago. However the big change in the outcome may also be because of the improved primary eye care introduced at the Basic Health Units (BHU) levels throughout the province and to the creation of functional eye units at the district levels. The education of the patients has also improved so overall the patients present earlier, treatment is started sooner and patients are referred in time to the tertiary eye care centres. At the end of the third week 74.10% of the eyes were already healed. 58.92% of the patients in this study ended up with a dense corneal scar, most of such patients can be rehabilitated if proper Keratoplasty services were available at our tertiary eye care centres.

CONCLUSION

Corneal ulcer is one of the common causes of ocular morbidity and corneal blindness in KPK, Pakistan. Public health education, prevention of
agricultural trauma, improved primary eye care services and ban on the over counter sale of ocular medications, can have a positive effect on the prevalence and incidence of corneal ulcers. Availability of effective keratoplasty services will be a major step forward in the visual rehabilitation of corneal blindness.

REFERENCES:
INTRODUCTION

Ocular trauma is a major cause of preventable monocular blindness and visual impairment in the world. During last decade epidemiological studies have contributed significantly to a better understanding of disease patterns of cataract, trachoma, xerophthalmia, and diabetic retinopathy resulting in prevention and control of blindness due to these diseases. Eye injuries have been considered a clinical issue and are mostly addressed within the context of clinical eye care delivery systems including emergency case management. However, like any other eye disorder, eye injuries do not occur as random events: there is evidence that some population groups are at increased risk of sustaining eye injuries because of greater exposure to hazards, decreased ability to avoid or detect hazards, and/or a lower likelihood of functional recovery following eye injury. Hence further evaluation and research are required on this area. Although one of the major causes of visual morbidity, it has remained a neglected disorder and has not received any importance from public health point of view.

Globally in 2001, 1.6 million people were blind from ocular injuries, 2.3 million had bilateral low vision, and 19 million were unilaterally blind or had low vision. In developing countries most of the complications occur due to delayed presentation at the hospital as well as lack of vitreo-retinal or corneal transplantation facilities. No national data are available on the incidence or prevalence of ocular injury. However few hospital based studies from the North of Pakistan show a high number of ocular injuries coming to those hospitals and non-trachomatous corneal opacity is the second most important cause of blindness in Pakistan and has shown an increase within the last fifteen years. It especially affects the south of Pakistan. Most of this is caused by Trauma.

To determine the pattern of ocular trauma in local circumstances, and placements of the injury is one of the objectives of this study carried out at Al-Ibrahim Eye Hospital, Isra Postgraduate Institute of Ophthalmology, Karachi from January to December 2006; that took a deeper look at the local pattern of ocular trauma,
its distribution, causes and complications. This hospital is situated in Gadap Town, an important geographical and agricultural area of Karachi which is one of the mega cities of the world and is situated in south-eastern region of Pakistan.

**METHODS**

This is a retrospective study on indoor and outdoor patients with ocular injury presented at Al-Ibrahim Eye Hospital during January and December, 2006. All the patients attending general eye OPD, pediatric eye clinic, retina and cataract clinics with the history of ocular trauma were included in the study. The questionnaire was designed at community ophthalmology department and was piloted over ten patients selected at random from the said period. Necessary changes were made by removing irrelative variables / fields and adding required columns. Most of the variables were coded in order to facilitate statistical analysis. The team involved in designing and conducting the study consisted of a clinical ophthalmologist, an ophthalmic paramedic and a data entry operator oriented with statistical methods. They were engaged in collecting files of ocular injury patients from various departments of the hospital and filled all required data on the printed questionnaire. The data was double-checked, verified against actual case sheets and forwarded for data entry. For the purpose of this study, a software application was specifically designed using Microsoft visual basic 6.0 and Microsoft office access 2007. Various statistics were extracted using the structured query language (SQL).

**RESULTS:**

A Total of 82837 patients attended OPD in year 2006 at Al-Ibrahim Eye Hospital, Karachi, out of them 1457(1.75%) were with ocular trauma, while 1512 eyes were affected; thus 55 (3.77%) patient had bilateral trauma (Table 2). The majority of victims were male. Out of 1457 patients 1277 (87.64%) were male, and 180 (12.35%) were female, an approximately 1:7 ratio. The preponderant age group was 16-25 years accompanying for 357 (24.50%) patients of whom 342 were males, followed by children < 15 years 309 (21.2%). Age distribution with gender is given in Table 1. More than half of the injuries happened at work place (54.91%), followed by home (31.9%), playground 4.39%, farms 3.91%, RTA 2.33%, industry 1.44%, school 0.55%, war/terrorism 0.27% and 0.07% by physical abuse. Information about place of injury in 5.49% was not available (Table 4). Mechanical trauma was the commonest cause of eye injury, accounting for 1328 (91.15%), followed by Agricultural trauma, which was in 82 eyes (5.63%) (Table 6). Most of the patients, that is 897 (61.56%), were hit by blunt objects, followed by sharp objects in 482 (33.08%), chemical burns in 26 (1.8%) and heat exposure to 5 eyes (0.34%), with variable depth of injury. Penetration with perforation was observed in 194 (13.32%) patients, while 283 (19.42%) patient had perforation only, 29 (2.0%) patient had penetration only and 904 (62.04%) had superficial injuries (Table 3). No visual impairment (VA 6/6-6/18) was seen in 921 (60.91%), visual impairment (VA < 6/18-6/60) in 139 (9.19%) patient, severe visual impairment (VA < 6/60-3/60) in 41 (2.71%) and blind (VA < 3/60) were in 271 (17.92%). The visual acuity of 140 (9.25%) was not recorded due to poor cooperation of patient. Table 5 corneal damage was the most common of visual impairment observed in 203 (45.01%), followed by posterior segment 145 (32.15%) and lens damage in 103 (22.83%) patients. Table 7

**DISCUSSION**

This study shows that 1.75% (1475) of the patients attending this tertiary eye care hospital presented with...
ocular trauma, significant enough for seeking treatment. Although it seemed to be a small proportion of the total OPD, yet it was a large number and the trauma cases that came through ER were not included, which might further increase the incidence of ocular injuries.

This study showed a high number of male involvement in ocular trauma similar to many hospital and population based studies. The greater tendency for men to sustain eye injury is multifactorial such as work-related, sports related, aggressive behavior, assault, alcohol, drug abuse and reluctance to use protective devices at work. This fact is supported by the high incidence of trauma in working age groups (16 – 35 years) as demonstrated in this study. Similar correlations have been demonstrated in other studies as well. The most common affected group in this study is young adults in 16-25 and 26-35 age-groups. Bilateral involvement of the eyes was in 3.1% cases in this study, similar to Karaman et al & Khan et al. Usually bilateral eye injuries occur as a result of bomb blasts, anti-personnel mines and motor vehicle accidents. Pakistan being a country under terrorist attacks now for more than a couple of decades and Southern Pakistan being one of the most affected areas suffers more causalities as a result of various disputes.

Workplace, including agricultural trauma, has been recognized as the most common location for ocular injury in this study. Agriculture is the most common occupation in rural Pakistan where the farmers still use very old techniques of cultivation without any protective measures. In other places, ignorance, negligence and lack of protective measures (industries) are the common causes of ocular trauma. Home is the second most common location of ocular injury similar to the studies from India. Work place, including agricultural trauma, is the most common cause of eye injuries. Amongst other causes, mechanical trauma with flying iron particles is an important cause of injury in young adults.

<table>
<thead>
<tr>
<th>Place of Injury</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work place</td>
<td>801</td>
<td>54.91%</td>
</tr>
<tr>
<td>Home</td>
<td>465</td>
<td>31.90%</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>1</td>
<td>0.07%</td>
</tr>
<tr>
<td>Playground</td>
<td>64</td>
<td>4.39%</td>
</tr>
<tr>
<td>RTA</td>
<td>34</td>
<td>2.33%</td>
</tr>
<tr>
<td>School</td>
<td>8</td>
<td>0.55%</td>
</tr>
<tr>
<td>BBI</td>
<td>4</td>
<td>0.27%</td>
</tr>
<tr>
<td>N/A</td>
<td>80</td>
<td>5.49%</td>
</tr>
<tr>
<td>Total</td>
<td>1457</td>
<td>99.99%</td>
</tr>
</tbody>
</table>

Table 5: Visual Acuity in injured eye

<table>
<thead>
<tr>
<th>VA Group</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/6-6/18</td>
<td>921</td>
<td>60.91%</td>
</tr>
<tr>
<td>&lt;6/18-6/60</td>
<td>139</td>
<td>9.19%</td>
</tr>
<tr>
<td>&lt;6/60-3/60</td>
<td>41</td>
<td>2.71%</td>
</tr>
<tr>
<td>&lt;3/60</td>
<td>271</td>
<td>17.92%</td>
</tr>
<tr>
<td>NA</td>
<td>140</td>
<td>9.25%</td>
</tr>
<tr>
<td>Total</td>
<td>1512</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 6: Pattern of trauma

<table>
<thead>
<tr>
<th>Type of Trauma</th>
<th>Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>782</td>
<td>53.67%</td>
</tr>
<tr>
<td>Mechanical</td>
<td>628</td>
<td>43.10%</td>
</tr>
<tr>
<td>Thermal</td>
<td>9</td>
<td>0.62%</td>
</tr>
<tr>
<td>Chemical</td>
<td>24</td>
<td>1.65%</td>
</tr>
<tr>
<td>Radiational</td>
<td>4</td>
<td>0.27%</td>
</tr>
<tr>
<td>NA</td>
<td>10</td>
<td>0.69%</td>
</tr>
<tr>
<td>Total</td>
<td>1457</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

CONCLUSION
Young adults at workplace and home are the most affected subjects. Agriculture trauma is the most common cause of eye injuries. Amongst other causes, mechanical trauma with flying iron particles is an important cause of injury in young adults.
Recommendations

Public awareness raising and health education for using eye safety measures, through electronic media, leaflets in community and teaching in Schools. Provision of better eye care services at the primary level and an emphasis on the training of paramedical staff in the recognition and treatment of minor injuries and referral of major ones. Education of the mother - the first health provider in the home. Creating awareness regarding eye injuries at the group level, for example, amongst groups sharing a common occupation or activity such as welders, football players, cyclists and industrial workers. At group level one might channel messages through community health workers, teachers, sports coaches, volunteers and journalists, who themselves will need to be educated. Advocacy amongst leaders and policy makers to introduce and enforce policies which will help prevent blindness from injuries, for example, legislation for health and safety at work, the wearing of car seat belts, the banning of explosive fire crackers, etc.

REFERENCES:
ABSTRACT:
Objectives: To evaluate the patients' and surgeons' experience in phacoemulsification using topical anesthesia with intracameral lignocaine in terms of pain, surgical complications, and the outcome.

Materials and Methods: Forty eight patients of senile cataract were operated by phacoemulcification under topical anesthesia with intracameral lignocaine in the department of ophthalmology Hayatabad Medical Complex from January 2011 to July 2011. One superior 3.2mm incision and two horizontal side ports with 15 degree were made. The patients and the single operating surgeon were given a questionnaire to evaluate their experience in terms of pain, surgical experience, and complications.

Results: There were 48 patients enrolled in the study. The mean pain score was 0.7 (SD ± 0.97, range 0-5, median 0.0, and mode 0.0). Fifty-one patients (53%) had pain score of zero, that is, no pain. Ninety-one patients (~95%) had a score of less than 3, that is, mild pain to none. All the surgeries were complication-free except one and the surgeon’s experience was favourable in terms of patient’s cooperation, anterior chamber stability, difficulty, and complications. The ocular movements were not affected, and hence, the eye patch could be removed immediately following the surgery.

Conclusions: Phacoemulsification under topical anesthesia with the use of 2% lignocaine jelly and 0.5% intracameral lignocaine makes cataract management better in every respect. The anesthesia achieved is adequate for patient comfort and safe cataract surgery.

Keywords: Anesthesia, intracameral lignocaine, pain evaluation, manual small incision cataract surgery, topical

INTRODUCTION:
Cataract is the commonest age related disease in most countries world wide. There are approximately 45 million blind people in the world. At least 80% of these people live in developing countries and more than half are blind as a result of cataract. These areas are under privileged in terms of medical services. Ophthalmology is even scarcely available speciality in such areas of the world. Cataract extractions is one of the most cost-effective of all surgical interventions in terms of quality of life restored. The only treatment option for cataract is the surgical removal of the opaque lens and the implantation of an artificial lens. The state-of-the-art technique is phacoemulsification with the insertion of a foldable intraocular lens (IOL) through a self-sealing incision. Kelman introduced his phacoemulsifier in 1967 but many intracapsular surgeons were not convinced. After that Robert Sinskey and John sheets were more popular in small incision ultrasonic surgery. Howard Gimbel introduced capsulorhexis first time. Small incision closing sutures introduced by John Shepherd and later by Howard Fine. Kelman performed phacoemulsification into anterior chamber and D. Calvard, Kratz T performed phacoemulsification into the papillary plane. Endocapsular phacoemulcification was introduced by Shepherd.

Several studies have demonstrated that topical anesthesia provides satisfactory analgesia, comparable with regional blocks (retrobulbar, peribulbar and subtenon anesthesia). On the other hand, even if current best practice is used, the retro and peribulbar techniques (using a sharp needle in the orbit) can cause serious and life-threatening complications in a limited number of cases (0.066%). Sub-Tenon’s anaesthesia by cannula can counteract this complication, but it increases the risk of mild complications of anaesthesia. Moreover, these techniques can cause post-operative akinaesia which is undesirable in one-day surgery. We here describe a topical anesthesia approach for performing phacoemulsification. We have performed a pain evaluation survey on patients who underwent this procedure. So for no study available in our setup of phacoemulsification under topical anesthesia with intracameral 0.5% lignocaine.

MATERIAL AND METHODS:
This prospective interventional case series
 containing forty eight patients of senile cataract were operated by phacoemulcification under topical anesthesia with intracameral lignocaine in the department of ophthalmology Hayatabad edical Complex from January 2011 to July 2011.

The patients with significant cataract causing impairment of visual functions not correctable by glasses or with unacceptable glare, polyopia, or reduced quality of vision attributable to cataract and willing for cataract surgery were included in the study. Only contraindication was inability to understand verbal commands. Sensitivity to lignocaine was also an absolute contraindication to topical anesthesia. Forty eight patients were included in the study after performing tests and investigations for cataract surgery under local anesthesia. At the start of the surgery, the patients were instructed to hold the hand of the paramedical staff and to squeeze the hand whenever they felt pain, which was recorded together with the surgical step during which they felt pain.

Lignocaine 2% drops were instilled in the conjunctival sac 5 minutes before the surgery. The lids and periorcular area were painted with povidone iodine 5% solution twice and the patient draped. Once fully draped, the surgery was started. No superior rectus suture was taken. One superior 3.2mm incision and two horizontal side ports with 15 degree were made. The entry into the anterior chamber was followed by intracameral injection of diluted 2% lignocaine (xylocaine) solution, either commercially available preservative-free or regular 2% lignocaine injection. In our pain evaluation survey, we gave intracameral lignocaine to all the patients. Then, 2% hydroxy propyl methyl cellulose was injected into the anterior chamber and capsulorrhexis was done. Hydrodissection was performed to separate the cortex from the capsule. Divide and concur technique used to emulsify the nucleus. Cortex aspirated with simcoe cannula, then the chamber filled with 2% hydroxy propyl methyl cellulose foldable intraocular lens implanted in the bag. The gel was washed out and wound hydration done. At the end of the surgery, a subconjunctival injection of dexamethasone and gentamycin was given (0.25 ml each). The eye was patched for about 2-3 hours, and then, the dressing was removed, eye was examined, and topical medications were started. Before opening the dressing, a pain survey questionnaire having visual analog scale for pain evaluation or Wong scale for simplified version of pain evaluation was given to the patients depending on their ability to comprehend. The surgeon also evaluated his experience in terms of surgical ease or difficulty, complications with regards to the topical anesthesia at the end of the surgeries. The surgeon’s evaluation was based on four parameters.

Patient’s cooperation, difficulty due to ocular movements, and anterior chamber stability were graded on a scale of 1-3, thus giving a cumulative range of 3-9 points. The questionnaire was designed to provide results in a manner that the lower values represent favorable experience. The fourth parameter was complications or adverse events, which were mentioned as and when they happened.

RESULTS:

There were 48 patients enrolled in the study according to the inclusion and exclusion criteria. Twenty three (47.9%) patients were male. Patients’ age ranged from 38 to 78 years (mean age 64.2 years). Twenty-one were the right eye and 27 left eye. Type of cataract according to the morphology was nuclear in 36 patients (37.5%), nuclear and subcapsular in 42 patients (43.7%), and subcapsular the rest. Nuclear density ranged from grade I-V and correlated with age. The pain experience during the surgical procedure was recorded as the patient’s response by squeezing the hand of the operation theater assistant during the surgery. The patients felt pain when the viscoelastic was being injected before capsulorrhexis (3 patients), during the stretching of the wound while delivering the nucleus (4 patients), and during the irrigation aspiration procedure (4 patients).

The visual analog scale or the Wong scale was used to evaluate the mean pain score. The mean pain score was 0.70 ±0.97SD, range 0-5). Only five patients (~5%) out of the whole series experienced pain who rated more than three on the visual analog scale of 10. The pain scores more than three has been accepted to represent moderate pain. Thus, rest of the patients can be assumed to have mild pain. There were 91 patients (~95%) who had a mean pain score of two or less. Fifty-one patients (53%) had pain score of zero that is no pain.

Figure 1.

**Figure 1:** Frequency distribution of visual analog scale response of patients undergoing cataract surgery under topical anesthesia.
The surgeon’s evaluation of the technique in terms of surgical ease and complications was favorable. On a cumulative scale ranging from 3 to 9 (lower value indicating favorable result), the average score was 3.4 (SD ±0.85). Table 1 for frequency distribution of individual parameters taken into account.

Only one patient had a small zonular dehiscence, which did not relate to the anesthesia technique, but it was because of small capsulorrhexis during the insertion of the IOL.

**DISCUSSION:**

The described use of topical anesthesia is presently limited to clear corneal phacoemulsification technique. The advantages are numerous, for the patients as well as for the surgeon. Topical anesthesia saves the patients from the risks of globe perforations, optic nerve injury, possibility of life-threatening respiratory arrest, and above all, the pain and fear perceived because of the peribulbar or retrobulbar injections. Topical anesthesia has additional benefits like not interfering with visual function, immediate visual recovery, absence of pain due to injection, unlimited ocular motility, and absence of an increase in orbital volume. Various studies regarding the pain perception and patients’ acceptability for anesthetic technique have been done and they concluded that the patients’ satisfaction for anesthesia is comparable for topical versus other techniques. Besides the patients’ subjective appreciation of pain during surgery, which may be limited by their tolerance and expression, there are studies which have investigated the various physiological and biochemical parameter changes during the surgery under topical anesthesia. Fichman has investigated the blood pressure, pulse rate, and respiration rate of patients during surgery under topical anesthesia and has found no major changes in these parameters. There is no significant change in the plasma cortisol levels during surgery under topical anesthesia, indicating that the procedure is well tolerated and does not pose stress to the patient. Thus, with all the advantages of topical anesthesia, it may be the preferred technique. Lignocaine gel has been previously shown to be an effective and possibly, a superior substitute to lignocaine drops. There has been no unwanted effect of the gel preparation of the drug on extracapsular cataract surgery and phacoemulsification; both have been successfully performed using the 2% lignocaine jelly.

In this study, the mean pain score of 0.70 (SD ±0.97, range 0-5) is comparable to the studies done on topical anesthesia use for phacoemulsification. The mean pain score of 0.84 (SD ±1.30, range 0-7) against peribulbar anesthesia 0.73 (SD ±1.5, range 0-5) was seen in a study done by Philipp, using 2% lignocaine drops. Similar results have been observed with the use of lignocaine 2% jelly for providing topical anesthesia for phacoemulsification for cataract removal in various other studies. The mean pain score in the present study was similar to the mentioned studies for the topical group, except that none of the patients in our studies needed subtenon lignocaine supplementation as was required by some patients in all the mentioned studies.

Topical anesthesia is used to anesthetize conjunctiva and sclera for several procedures like scleral indentation, forced duction test, subconjunctival injections, pterygium surgery, and cryoapplication for retinal cryopexy. Thus, topical anesthesia is effective and safe for manipulating conjunctiva and sclera as well. This fact has been utilized and demonstrated well in our study, where the pain experience of the patients has been comparable to that during phacoemulsification performed under topical anesthesia as reported in other studies. A pain evaluation study comparing the delivery of prechopped nucleus through a clear corneal incision and phacoemulsification through clear corneal incision using topical anesthesia has shown that the perioperative pain is significantly higher in the prechop method. The pain experienced by the patients during cataract surgery under topical anesthesia is during the steps when there is stretching of the eye ball. Similar opinion has been expressed by Philipp et al., regarding the cause of pain in topical anesthesia.

Surgeon’s evaluation of the technique has been favorable as demonstrated by the fact that patients’ cooperation was good in majority of cases (87.5%). In most of the patients, there were no unwanted eye movements (83%). With topical anesthesia, there is no rise in intraocular pressure as compared with peribulbar anesthesia. This is because the placement of 5 ml of anesthetic cocktail in the orbit increases the intraocular pressure. Thus, even without the use of ocular pressure, the anterior chamber stability is good in topical anesthesia. Thus, combining phacoemulsification with topical anesthesia with intracameral 0.5% lignocaine makes cataract
management better in every respect.

CONCLUSION:

Phacoemulsification under topical anesthesia with the use of 2% lignocaine jelly and 0.5% intracameral lignocaine makes cataract management better in every respect. The anesthesia achieved is adequate for patient comfort and safe cataract surgery.

REFERENCES:
INTRODUCTION

Central Serous Chorioretinopathy (CSCR) was described by Albrecht Von Graefe, 150 years ago in 1866. Since then different etiological and pathophysiological mechanisms have been proposed but still the exact aetiology of CSCR is not clear.

A high proportion of the patients with CSCR were found to be young males, and especially those working under stressful conditions and experiencing acute psychological trauma. In one study, the use of psychopharmacological drugs like anxiolytic and anti-depressive medications were found in 13% of the patients and author speculated that increased sympathetic nervous system activity may induce CSCR. Choroidal ischemia has been considered as a possible pathophysiological factor for CSCR.

Clinically CSCR is characterized by an idiopathic serous detachment of the central neurosensory retina, secondary to retinal pigment epithelium (RPE) leaking points as observed on Fundus fluorescein angiography (FFA). Usually it resolves spontaneously within few months. But a few patients may require focal photocoagulation, photodynamic treatment or Anti-VEGF injections given intra-vitreally. Different investigative procedures have been used to confirm the diagnosis and monitor the treatment efficacy of CSCR, including Fundus fluorescein angiography (FFA), Indocyanine green (ICG) angiography, and Optical Coherence Tomography (OCT).
Angiographic Features of Central Serous Chorio-retinopath in Pakistani Population

leaking point(s) at the level of retinal pigment epithelium (RPE). These leaking points may be single, multiple or there may be a rarely generalized RPE dysfunction.15, 16.

The objective of this prospective study was to investigate about the numbers of leaking points, the leaking pattern of these points during the FFA, quadrant wise location of these leaking points in the macular area, their distance from the centre of fovea, area of serous retinal detachment in millimetre square (mm²) and the presence or absence of RPE leaking points in the fellow eyes of Pakistani patients diagnosed for CSCR.

MATERIALS AND METHODS:

This was a hospital based, prospective, cross-sectional observational study done at the Department of Ophthalmology, Allied Hospital, Punjab Medical College Faisalabad during July 2007 to June 2011. According to the inclusion criteria, 86 patients presenting with the diagnosis of CSCR in at least one eye were enrolled for the study. Patients with history of previous attacks of CSCR, and the patients with a history of any ocular surgery were excluded from the study. Similarly diabetic and hypertensive patients and the patients with any other ocular disease were also excluded from the study. After a detailed history and ophthalmic examination of these patients, Fundus fluorescein angiography of both eyes of these patients was done using Topcon TRC DX-50 Retinal Camera. The coloured fundus photographs and angiograms of these patients were stored and analysed using Imagenet® Topcon software.

CSCR was confirmed angiographically by the presence of hyperfluorescent leaking point(s) taking the pattern of either inkblot, smokestack or a generalized RPE dysfunction. An “ink-blot” pattern was assigned when a small focal hyperfluorescent leaking point increased in size and intensity during the course of angiogram. A “smokestack pattern” was labelled when the hyperfluorescent leakage ascended vertically with a plume of smoke during the course of angiogram. A “smokestack pattern” was labelled when the hyperfluorescent leakage ascended vertically with linear configuration and then spreading laterally like a plume of smoke during the course of angiogram. Number of leaking points was noted for each angiogram. The location of each of these leaking points was recorded regarding superonasal, (S.N) inferonasal, (I.N) superotemporal, (S.T) and inferotemporal (I.T) quadrants of the macular region. The macula was defined as the retinal area within the temporal vascular arcades. The distance of the centre of leaking points from the centre of fovea was calculated using the Imagenet® Topcon software. The area of serous retinal detachment was also measured by marking the boundary of the detachment and then calculating the area within the boundary using the same programme.

All the findings were entered on a proforma and the results were analysed using Statistical package for social sciences (SPSS) for windows (version 16, Inc. Chicago) and t-test was applied for calculating the means and P-values of various outcomes.

RESULTS:

Out of 86 patients presenting with the diagnosis of CSCR in at least one eye, 78 (91%) were male and 8 (9%) were female with a male to female ratio of 10:1. All patients were Pakistani nationals without any other racial or ethnic mixture.

The age of the patients ranged from 25 to 60 years with a mean of 35±3.0 years. All 86 patients were divided into four different age groups. Age of 13 (15%) patients was between 25 to 30 years, 51 (59%) from 31-40 years, 19 (22%) patients from 41-50 years and only three (4%) patients aged between 51-60 years (Figure 1).

Visual acuity was 6/12 in 20 (21%) eyes, between 6/18 to 6/36 in 48 (49%) eyes and between 6/60 to counting fingers in 29 (30%) eyes (Table I). Angiographically, CSCR was found in one eye of 75 (87%) patients and both eyes of 11 (13%) patients. So a total of 97 eyes of 86 patients were found to be affected with CSCR. Left eye was more commonly affected as compared to right eye (48 vs. 27) while 11 patients had bilateral disease.

Only one leaking point was observed in 73 (75.5%) eyes, two leaking points were visible in 17 (17.5%) eyes, three leaking points in three (3%) eyes, four leaking points in two (2%) eyes and five leaking points in two (2%) eyes (Table II). In total 134 leaking points were observed in 97 eyes of 86 patients. Out of these, 126 (94%) points followed the ink-blot pattern of fluorescein leakage, while the smoke-stack pattern was seen in only 8 (6%) leaking points.

Quadrant wise location of these 134 leaking points in the macular region was noted and it was found that 80 (60%) points were located in the superonasal quadrant of the macula, 32 (23%) leaking points were found in the superotemporal quadrant, 17 (13%) points were located in inferonasal quadrant, and only five (4%) leaking points were found in inferotemporal quadrant (Table III). The distance of the 134 leaking points from the centre of fovea was also measured in millimetres. Thirty two (24%) leaking points were within 1.0 mm for the centre of fovea and 55 (41%) points were located between 1.1mm-2.0mm, while 34 (25%) points were located between 2.1mm-3.0 mm from the centre of fovea. Only 13 (10%) leaking points were located at a distance of more than 3.0 mm from the centre of fovea. So overwhelming majority (90%) of leaking points were located within 3mm from the centre of fovea (Table IV).

In the study we also calculated the area of serous
retinal detachment by marking the outline of the dome of retinal detachment using the Imagenet software and it was found that usually a large area of the central retina is detached in this pathology. In 28 (29%) eyes the detachment area was between 1.0-10 mm² and in 30 (31%) eyes detached retina was in the range of 10-20 mm² while 15 (15.5%) eyes had 21-30 mm² area of retinal detachment. In 13 (13.5%) eyes the detached retinal area was found to be of the size of 31-40 mm² and 11 (11%) eyes had more than 41 mm² area of serous detachment (Table V).

**DISCUSSION:**

Clinical entity of central serous chorioretinopathy was described by Albrecht Von Graefe in 1866 but it was Maumene, 100 years later, who utilized Fundus Fluorescein Angiography to demonstrate that the subretinal fluid in CSCR was derived from the disturbance of outer blood retinal barrier i.e. retinal pigment epithelium. Since then different studies have been done to find out the demographic and angiographic features of CSCR. In our study, 78 (91%) patients out of 86 patients were male and 8 (9%) patients were female with a male: female ratio of 10:1. This gender distribution of CSCR in Pakistani patients is the same as reported in most of the studies with the findings that CSCR is 6-10 times more common in males than in females. Mean age of our patients was 35 ± 3.0 years, with a range from 25 years to 60 years. However 81% of our patients were between 31 years to 50 years. This corresponds to the mean age of 41 years found in a study in Asian population. Our study shows that the incidence of CSCR increases during the 4th and 5th decade of life (Figure 1).

Visual acuity was significantly reduced in most of the patients at the time of presentation. A total of 21% patients had visual acuity of 6/12, 49% had visual acuity of 6/18-6/36 and 30% had visual acuity of 6/60 to counting fingers only. So a total of 79% patients had visual acuity of less than 6/12 at presentation (Table I).

<table>
<thead>
<tr>
<th>Area in mm²</th>
<th>No. of eyes</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 10.0</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>11-20</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>21-30</td>
<td>15</td>
<td>15.5</td>
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<tr>
<td>31-40</td>
<td>13</td>
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<td>≥ 40</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>97</td>
<td>100</td>
</tr>
</tbody>
</table>

Table V: Area of serous detachment in CSCR

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>No. of leaks</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.N</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>S.T</td>
<td>32</td>
<td>23</td>
</tr>
<tr>
<td>I.N</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>I.T</td>
<td>5</td>
<td>4</td>
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</tbody>
</table>

S.N= Superonasal, S.T=Superotemporal, I.N=Inferonasal, I.T=Inferotemporal

Figure-1

Incidence of CSCR in relation to age groups
Angiographic Features of Central Serous Chorio-retinopathy in Pakistani Population

This finding corresponds with the results of other studies.19

The “inkblot” pattern of leaking was observed in overwhelming majority 126 (94%) of leaking points as compared to “smokestack” pattern which was observed in only 8(6%) leaking points. This finding is comparable to the finding by Mutlak et al.15 But it is in contradiction to the finding of Kansky which states that smokestack pattern of leakage is more common than the inkblot pattern.20

Our study shows that 75% of the eyes affected by CSCR have one leaking point and 25% eyes have two or more than two leaking points on angiography. Similarly 87% of the patients have unilateral disease while 13% of the patients have bilateral involvement. These findings support the concept that although CSCR presents as unilateral disease but in quite a significant number of patients CSCR is caused by systemic disorders resulting in bilateral disease and causing multiple leaking points of RPE.

T-test analysis of the group statistics revealed that average number of leaking points per eye in unilateral cases was 1.48 points, while the average number of leaking points per eye in bilateral cases was 2.21 (P=0.030 & t-value=2.21). These findings suggest that possibly there are two different types of CSCR. First type of CSCR causing a localised dysfunction of RPE, involving usually one eye of the patient and a second type of CSCR causing widespread RPE dysfunction resulting in multiple leaking points in both eyes of the patient.

Location of the leaking points was noted by dividing the macular area into four different quadrants by drawing a vertical and a horizontal line passing through the fovea. A total of 80 (60%) leaking points were located in the superonasal(SN) quadrant of the macula involving the RPE beneath the maculopapillary bundle, whereas 32 (23%) leaks were found in the superotemporal (ST) quadrant (Table III). Out of the rest, 17(13%) leaks were in inferonasal(IN) quadrant and 5(4%) leaks were found in inferotemporal(IT) quadrant. These results show that 83% of the leaking points were located above the horizontal raphe of temporal retina. These findings are almost in the same range as observed by Mutlak & Dutton in their study and other studies done in the west. 15,16

Regarding the distance of the leaking points from the centre of fovea, it was observed that 121 (90%) of the leaking points were within 3.0 mm (2 disc diameter) from the centre of fovea. Only 13(10%) leaks were located more than 3.0mm away from the centre of fovea (Table IV). The mean distance of all the leaking points from the centre of fovea was 1.8 ±1.1mm. These finding confirm the results of other studies where 82 % of the leaking points were found within two disc diameter.15

Central serous chorioretinopathy (CSCR) results in exudative detachment of the central retina causing a dome shaped elevation of the detached retina. We measured the area of this retinal elevation and the mean area of detachment was 22.6±15.60 mm². This measurement of the detached retinal area caused by CSCR is done for the first time and has not been reported in any earlier study. The large area of retinal detachment corresponds with the profound loss of central vision observed in patients of CSCR. Furthermore t-test analysis revealed that in unilateral cases of CSCR the mean area of detached retina was 24.78±15.75 mm² and in cases of bilateral disease the mean area of detached retina was 9.95±6.69 mm² (P=0.012). These findings suggest that the first type of CSCR, which is more common, causes less number of RPE leakages but is more aggressive in nature resulting in relatively larger area of detached retina and a large central scotoma. The second type of CSCR, less common in frequency, seems to be less aggressive in nature causing multiple RPE defects usually in both eyes of the patient. However further extensive studies are required to confirm these findings.

CONCLUSION:

1. Pakistani population has the same demographic and angiographic features of Central serous chorioretinopathy as in other parts of the world.
2. Central serous chorioretinopathy affects the young males causing significant loss of productive work hours adding burden to the economies already under stress.
3. Central Serous Chorioretinopathy can be classified as Type-I, more aggressive but localized disease and Type II, less aggressive but widespread disease of the Retinal Pigment Epithelium.

REFERENCES:


Can we use Non-Ophthalmic Drug in Ophthalmology?
(Non-ophthalmic drug potential for ophthalmology)

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ABSTRACT:
Background: Progress in ophthalmology is accompanying with non-ophthalmic drug use. Calcium channel blockers, which alter the intracellular calcium concentration by modifying calcium flux across cell membranes and affect various intracellular signaling processes, have been long and widely used to treat essential hypertension and certain types of cardiac diseases such as angina pectoris. Among five subtypes of calcium channels, only specific agents for L-type calcium channels have been used as therapeutics. There are potentially multiple biological bases for the protective effect of calcium channel blockers on eye structures.

Objective: The objective of this review is to evaluate the evidence and discuss the rationale behind the recent suggestions that calcium channel blockers may be useful in the prevention and the treatment of different eye diseases.

Key words: calcium channel blockers, glaucoma, retinal degeneration, ocular inflammation, neuroprotective effect, antioxidative action.

INTRODUCTION:
Calcium channel blockers, which alter the intracellular calcium concentration by modifying calcium flux across cell membranes and affect various intracellular signaling processes, have been long and widely used to treat essential hypertension and certain types of cardiac diseases such as angina pectoris. Among five subtypes of calcium channels, only specific agents for L-type calcium channels have been used as therapeutics. Calcium antagonists induce vasodilatation at smooth muscle cells and are neuroprotective through the intracellular decrease of $K^+$. Calcium channel blockers generally dilate isolated ocular vessels and increase ocular blood flow in experimental animals, healthy humans, patients with open-angle glaucoma and in patients who have vascular diseases in which considerable vascular tone is present. As well contrast sensitivity in patients with normal tension glaucoma was found ameliorated by calcium channel inhibition. Neuroprotective effect of calcium channel blockers against retinal ganglion cell damage under hypoxia was shown by Yamada et al. and also by Garcia-Campos et al. Apoptosis, genetically programmed mechanism of cell death in which the cell activates a specific set of instructions that lead to the deconstruction of the cell from within, is now understood as a final common pathway for retinitis pigmentosa. Retinitis pigmentosa is an inherited retinal degeneration characterized by nyctalopia, ring scotoma, and bone-spicule pigmentation of the retina. Apoptosis can thus be considered as a therapeutic target for retinitis pigmentosa.

The general consensus is that intracellular concentrations of calcium ion are increased in apoptosis. These findings suggest that calcium channel blockers may potentially inhibit ganglion cells and photoreceptor apoptosis in glaucoma and retinitis pigmentosa respectively.

There are potentially multiple biological bases for the protective effect of calcium channel blockers on eye structures, as was shown above. The objective of this review is to evaluate the evidence and discuss the rationale behind the recent suggestions that calcium channel blockers may be useful in the prevention and the treatment of different eye diseases.

NON-OPHTHALMIC DRUGS
1. Diltiazem
Frasson et al. first reported the effects of D-cis-diltiazem, a benzothiazepin calcium channel antagonist which blocks both cyclic-nucleotid-gated cation channels (CNGC) and voltage-gated calcium channels (VGCC) on photoreceptor protection in rd1 mice,
several investigators have reported positive and negative effects of calcium channel blockers on animal models of retinitis pigmentosa. The intracellular concentration of calcium ions is subsequently elevated, leading to photoreceptor apoptosis. Sanges et al. demonstrated that systemic administration of D-cis-diltiazem reduced intracellular concentrations of calcium, down regulating calpains and photoreceptor apoptosis in rd1 mice. Direct inhibitory effects of D-cis-diltiazem on L-type VGCC have been reported by Hart et al., and D-cis-diltiazem effectively blocks photoreceptor light damage in mouse models by inhibiting photoreceptor apoptosis. In contrast, L-cis diltiazem reduced intracellular concentrations of calcium, leading to photoreceptor apoptosis. Sanges et al. demonstrated that application of diltiazem do not appear to reduce apoptosis. Investigating the inhibitory effect of nimodipine on the pathogenesis of photoreceptor light damage suggested that a combination of D-cis-diltiazem, taurin, and vitamin E has beneficial effects on the visual field progression, although the study did not clarify whether diltiazem alone demonstrated beneficial effects. Otori et al. evaluated the effect of diltiazem on inhibition of glutamate-induced apoptotic retinal ganglion cells death and concluded that application of diltiazem do not appear to reduce apoptosis. Investigating the pharmacokinetics of diltiazem after subconjunctival and topical administration in rabbits and effect on wound healing after the creation of conjunctival flaps, Oruc et al. have found that topical and subconjunctival diltiazem successfully penetrated the aqueous humor, but did not appear to affect wound healing.

Based on antioxidative action of calcium channel blockers, which have recently been shown, another therapeutic target is ocular inflammation. Animal study of intra-peritoneal injections of either nilvadipine, diltiazem, or vehicle have not found a beneficial inhibitory effect of diltiazem on the pathogenesis of ocular inflammation through the suppression of inflammation-related molecules.

2. Nimodipine

Nimodipine is an isopropyl calcium channel blocker which readily crosses the blood-brain barrier due to its high lipid solubility. Its primary action is to reduce the number of open calcium channels in cell membranes, thus restricting influx of calcium ions into cells. Several clinical trials have unequivocally shown that nimodipine is capable of preventing neurological deficits secondary to aneurysmal subarachnoid haemorrhage. The results of the VENUS (very early Nimodipine use in stroke) study do not support the concept that early nimodipine exerts a beneficial effect in stroke patients. On the other hand oral nimodipine showed an enhanced acute reperfusion if applied within 12 hours of onset of acute stroke. Yamada et al. in experimental in vitro model revealed that nimodipine have a direct neuroprotective effect against retinal ganglion cells damage related to hypoxia.

Michelson et al., have evaluated the impact of nimodipine on retinal blood flow in double-blind, two-way, crossover study of healthy subjects and found that orally administered at a dosage of 30 mg three times a day nimodipine significantly increases retinal perfusion in healthy subjects. Based on experimental findings Shahsuvaryan investigated the efficacy of nimodipine in the prospective comparative clinical interventional study of patients with non-arteritic anterior and posterior optic neuropathy. The author stated that increase in visual acuity was higher in the posterior ischemic neuropathy subgroup than in the anterior ischemic subgroup. Visual field testing during the follow-up also revealed positive transformation of visual field defects size and location, which correlated to visual acuity changes. These encouraging findings need to be confirmed by double-blind study.

Nimodipine has also been shown to significantly inhibit the growth of new vessels in experimental rat model of retinopathy of prematurity. Vascular endothelial growth factor (VEGF) can induce cell proliferation by activating the calcium channel in cell membrane through the influx of calcium increased. Another animal study also have found a beneficial inhibitory effect of nimodipine on proliferative retinopathy by blocking the influx of calcium and expression of VEGF.

The impact of nimodipine on ocular circulation in normal tension glaucoma have been evaluated in many clinical studies. Piltz et al., have described a performance-corrected improvement in visual field deviation and contrast sensitivity in patients with normal tension glaucoma (NTG) and in control subjects in a prospective, placebo-controlled double-masked study after oral administration of nimodipine (30 mg twice a day). Other authors also stated that a single dose of 30mg nimodipine normalizes the significantly reduced retinal blood flow in NTG patients with clinical signs of vaso-spasmic hyperactivity. Lukesch et al., have examined the impact of 60 mg nimodipine in NTG patients 2 hours after oral administration. Results disclosed that nimodipine increased the blood flow of the optic nerve head by 18% and improved color-
contrast sensitivity. Thus, nimodipine is potentially useful calcium channel blocker for eye disorders treatment due to its high lipid solubility and ability to cross the blood-brain barrier.

3. Nilvadipine

Recent experimental evidences suggest that Nilvadipine appear to have beneficial effects on different ocular structures. Ogata et al.,30 have evaluated the effects of nilvadipine on retinal blood flow and concluded that this agent may directly and selectively increase retinal tissue blood flow, while having only minimal effect on systemic circulation including arterial blood pressure. Another experimental study conducted by Uemura and Mizota40 have also advocated the use of nilvadipine for the treatment of glaucoma or other retinal diseases that have some relation to apoptosis, based on claims that nilvadipine has high permeability to retina and neuroprotective effect to retinal cells. Otori et al.,28 in the experimental study of different calcium channel blockers protective effect against glutamate neurotoxicity in purified retinal ganglion cells has found that nilvadipine significantly reduce glutamate-induced apoptosis.

Systemic administration of nilvadipine has been shown to be effective for protecting photoreceptors in rats experienced by the Royal College Surgeons20 on rd1 mice23, and heterozygous rd2 (rds) mice24. In addition to direct effects of calcium channel blockers on intracellular concentrations of calcium ion in photoreceptor cells, other indirect effects are expected such as increased expression of fibroblast growth factor (FGF)223 and ciliary neurotrophic factor (CNTF) in the retina24, and increased choroidal blood flow.2

In the latest animal study of intraperitoneal injections of nilvadipine Ishida et al.,30 have found a beneficial inhibitory effect of this drug on the pathogenesis of ocular inflammation through the suppression of inflammation-related molecules. Several clinical trials have shown the effectiveness of nilvadipine in retinitis pigmentosa and glaucoma. Ohguro41 reported the photoreceptor rescue effects of nilvadipine in a small patient group. Nakazawa et al.,16 expanded his nilvadipine study for RP patients to confirm the results. Although both treated and control groups are still small, authors results have shown significant retardation of the mean deviation (MD) slope as calculated by the central visual field (Humphry Visual Field Analyzer, 10-2 Program) after a mean of 48 months of observation. As these pilot studies are small-sized and cannot completely exclude possible biases, a large-scale, randomized, multicenter human trial of calcium channel blockers is required in order to evaluate their efficacy as therapeutic agents for retinitis pigmentosa. The potential beneficial impact of nilvadipine on ocular circulation in normal tension glaucoma has been evaluated in different clinical studies.

Yamamoto et al.,42 Tomita et al.,45 Niwa et al.,44 have found that nilvadipine reduces vascular resistance in distal retrobulbar arteries and significantly increases velocity in the central retinal artery in patients with normal tension glaucoma. Tomita et al.,43 also stated that reduced orbital vascular resistance after a 4-week treatment with 2 mg oral nilvadipine consequently increases the optic disc blood flow. Koseki et al.,2 conducted a randomized, placebo-controlled, double-masked, single-center 3-year study of nilvadipine on visual field and ocular circulation in glaucoma with low-normal pressure. No topical ocular hypotensive drugs were prescribed.

The authors concluded that nilvadipine (2 mg twice daily) slightly slowed the visual field progression and maintained the optic disc rim, and the posterior choroidal circulation increased over 3 years in patients with open-angle glaucoma with low normal intraocular pressure. The results of this study add to the growing body of evidence that nilvadipine may be useful for neuroprotection in glaucoma. Thus, nilvadipine is potentially useful calcium channel blocker for eye disorders treatment due to its hydrophobic nature with high permeability to the central nervous system, including the retina and the highest antioxidant potency among calcium channel blockers.

4. Other Calcium Channel Blockers

The experimental study conducted by Oku et al.,45 evaluated the effect of topical Iganidipine, a new Dihydropyridine derivative calcium channel blocker on the impaired visual evoked potential after endothelin-1 injection into the vitreous body of rabbits and have advocated iganidipine eyedrops for the treatment of ischemic retinal and optic nerve disorders for the maintenance of visual function.

The latest experimental study46 evaluated a neuroprotective effect of another new calcium channel blocker Lomerizine. The authors stated that lomerizine alleviates secondary degeneration of retinal ganglion cells induced by an optic nerve crush injury in the rat, presumably by improving the impaired axoplasmic flow. Tamaki et al.,47 also investigated the effects of lomerizine on the ocular tissue circulation in rabbits and on the circulation in the optic nerve head and choroid in healthy volunteers and have found that lomerizine increases blood velocity, and probably blood flow, in the optic nerve head and retina in rabbits, and it also increases blood velocity in the optic nerve head in healthy humans, without significantly altering blood pressure or heart rate.
CONCLUSION

In conclusion, there are potentially multiple biological bases for the therapeutic effect of calcium channel blockers in eye diseases. Taken into account that not all calcium channel blockers are equally effective, the challenge for future laboratory research will be to determine the best type and dosage of calcium channel blockers and also to determine which processes are modulated by these drugs in vivo and therefore are primarily responsible for the apparent beneficial effects observed in the previous studies.

Clearly, further observational studies cannot adequately address many unanswered questions. It is time to conduct a randomized controlled trial to provide direct evidence of the effectiveness of specific type nonophthalmic drug - calcium channel blocker in different eye diseases.

REFERENCES


Can we use Non-Ophthalmic Drug in Ophthalmology?

Intravitreal Triamcinolone (IVTA) vs Laser Photocoagulation as a Primary Treatment for Diabetic Macular Oedema (DME)*
(A Comparative Study)

Mustapha Norlaili1, Shaharuddin Bakiah2, Embong Zunaina3

ABSTRACT:
Background: Diabetic macular oedema is the leading causes of blindness. Laser photocoagulation reduces the risk of visual loss. However recurrences are common and despite laser treatment, patients with diabetic macular oedema experienced progressive loss of vision. Stabilization of the blood retinal barrier introduces a rationale for intravitreal triamcinolone treatment in diabetic macular oedema. This study is intended to compare the best corrected visual acuity (BCVA) and the macular oedema index (MEI) at 3 month of primary treatment for diabetic macular oedema between intravitreal triamcinolone acetonide (IVTA) and laser photocoagulation.

Methods: This comparative pilot study consists of 40 diabetic patients with diabetic macular oedema. The patients were randomized into two groups using envelope technique sampling procedure. Treatment for diabetic macular oedema was based on the printed envelope technique selected for every patient. Twenty patients were assigned for IVTA group (one injection of IVTA) and another 20 patients for LASER group (one laser session). Main outcome measures were mean BCVA and mean MEI at three months post treatment. The MEI was quantified using Heidelberg Retinal Tomography II.

Results: The mean difference for BCVA at baseline [IVTA: 0.935 (0.223), LASER: 0.795 (0.315)] and at three months post treatment [IVTA: 0.405 (0.224), LASER: 0.525 (0.289)] between IVTA and LASER group was not statistically significant (p = 0.113 and p = 0.151 respectively). The mean difference for MEI at baseline [IVTA: 2.539 (0.914), LASER: 2.139 (0.577)] and at three months post treatment [IVTA: 1.753 (0.614), LASER: 1.711 (0.472)] between IVTA and LASER group was also not statistically significant (p = 0.106 and p = 0.811 respectively).

Conclusions: IVTA demonstrates good outcome comparable to laser photocoagulation as a primary treatment for diabetic macular oedema at three months post treatment.

INTRODUCTION

Background: Diabetic macular oedema (DME) is the leading causes of blindness in an increasing number of patients with diabetes. Reduction of visual acuity in DME results from accumulation of fluid produced from a rupture of the blood-retinal barrier into the inner nuclear layer of the retina. The thickened macula can be visualized on slit lamp examination using 90 Dioptre or 78 Dioptre lens. The retinal thickness can be measured or quantified by Optical Coherent Tomography (OCT), Confocal laser scanning using Heidelberg Retina Tomography II (HRT II) or Retinal Thickness Analyzer.

Scanning laser tomography (SLT) in HRT II is a non-invasive technique which permits the objective, topographic measurement of the fundus. SLT employs confocal optics to attain a high resolution not only perpendicular to x and y axis but also along z axis (the optical axis). The distribution of reflected light intensity along the optical axis for a given pixel is described as the z-profile or confocal intensity profile. An oedema index can be derived for each pixel, which is sensitive to oedematous changes of the retina. The resultant map of these oedema indices gives a measure of the location and extent of retinal oedema. It should be noted that the macular oedema index (MEI) is not a measure of retinal thickness but reflects the changes of retinal thickness based on the retinal refractive index in the areas of oedema. The oedema index methodology has been validated in diabetic retinopathy but not in other disease states. Change of the oedema index has been shown to correlate with change of visual function, including logarithm of the minimum angle of resolution.
Intravitreal Triamcinolone (IVTA) vs Laser Photocoagulation as a Primary Treatment for Diabetic Macular Oedema (DME)

In this study, patients with media opacity impairing visual acuity, conventional automated static perimetry and short-wavelength automated perimetry, in patients undergoing grid laser treatment for clinically significant macular oedema. Laser photocoagulation reduces the risk of visual loss in 60% of patients. However, recurrences are common and despite laser treatment, 26% of patients with DME experienced progressive loss of vision. Furthermore, 40% of treated eyes that had retinal oedema involving the centre of the macula at baseline still had oedema involving the centre at 12 months, as did 25% of treated eyes at 36 months. The frequency of an unsatisfactory outcome following laser photocoagulation in some eyes with DME has prompted interest in other treatment modalities.

Intravitreal triamcinolone acetonide (IVTA) has been shown experimentally to reduce the breakdown of blood retinal barrier. It downregulates the production of vascular endothelial growth factor; a known vascular permeability factor hence reducing the vascular permeability. Stabilization of the blood retinal barrier introduces a rationale for IVTA treatment in DME.

IVTA has proved to be effective in the treatment of DME from previous studies. It constitutes a newer, less destructive treatment modality in the management of DME. Two previous studies of primary IVTA in DME have shown improvement on visual acuity as well as central macular thickness. Massinet et al. compared the use of IVTA as an adjunctive therapy in DME eyes which failed laser treatment where it effectively reduced the macular thickening. Jonas et al. in 2003 reported in their prospective, interventional, clinical case series study, the visual acuity had significantly improved with IVTA.

This study is designed to compare the best corrected visual acuity (BCVA) and the macular oedema index (MEI) at 3 months of primary treatment for DME between IVTA and laser photocoagulation. Confocal laser scanning machine, HRT II is used to quantify the MEI pre and post treatment. To our knowledge, HRT II has never been used as an evaluation tool in comparative study to assess macular oedema in DME before and after treatment.

**MATERIAL & METHOD:**

A comparative pilot study was conducted from June 2007 to February 2008, at Hospital Universiti Sains Malaysia, Kelantan, Malaysia. It was calculated based on improvement of visual acuity in IVTA, 81% and 25% in laser photocoagulation group. A total 40 patients (20 per arm) was required for this study.

Diabetic patients with newly diagnosed clinically as DME, and age more than 18 years old were included in this study. Patients with media opacity impairing intravitreal injection or laser photocoagulation procedure, DME with proliferative diabetic retinopathy still undergoing pan retinal photocoagulation, history of ocular surgery (e.g., cataract operation) or Yag procedure with the risk of further aggravating the macular oedema, intra-ocular pressure > 25 mmHg or any established glaucoma patient, ocular or systemic infection, known steroid allergy or responder, history of systemic steroid within 4 months prior to randomization and HbA1c more than 10% were excluded from the study.

**Sampling Procedure:** Envelope technique sampling procedure was conducted. A stack of opaque envelopes was prepared with 20 envelopes containing a piece of paper with the word ‘IVTA’ and the remaining 20 envelopes stated ‘LASER’. The envelope was drawn for each patient by a co-investigator. This was performed once the patient had agreed to be included in the study.

**Study Procedure:** All patients underwent a complete ocular and systemic assessment once they consented for the study. The assessment was performed by the primary investigator before they were randomized into the two groups.

1. **Pre-treatment Parameters Measurements**

1.1 **Visual Acuity:** Visual acuity of both eyes was tested with the standard retro illuminated Snellen chart. BCVA for each eye was recorded in logarithm of the minimum angle of resolution (log MAR) notation and used as a baseline.

All patients underwent subjective refraction by one optometrist. This is important as any astigmatism of -1 Dioptre and more need to be corrected with an astigmatism lens before proceeding with the HRT II for measurement of MEI.

1.2 **Fundus Examination:** Fundus examination was done using 78 Dioptre lens on slit lamp bio microscopy and binocular indirect ophthalmoscopy. DME was classified as mild, moderate and severe based on the International Clinical Diabetic Macular Oedema Disease Severity Scale.

1.3 **Macular Oedema Index:** MEI analysis has been incorporated within the HRT II as the macular oedema mapping (MEM). The baseline MEM was taken using the HRT II. Patients were properly positioned in front of the HRT II system with their full correction of astigmatism if any. The focus was then adjusted to get a clear image of the macula formed on the monitor. Three sets of three consecutive images were captured each time. To ensure image quality and proper handling, all guidelines recommended by the manufacturer were followed.

The best image was chosen based on the quality and smallest standard deviation. One good quality scan
of each eye was utilised in all analyses. A 0.5 mm diameter circle was drawn using the circle draw facility of the HRT II. The area was chosen based on the most oedematous area and the same area was marked for the follow up photograph at three months. Measurement of MEI was performed by a blinded trained medical technician. After the baseline measurement of MEI, all the patients were randomized using the envelope technique. The type of treatment selected would be performed the next day.

**TREATMENT PROCEDURE**

2.1 **Laser Photocoagulation:**

Patients were properly positioned on a stable chair with the chin rested on the slit lamp that was mounted with a laser wavelength, Carl Zeiss Visulas 532S laser system. Patients were given grid or focal laser depending on the type of the macular oedema. Topical anaesthetic, 5% proparacaine hydrochloride was instilled in the eye which needed to be lasered. The laser settings were 50 micron spot size, duration of 0.1 seconds and appropriate power started from 50 mW and stepped up till it burned the retina with light gray burn. The number of laser burn given was based on the severity of diabetic macular oedema (range: 20 - 200 laser burns and 500 im away from the centre of the fovea). Only one session of laser (either focal or grid laser) was given to each patient in LASER group. The procedure was done by Investigator A (ophthalmologist). Patient was follow-up at 3 months post laser and no other treatment was given during that period.

2.2 **Intravitreal Triamcinolone Acetonide:**

Intravitreal injection of triamcinolone was carried out under sterile conditions in the operation room. Patient was admitted on a day care basis. Topical chloramphenicol four times a day was prescribed one day prior to procedure. The procedure was done under local anaesthesia using topical 5% Proparacaine hydrochloride. The selected eye was properly cleaned and draped. An eye speculum was then applied; flush irrigation with 5 mls 5% Povidone iodine was performed on the eye for one minute.

Triamcinolone acetonide in a single-use vial (40mg/ml, 1 ml vial), was drawn into a 1-cc tuberculin syringe after cleansing the top of the bottle with an alcohol wipe. A separate 27 gauge needle was placed onto the syringe, which was then inverted to remove air bubbles. The excess triamcinolone was discarded till 0.1 ml (4 mg) remained in the syringe.

The site of injection was then identified, at 3.5 mm in pseudophakic and 4 mm in Phakic eye to ensure against passage of the needle through the vitreous base. It was given at the infero-temporal region to avoid drug deposition in front of the visual axis. Triamcinolone acetonide of 4 mg in 0.1 mls was injected into the vitreous using a 27-gauge needle trans-conjunctivally. Using a single, purposeful continuous maneuver, the 4 mg triamcinolone acetonide was injected into the eye. The needle was removed simultaneously with the application of cotton tipped applicator over its entry site to prevent regurgitation of the injected material.

Indirect ophthalmoscopy was performed to check for central retinal artery pulsation. The procedure was done by Investigator B (ophthalmologist). Topical chloramphenicol four times daily would be continued for one week. Only one injection of IVTA was given to each patient in IVTA group. Patient was follow-up at 3 months post IVTA and no other treatment was given during that period.

3. **Post-treatment Parameters Measurements:**

Patient was follow-up at 3 months post procedure. The similar step of visual acuity and MEI assessment as pre-treatment measurement was done. The outcome measures were mean BCVA and mean MEI.

**Statistical Analysis:** All the statistical method analysis was done with Statistical Package for Social Sciences (SPSS Inc) software, version 12.0. Normality was tested using Eye-ballling (histogram pattern), Independent T-test, paired T-test and Chi square test were used to analyze the results where appropriate. The p value of < 0.05 is considered as statistically significant.

**Ways to minimize study error:** The following steps were taken to reduce errors while conducting the study:-

(i) Patients were selected strictly based on the inclusion and exclusion criteria.

(ii) Randomization of patients.

(iii) IVTA and laser photocoagulation were performed by experienced ophthalmologist who was masked to patient’s identity. A standardized technique was used for both procedures.

(iv) The measurement of MEI was performed by one identified and trained medical technician.

(v) The primary investigator was masked to patient’s identity and procedures when analyzing the MEI results (pre and post intervention) of all patients.

**RESULTS:**

**Demographic Data:** A total of 40 patients were enrolled into this study. Twenty patients were assigned for IVTA group and another 20 patients for LASER group. Mean age, duration of Diabetes Mellitus (DM), and status of HbA1c of patients in IVTA and LASER group is shown in Table 1. There were 8 males (40%) and 12 females (60%) in the IVTA group while 11 males (55%) and 9 females (45%) in the LASER group. The severity of DME for both groups is shown in Table 2.

**Comparison of BCVA and MEI:** The comparison of mean BCVA and MEI in both groups at baseline and
at three months post treatment is shown in Table 3. The mean difference for BCVA and MEI within the group at baseline and at three months post treatment was statistically significant ($p < 0.01$). The comparison of mean BCVA and MEI between IVTA and LASER groups at baseline and three months post treatment is shown in Table 4. The mean difference for BCVA at baseline and at three months post treatment between IVTA and LASER was not statistically significant ($p = 0.113$ and $p = 0.151$ respectively). Similarly, the mean difference for MEI at baseline and at three months post treatment between IVTA and LASER group was also not statistically significant ($p = 0.106$ and $p = 0.811$ respectively).

**DISCUSSION**

We conducted this comparative pilot study to assess whether there was a significant difference between IVTA and laser photocoagulation with a single treatment as primary treatment of DME at three months by evaluating the BCVA and MEI. We used HRT II to evaluate the DME. We did not perform OCT to quantify the DME. MEM of HRT II showed very good agreement with fundus biomicroscopy in diabetic maculopathy.1

In this study, the duration of DM in both groups were comparable ($p = 0.972$). Mean diabetic controlled

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### Table 1. Characteristic of patients in IVTA and LASER group at baseline

<table>
<thead>
<tr>
<th>Variables</th>
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</tr>
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<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Mean</td>
<td>58.65</td>
<td>56.85</td>
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<td>0.411</td>
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<tr>
<td>SD</td>
<td>7.26</td>
<td>6.40</td>
<td></td>
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<tr>
<td>Duration of DM (year)</td>
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<tr>
<td>Mean</td>
<td>8.40</td>
<td>8.35</td>
<td></td>
<td>0.972</td>
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<tr>
<td>SD</td>
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<td>4.98</td>
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<tr>
<td>HbA1c (mmol)</td>
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<tr>
<td>Mean</td>
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<td>9.01</td>
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<td>0.762</td>
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<tr>
<td>SD</td>
<td>0.81</td>
<td>0.95</td>
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</tbody>
</table>

DM: Diabetes Mellitus, *Independent T-test, p < 0.05 significant

### Table 2. Distributions of cases according to severity of DME

<table>
<thead>
<tr>
<th>Severity of DME</th>
<th>IVTA (n = 20)</th>
<th>LASER (n = 20)</th>
<th>*p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Mild</td>
<td>6</td>
<td>9</td>
<td>0.265</td>
</tr>
<tr>
<td>Moderate</td>
<td>8</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>6</td>
<td>2</td>
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</tr>
</tbody>
</table>

DME: Diabetic macular oedema, *Chi square test, p < 0.05 significant

### Table 3. Comparison of best corrected visual acuity and macular oedema index within the group at baseline and at three months post treatment

<table>
<thead>
<tr>
<th>Best Corrected Visual Acuity</th>
<th>At baseline</th>
<th>At 3 months post treatment</th>
<th>(95% CI of mean difference)</th>
<th>*p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVTA</td>
<td>0.935</td>
<td>0.405</td>
<td>(0.430, 0.629)</td>
<td>$p &lt; 0.01$</td>
</tr>
<tr>
<td>LASER</td>
<td>0.795</td>
<td>0.525</td>
<td>(0.162, 0.377)</td>
<td>$p &lt; 0.01$</td>
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</table>

### Table 4. Comparison of best corrected visual acuity and macular oedema index between IVTA and LASER groups at baseline and at three months post treatment

<table>
<thead>
<tr>
<th>Best Corrected Visual Acuity</th>
<th>IVTA (n = 20)</th>
<th>LASER (n = 20)</th>
<th>(95% CI of mean difference)</th>
<th>*p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>At baseline</td>
<td>0.935</td>
<td>0.405</td>
<td>(-0.349, 0.315)</td>
<td>0.113</td>
</tr>
<tr>
<td>At 3 months post treatment</td>
<td>0.405</td>
<td>0.525</td>
<td>(-2.857, 0.457)</td>
<td>0.151</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Macular Oedema Index</th>
<th>IVTA (n = 20)</th>
<th>LASER (n = 20)</th>
<th>(95% CI of mean difference)</th>
<th>*p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>At baseline</td>
<td>2.539</td>
<td>1.753</td>
<td>(-0.089, 0.889)</td>
<td>0.106</td>
</tr>
<tr>
<td>At 3 months post treatment</td>
<td>1.753</td>
<td>1.711</td>
<td>(-0.315, 0.400)</td>
<td>0.811</td>
</tr>
</tbody>
</table>

*Independent T-test, p < 0.05 significant
In our study, we treat the patient either IVTA or laser for DME and review the mean BCVA and MEI at three months post procedure. Three months follow-up was chosen because only a single treatment was given. The requirement of re-treatment if needed will be given after three months. The mean BCVA in IVTA group at three months was 0.405 (0.224) and 0.525 (0.289) in LASER group. The mean difference at three months was not statistically significant (p = 0.151) which meant that neither IVTA nor laser were superior to each other as a primary treatment of DME at 3 months of treatment. Our result showed a comparable outcome with study done by Lam et al.13

The significant improvement of BCVA in the IVTA group (p < 0.01) in our study was similar to the studies reported by few published data.1,14 Our result also showed significant improvement of BCVA post laser therapy at three months (p < 0.01). However a study done by Lee et al.15 showed no significant improvement of BCVA at three months after laser treatment.

The mean MEI at three months in IVTA group was 1.753 (0.614) and 1.711 (0.472) in the LASER group. The mean difference of both groups was not statistically significant (p = 0.811). Both modalities demonstrated comparable outcome of reduction of MEI at three months. There was no published data on study using HRT II as an objective evaluation for DME post IVTA or laser treatments. Hence we could only compare our study with study using OCT measurement. Lam et al again reported comparable outcome of central macular thickness of IVTA and laser treatment at three months which was similar to our result.13

The significant improvement of mean MEI at three months in the IVTA group in our study (p < 0.01) was comparable to previous studies using OCT evaluation.1,3,14,16–18 We also found that the mean MEI in the LASER group also showed significant improvement at three months (p < 0.01). However, Lee et al.15 reported that there was no significant improvement of central macular thickness at 3 months after laser treatment. They found that for DME patients, the combination treatment (laser and IVTA) had a better therapeutic effect than the laser alone for improving BCVA and central macular thickness at the early follow-up time periods.15

Limitation of this present study is our number of patients was relatively small and a bigger sample size would give a better and reliable result. Another limitation of this study was a short duration of follow up. A longer period of follow up, at least over 12 months would give more value especially to arrive a treatment recommendation and able to assess the side effect of Triamcinolone. The analysis of macular oedema may be improved by using alternative instrument like OCT to support the HRT II findings.

CONCLUSION:

Both IVTA and laser photoagulation showed good comparable outcomes in term of BCVA and MEI at three months post treatment as primary treatment for DME.

REFERENCES:


Topical Nsaid’s and Fluoromethalone in the Treatment of Epidemic Keratoconjunctivitis* (A Comparative Study)

Inam ul Haq Khan FCPS¹, Anwar Ali FCPS², Ashok Kumar Pinjani FCPS³

ABSTRACT

Purpose: The purpose of this study is to compare the role of NSAIDS and Fluoromethalone in the treatment of epidemic keratoconjunctivitis.

Patient and Methods: 30 patients of bilateral punctuate epithelial keratitis were diagnosed as cases of adenoviral keratitis on the basis of their clinical picture. 18 males, 12 females, aged from 12 to 40 years, were selected for study.

First group. In right eye NSAIDS eye drops were used.

Second group. In left eye Fluorometholone eye drops were used.

In the first group, 18 eyes (60 %) have completed resolution of conjunctivitis and anterior stromal infiltrates after 3 weeks of treatment. Complaints of stinging sensation were present in all the patients. In spite of unpleasant stinging sensations these patients were encouraged to continue using the eye drops. After three weeks of treatment the patients with minimal improvement were switched on to topical Fluorometholone. Out of these 12 patients, 7 recovered completely in one weeks time, 3 took another week to recover and in 2 patients topical steroids had to be used in tapering dosage for 4 months. In 1 patient after the cessation of therapy there was recurrence of sub epithelial opacities and topical Fluoromethalone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks.

In the second group, 24 eyes (80%) recover completely within 10 days without sub epithelial opacities or stromal infiltrates. They were told to continue eye drops for another week and then to stop. 28 patients (84%) recover completely in three weeks time. 2 patients had to use topical steroids for about 4 months. In 1 patient after the cessation of therapy there was recurrence of sub epithelial opacities and topical Fluoromethalone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks. Fluoromethalone eye drops proved to be significantly better than the NSAID eye drops with no rise in IOP. In addition stinging sensations of NSAIDS eye drops heralds their use as the First choice in the management of the disease.

Results:

NSAIDS group

• Conjunctivitis recovered completely in one week time. 18 eyes (60 %) have complete resolution of anterior stromal infiltrates on their third visit. Complaints of stinging sensation were present in all the patients, in spite of this the patients were encouraged to continue using the eye drops.

• After three weeks of treatment 12 patients had either no or minimal improvement and these patients were switched on to topical Fluorometholone. Out of these 12 patients, 7 recovered completely in one weeks time (total 25 patients 83.3%), 3 took another week to recover and in 2 patients topical steroids had to be used in tapering dosage for 4 months. In 1 patient after the cessation of therapy there was recurrence of sub epithelial opacities and topical Fluoromethalone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks.

Fluoromethalone group

• Conjunctivitis recovered completely on second visit. 24 patients (80%) recover completely within 9-12 days without sub epithelial opacities or stromal infiltrates.

• 28 patients (93.3%) recover completely in three weeks time.

• 2 patients had to use topical steroids for about 4 months. In 1 patient after the cessation of therapy there was recurrence of sub epithelial opacities and topical Fluoromethalone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks. This patient had to use topical medications once a day for six months for complete resolution of corneal stromal infiltrates.

Conclusion: We conclude from our study that the use of Fluorometholone in the management of epidemic viral Keratoconjunctivitis alleviate the patient’s symptoms (redness, discomfort, swelling, tearing, photophobia, blurring of
INTRODUCTION
In Saudi Arabia due to the peculiar conditions, added by the world’s largest gathering of human beings during Hajj adenoviral infections are common. It involves upper respiratory tract, and large number of GIT infections are attributed to this virus. It is seen that after every Hajj there is an endemic of upper respiratory tract infections and conjunctivitis. Different viruses are the culprit among them is multiple strains of adenovirus. This virus keeps on changing its genetic code. It is said that upto 50 different strains of this virus have been identified till now. Due to its behavioral diversity it is difficult to develop a much needed vaccine.

The treatment options available to us are based on the symptomatic and physical findings. If the disease involves the cornea we think of more aggressive means of treatment. If it is limited to the conjunctiva; our aim is to prevent the involvement of cornea and prevention of spread of infection as well as secondary infections.

MATERIAL AND METHODS:
Epidemic Viral Keratoconjunctivitis (EKC) is a type of adenovirus ocular infection. EKC is highly contagious and has tendency to occur in epidemics. At least 19 serotypes of adenovirus have been implicated in causing eye infection. The aim of this study was to compare the role of NSAIDS and Fluorometholone in the treatment of epidemic keratoconjunctivitis. 30 patients of red eye were diagnosed as cases of adenoviral keratoconjunctivitis on the basis of clinical picture. 18 males, 12 females, aged from 9 to 40 years.

First group. In right eye NSAIDS eye drops were used. Second group. In left eye Fluorometholone eye drops were used.

The study was held between July 2008 and August 2009 in SAFH Sharourah KSA. Patients were followed up for 6 months.

In the first group, 18 eyes (60 %) have complete resolution of conjunctivitis and anterior stromal infiltrates after 3 weeks of treatment. Complaints of stinging sensation were present in all the patients. In spite of unpleasant stinging sensations these patients were encouraged to continue using the eye drops. After three weeks of treatment the patients with minimal improvement were switched on to topical Fluorometholone. Out of these 12 patients 7 recovered completely in one weeks time, 3 took another week to recover and in 2 patients topical steroids had to be used in tapering dosage for 4 months. In 1 patient after the cessation of therapy there was recurrence of sub epithelial opacities and topical Fluorometholone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks.

In the second group, 24 eyes (80%) recover completely within 10 days without sub epithelial opacities or stromal infiltrates. They were told to continue eye drops for another week and then to stop. 28 patients (84%) recover completely in three weeks time. 2 patients had to use topical steroids for about 4 months. In 1 patient after the cessation of therapy there was recurrence of sub epithelial opacities and topical Fluorometholone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks.

Fluorometholone eye drops proved to be significantly better than the NSAID eye drops with no rise in IOP. In addition stinging sensations of NSAIDS eye drops heralds their use as the First choice in the management of the disease.

Aim of the Study: Different treatment options are available for the treatment of adenoviral keratitis. Aim of this study was to see the efficacy of fluorometholone compared to NSAIDS in the treatment of adenoviral keratitis.

Selection Criteria: Patients with bilateral sub epithelial opacities diagnosed as cases of adenoviral keratitis were selected (Thygeson superficial punctuate keratitis need to be differentiated from epidemic keratoconjunctivitis. In former, conjunctivitis is absent while in the later it is present). A thorough history was taken. Clinical examination was performed. Diagnosis of adenoviral keratitis was on the basis of clinical findings. Those cases with bilateral findings were recruited. Performa of history, clinical examination and treatment plan was prepared for each patient. In the end, data was compiled and results were prepared.

Aim of this study was to see the efficacy of Fluorometholone compared to NSAIDS in the treatment of adenoviral keratitis. Since the facilities for the identification of the virus strains are not available, the study was based on the symptomatic and clinical improvements.

30 patients were selected for the study. They were briefed about the purpose of the study and their cooperation in this regard was requested. Those who were willing to cooperate and agreed to follow the instructions were recruited. Results of medication were monitored meticulously. Diagrams of corneal changes vision and pain as well). It decreases the course of the disease, as without treatment the course is prolonged and may accompany complications. It also decreases the occurrence of sub-epithelial opacities and helps in the complete resolution of residual opacities.

Key Words: Fluorometholone, NSAIDS. EKC. Punctate epithelial keratitis.
were drawn. Number, size and depth of the stromal exudates were noted down. Patients were requested to visit after three days of initiation of therapy and then after one week. If there is improvement they were requested to visit after two weeks, otherwise after one week. Further visits were requested depending upon the response from the treatment. In one eye NSAID eye drops and in the other Fluorometholone eye drops were used. Symptomatic as well as clinical improvements were monitored.

**Performa of History:** Name, age, sex, occupation, numbers of individuals in the family, history of eye complaints in other family members, history of recent upper respiratory tract/gastrointestinal infections and history of Umra or Hajj in the recent past or of contact with such an individual. The complaints of the patient along with duration were noted down. Redness, pain, discharge, foreign body sensations, generalized visual complaints, history of conjunctivitis in the past and use of eye drops. Systemic complaints, specifically upper respiratory tract infections and GI infections were also asked.

**Performa of Clinical Examination:** VA on Snellen’s projector was documented on Ist visit and subsequently. Examination of lids for lid edema noted, involvement of the conjunctiva documented, type of response (follicular or papillary), pre-auricular lymphadenopathy, subconjunctival hemorrhages and pseudo-membranes were noted down1. Location and size of subconjunctival hemorrhages were also noted and drawn. Corneal changes are documented meticulously. Epithelial edema, sub epithelial deposits were noted down, counted and drawn carefully on the paper. Staining with Fluorescein and Rose Bengal done. Anterior chamber reaction was noted down. IOP monitored by air puff tonometer.

**TREATMENT**

In right eye NSAIDS eye drops and in the left eye Fluorometholone eye drops were started simultaneously. The dose was one drop five times a day. Patients were called after three days for the first visit and then after one week. Further visit was requested after two weeks in cases which were showing good response, in other cases patients were called after one week. Changes in the cornea were noted down. After second visit, in patients showing improvement the dose was reduced to one drop three times a day for another one week. Treatment was continued in the patients showing improvement. In those patients in whom there was complete resolution of corneal changes, the treatment was stopped and the patient was requested to come again after one week. Intra ocular pressure was noted by air puff tonometer.

**RESULTS**

**NSAIDS group:**

- Conjunctivitis recovered completely in one week time. 18 eyes (60 %) have complete resolution of anterior stromal infiltrates on their third visit. Complaints of stinging sensation were present in all the patients, in spite of this the patients were encouraged to continue using the eye drops.
- After three weeks of treatment 12 patients had either no or minimal improvement and these patients were switched on to topical Fluorometholone. Out of these 12 patients, 7 recovered completely in one weeks time (total 25 patients 83.3%), 3 took another week to recover and in 2 patients topical steroids had to be used in tapering dosage for 4 months. In 1 patient after the cessation of therapy there was recurrence of

<table>
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<th>Table 1. Recovery Table</th>
<th>Number of Eyes</th>
<th>Complete recovery</th>
<th>Recovery with subepithelial infiltrates</th>
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<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>First group</td>
<td>30</td>
<td>100</td>
<td>18</td>
</tr>
<tr>
<td>Second group</td>
<td>30</td>
<td>100</td>
<td>24</td>
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<table>
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<th>Table 2. Duration Table</th>
<th>Number of Eyes</th>
<th>Recovery after 1 week</th>
<th>Recovery after 2 weeks</th>
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<th>Recovery after 4 weeks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
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<td>%</td>
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<td>24</td>
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<td></td>
<td></td>
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<td>28</td>
<td>84</td>
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</table>
sub epithelial opacities and topical Fluorometholone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks.

**Fluorometholone group:**
- Conjunctivitis recovered completely on second visit. 24 patients (80%) recover completely within 9-12 days without sub epithelial opacities or stromal infiltrates.
- 28 patients (93.3%) recover completely in three weeks time.
- 2 patients had to use topical steroids for about 4 months. In 1 patient after the cessation of therapy there was recurrence of sub epithelial opacities and topical Fluorometholone had to be started again, in TID dosage for 2 weeks, followed by BD dosage for another 2 weeks. This patient had to use topical medications once a day for six months for complete resolution of corneal stromal infiltrates.

**DISCUSSION**

Human adenovirus type 37 (HAdV-37) is a major cause of epidemic Keratoconjunctivitis and has recently been the largest causative agent of Keratoconjunctivitis in Japan. Adenovirus types 8 and 19 are responsible for epidemic Keratoconjunctivitis and they are highly contagious for up to 2 weeks. The incubation period is 2-14 days and the person may remain infectious for 10-14 days after symptoms develop. It is characterized by conjunctivitis: acute onset of watering redness, foreign body sensation and discomfort. Both eyes are affected in 60% of cases.

**Keratitis occurs in 80 % of cases and divided into 3 stages:**
- Stage 1: occurs within 7-10 days of the onset of symptoms. It is characterized by a diffuse punctate epithelial Keratitis which may resolve or may go to stage 2.
- Stage 2: is characterized by focal white subepithelial infiltrates which develop beneath the epithelial lesions. They are thought to represent immune response to adenovirus and may be associated with mild transient anterior uveitis.
- Stage 3: is characterized by anterior stromal infiltrates which may persist for months and even years.
- No gender predilection exists. The infection is more common in adults, but all age groups can be affected. EKC epidemics tend to occur in closed institutions (e.g., schools, hospitals, camps, nursing homes, workplaces). Direct contact with eye secretions is the major mode of transmission. Other possible methods of transmission are through air droplets and possibly swimming pools. Adenovirus can be recovered from the eye and throat for as long as 14 days after onset of clinical symptoms. Many epidemics have been initiated in ophthalmologic outpatient clinics by direct contact with contaminated diagnostic instruments.

The following explains the infectious transmission in hospitals and clinics: (1) the virus (adenovirus type 19) remains viable for 5 weeks, (2) the virus is resistant against standard disinfectants such as 70% isopropyl alcohol and ammonia, and (3) the virus sheds from the eye 3 days before and 14 days after symptom onset. Epidemics of Keratoconjunctivitis are often traced to an eye care facility. Disease is commonly spread by ophthalmologists “contaminated fingers or contaminated instruments and eye drops.” Virus can be spread by finger to eye contact; it can also be spread to contaminated instruments such as applanation tonometers.

EKC in East Asia and other parts of the world is endemic and does not appear to be transmitted through medical intervention. Viruses were isolated from more than 50% of cases of viral conjunctivitis; adenovirus constituted 94% of the EKC is a self-limiting disease. It tends to resolve spontaneously within 1-3 weeks without significant complications. In 20-50% of cases, corneal opacities can persist for a few weeks to months (rarely up to 2 y). This phenomenon can decrease visual acuity significantly and cause glare symptoms. In rare cases, conjunctival scarring and symblepharon can occur secondary to membranous conjunctivitis.

The patients recover spontaneously within 2-3 weeks with subepithelial opacities in 80% of cases which persists for months or years even with the use of topical steroid. It is necessary to pay attention to the health education of population as well as to improve hygienic habits.

**CONCLUSION**

We conclude from our study that the use of Fluorometholone in the management of epidemic viral Keratoconjunctivitis alleviate the patient’s symptoms (redness, discomfort, swelling, tearing, photophobia, blurring of vision and pain as well). It decreases the course of the disease, as without treatment the course is prolonged and may accompany complications. It also decreases the occurrence of sub epithelial opacities and helps in the complete resolution of residual opacities.

**REFERENCES**

INTRODUCTION
The antimetabolites Mitomycin and 5-flourouracil have been used intra-operatively to augment the success of trabeculectomy in primary glaucomas for about two decades. The experience over time has suggested that the 5-fluorouracil(5-FU) may be less potent than Mitomycin-C in lowering the IOP postoperatively but is quiet safer as regards the long term post-op complications are concerned. The confidence in this wonderful tool has encouraged us to use it not only in the primary glaucoma patients in a conventional way but also a few carefully selected other types of glaucoma cases with a view to the possibility of expanding its role in these situations.

This retrospective study was made to check the IOP lowering effect of trabeculectomy with 5-Fluorouracil (5-FU) in various types of our adult glaucoma patients. The records of the patients who underwent primary trabeculectomy with 5-FU in the last one year were reviewed. The indication for surgery in the majority of the patients was uncontrolled intraocular pressure (IOP) in spite of maximal tolerable medical treatment. The other important indications for surgery included in-affordability of the cost of medications, inability to follow the physician’s instructions properly, unavailability of medications in the far flung areas of the country and the allergy to the drugs. Majority of the patients did not have any previous history of intraocular surgery but others did have a prior history of intraocular surgery other than the glaucoma drainage procedure.

MATERIALS AND METHOD
A total number of 44 eyes in 39 patients were operated (Table 1). All these eyes had no previous glaucoma drainage procedure done on them making the reviewed procedure a primary trabeculectomy in these eyes. As mentioned earlier majority 34 eyes (77%) of these eyes had no history of any prior eye disease except glaucoma (Table 2-A). Out of the total 44 eyes 22(50%) had primary open angle glaucoma (POAG), 9(20%) had chronic narrow angle glaucoma and 3(7%) had pseudo-exfoliative glaucoma. Three eyes had a history of previous ailments out of these two eyes (5%) had angle recession glaucoma from previous blunt trauma and one eye (2%) had a history of idiopathic uveitis leading on to glaucoma( Table 2-B). Seven eyes (15%) did have a history of intraocular surgery like phacoemulsification in 4 eyes(9%), penetrating keratoplasty in 2(5%) and repaired penetrating corneal trauma in 1 eye (2%). In this group (Table 2-C) the conjunctiva at the planned drainage site appeared to be healthy and there was no obvious sign of subconjunctival scarring. It would also be appropriate to mention here that eyes having Argon laser trabeculoplasty and YAG laser iridotomy in the past

| Table 1: Patient characteristics |
|-----------------|-----------------|
| Total number of patients        | 39              |
| Total number of eyes        | 44              |
| Age       | 16 to 85 years (mean 56 years) |
| Sex       | Male 27 Female 12 |

| Table 2: Types of Glaucoma |
|-----------------|-----------------|
| 2-A: Primary Glaucoma |
| POAG | 22 | 50% |
| Ch. NAG | 9 | 20% |
| PXE | 3 | 7% |
| 2-B: Secondary Glaucoma |
| Angle recession Glau. | 2 | 5% |
| UveiticGlau. | 1 | 2% |
| 2-C: Secondary Glaucoma- Post surgical |
| PKP | 2 | 5% |
| Phaco | 4 | 9% |
| Corneal repair | 1 | 2% |
were not excluded from the study.

Surgical procedure

IOP was controlled preoperatively with topical medications as well as oral Diamox and if the IOP exceeded 25mmHg IV Mannitol (1gm/kg body weight) was given half an hour before surgery in the operation room to bring the IOP down to a safer level. Generally patients less than 30 years of age were operated under general anaesthesia and above that age were operated under local anaesthesia. Local infiltration anaesthesia was given as peribulbar block with or without facial block. It consisted of a mixture of 2% Xylocaine and 0.5% of Bupevicaine in equal amounts. 5% Povidone solution was used to clean the lids and area around the orbit. Sterile drapes were placed with opsite film over the lids to isolate the lashes. Wire lid speculum was placed to open the eye. A 6/0 vicryl traction suture with a spatulated needle was passed through the superior cornea to expose the surgical field. Fornix based conjunctival/tenon flap at the limbus with a cord length of about 8mm without a radial relaxing incision was usually sufficient to expose the episclera. The flap was undermined with blunt conjunctival spring scissors. Gentle bipolar wet field cautery was used over the intended scleral flap area. Tenon capsule was not usually excised until excessively thick. 3x4 mm rectangular half thickness scleral incision was given superiorly to demarcate the extent of the scleral flap. This flap was raised in a horizontal plane with the help of a crescent knife till it reaches 1mm into the clear cornea. 3 to 4 cellulose sponges impregnated with 50 mg/ml 5-flurouracil (5-FU) were placed over and around the scleral flap and under the conjunctiva/tenon flap. Care was taken that the edge of the conjunctival flap does not touch the sponges at all times. The sponges were removed after 5 minutes and this area was washed with at least 30 ml of balanced salt solution.

A paracentasis was made in the temporal cornea with a fine sharp blade while taking care that the A/C does not collapse. 2x2 mm full thickness sclerectomy/trabeculectomy was done with the help of sharp blade and Vanna’s scissors. Peripheral iridectomy was done and the scleral flap was repositioned to its place. Two 10/0 nylon sutures placed at the corners of scleral flap were usually sufficient to secure it back to its bed satisfactorily. A/C was deepened with injection of BSS through the temporal paracentesis. End point was a steady ooze of aqueous humour with a stable anterior chamber. When it was achieved the conjunctiva was sutured at the limbus with 10/0 nylon sutures. Subconjunctival injection of 20mg gentamycin and 2mg of dexamethsone was given in the inferior fornix. The eye was patched for 24 hours after instillation of 1% cyclopentolate and betnesol-N eye ointment. The patient was instructed to stop systemic antiglaucoma medications as well as the topical medications in the operated eye.

DISCUSSION

Full thickness trabeculectomy is still the most commonly performed surgical procedure to lower the IOP in patients with otherwise uncontrolled glaucoma and is considered the gold standard. The procedure was described originally by Sugar in 1961 but innumerable variation of the technique has since been suggested with the success rate of the primary procedure with antimetabolites being around 84.0% at one year follow-up. The most common cause of failure of this drainage procedure is considered to be the postoperative subconjunctival fibrosis at the drainage site and to prevent this complication various substances were used. These substances known as metabolites not only enhanced the success of this surgery but were helpful in achieving lower intraocular pressures postoperatively. The two most commonly used anti-fibrosis substances are Mitomycin C and 5 fluorouracil (5-FU).

Mitomycin C is an alkylating agent which damages the DNA of replicating as well as non-replicating cells. Clinically Mitomycin C is much more potent as compared to 5-FU. The 5-FU is an antimetabolite which acts on the DNA synthesis “S” phase of only the replicating cells. It selectively affects the replicating fibroblasts only and does not damage DNA of the stable cells in the area of its application. In present day world terminology it means that it causes less collateral damage to the adjacent tissues. Comparing it with mitomycin C it leads to fewer incidences of late complications related with

<table>
<thead>
<tr>
<th>Table 3: Intra-ocular pressures-IOP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-op</strong> (mmHg)</td>
</tr>
<tr>
<td>One day</td>
</tr>
<tr>
<td>16 to 55</td>
</tr>
<tr>
<td>Mean(28.2)</td>
</tr>
</tbody>
</table>

*32 eyes (73 %) had IOP of less than 21 mmHg without antiglaucoma medications and 12 eyes (27%) required medications to bring their IOP to this level.
Expanding the Role of Trabeculectomy with 5-FU

The use of 5-FU was started in 1989 followed by the Mitomycin C in 1991 as an adjunct to trabeculectomy. 5-FU was used initially in the form of multiple subconjunctival injections postoperatively. In most instances it required the patient to be admitted in the hospital for a prolonged period of time adding to the cost of the surgery. Among other complications there was almost universal occurrence of corneal epithelial defects in these patients postoperatively. The intra-operative use of 5-FU was reported in 1992 which was found to have much less immediate post-operative problems and was convenient for the patient as well as the physician. This was found to be as much effective as given subconjunctivally. In some studies was even considered to be as safe and effective as Mitomycin C.

The 5-FU has generally been used to augment trabeculectomies in previously un-operated eyes but its usefulness was also demonstrated by the Fluorouracil filtering surgery study in the pseudophakic patients as well.

We have been using anti-metabolites intra-operatively for a long time now in our hospital and are confident about the efficacy as well as the relative safety of the use of 5-FU in our patients. We have used 5-FU with trabeculectomy not only in the primary glaucomas in the conventional sense but have tried to explore the possibility of expanding its use in few other situations. We have tried to check the efficacy of the procedure in lowering the IOP as well as its safety in the post-operative period in all these patients.

RESULTS

The operated patients were examined on the slit lamp next morning. Particular attention was given to the trabeculectomy site for the appearance of drainage bleb and any leakage. Anterior chamber was noted for its depth, hyphema and the extent of inflammatory reaction. Intra-ocular pressure was measured with the help of Goldmann tonometer. The patients with satisfactory post-op condition were discharged from the hospital with a combination of topical steroids, antibiotics and cycloplegic eye drops. The frequency of post-op use of drops was determined by the inflammatory activity noted in the eye as well as the age of the patients. The younger patients generally received more frequent post-op steroid drops as they are considered prone to excessive inflammatory response to surgery leading on to scarring. The patients were seen in the OPD after one week, three weeks and then every month till the IOP was stabilized.

Trabeculectomy with 5-FU (as described in M & M) was done in 44 eyes of 39 adult patients. Among them 27 were male and 12 female and their ages ranged from 16 to 85 with a mean age of 56. The diagnosis of Primary open angle glaucoma was made in 22 eyes (50%), Pseudo-exfoliative glaucoma in 3 eyes (7%), Chronic angle closure glaucoma in 9 eyes (20%). The secondary glaucomas included angle recession glaucoma in 2 eyes (5%), Uveitic glaucoma in 1 eye (2%), glaucoma following penetrating keratoplasty (PKP) in 2 eyes (5%), glaucoma following an un-eventful phacoemulsification was seen in 3 eyes (7%) where as secondary glaucoma following a phacoemulsification complicated by the posterior capsular rupture (PCR) requiring anterior vitrectomy and PC IOL implant was seen in 1 eye (2%) and 1 eye (2%) had glaucoma following a penetrating paracentral corneal injury which was repaired in the past.

The intraocular pressures at presentation in these eyes ranged from 16 mmHg to 55 mmHg with a mean pre-operative IOP of 28.2 mmHg (Table 3). It will be worthwhile to mention here that the cup disc ratio (CDR) at presentation in these patients ranged from 0.3 to 1.0 with a mean of 0.78 indicating that our patients tend to present for treatment at a fairly advanced stage of the disease. The IOPs recorded 24 hours after trabeculectomy (with 5-FU) in these eyes ranged from 03 mmHg to 56 mmHg with a mean IOP of 11.3 mmHg. At one week the IOPs ranged from 06 to 35 mmHg with a mean of 12.2 mmHg. The mean drop of IOP recorded in one week after the surgery from the IOP at presentation was 16 mmHg (60%). At three weeks the intraocular pressures ranged from 05 to 34 mmHg with a mean of 13.7 mmHg. The follow-up period for these patients ranged from one month to 12 months (mean of 6.9 months). At the end of one year 32 eyes (73%) had IOP of less than 21 mmHg without anti-glaucoma medication and 12 eyes (27%) required medication to bring their IOP to less than 21 mmHg. The mean IOP achieved in these eyes at the end of the study was 15.2 mmHg with a mean drop of 13 mmHg (46%).

We all are aware that the post trabeculectomy period is a turbulent one and many complications/ variations are noted in the post-operative course until the drainage bleb matures. In our patients we saw leakage from the conjunctival wound without shallowing of anterior chamber in 9 eyes (20%) and leakage with shallowing of anterior chamber in 6 eyes (14%), 5 of these 6 eyes settled with conservative management and only one required reformation of AC.

Varying degrees of hyphema was observed postoperatively in 7 eyes (16%) which was absorbed in due course of time in all these eyes and none required surgical evacuation. Flattish blebs with deep anterior chamber and higher than expected IOP in the initial post-op period were noted in 11 eyes (25%) which
responded to massage and suture lysis favorably in 8 eyes (18%) and the remaining 3 eyes (7%) in this group eventually required antiglaucoma medications to achieve their target pressures. Tenon cysts formed in 3 eyes (7%) and required needling with sub-conjuntival injection of 5-FU to achieve a functioning bleb. Choroidal detachment was seen in only one eye which had a history of complicated phacoemulsification with PC rupture and anterior vitrectomy. This choroidal detachment was treated with medications and settled without surgical intervention. During the follow-up one eye developed blebitis which settled with intensive topical broad spectrum antibiotic treatment. This eye incidentally had PKP done previously.

CONCLUSION

Despite being a potent antimetabolite 5-FU has generally been used to augment the success of trabeculectomy in eyes having primary types of glaucoma but in our patients some eyes did have secondary glaucomas and even others had intraocular surgeries performed on them in the past. The key was that despite the history of prior surgery in this group their trabeculectomy sites did not show any obvious sign of disturbance or scarring.

The mean intraocular pressure drop achieved in this group of patients having various types of glaucomas was significant (13 mmHg) at the end of mean follow-up period of 6.9 months. Post-operative period was more eventful and a tendency towards having postoperative complications was noted in the eyes having previous history of intraoccular surgeries but still these patients could achieve acceptable lowering of IOP at least during this follow-up period. At the end of this review we tend to think that 5-FU can not only be used safely in the primary glaucomas but in some carefully selected eyes having secondary glaucomas as well. We were encouraged by the results of our use of 5-FU in conditions like angle recession glaucoma and open angle type of glaucoma encountered after phaco-emulcification especially if the surgery was not complicated by the posterior capsular rupture.

In a study where the maximum follow-up period is one year we did not expect to find many late complications of glaucoma surgery. We will continue to monitor these patients in future regarding the pattern of IOP control and the development of late complications attributed to the use of antimetabolites during trabeculectomy.

REFERENCES

5. Ingrid U. Scott, MD, MPH; David S. Greenfield, MD; Joyce Schiffman, MS; Marcelo T. Nicolela, MD; Juan C. Rueda, MD; James C. Tsai, MD; Paul F. Palmberg, MD, PhD. Outcomes of Primary Trabeculectomy with the Use of Adjunctive Mitomycin. Arch Ophthalmol. 1998; 116:286-291.
INTRODUCTION

Trachoma is exclusively a disease of poor families and communities living in developing countries. Although it is avoidable, continues to blind and as it remains a neglected public health issue. Trachoma is Greek word used for rough and swelling. Globally it is a leading infectious cause of preventable blindness. Trachoma is chronic kerato conjunctivitis, caused by Chlamydia trachomatis an obligate intracellular bacterium. Only serotype A, B, Ba and C are responsible for trachoma. Disease transmission occurs primarily between children and women. Most of the children are infected by the age of one to two years. The peak rate of active trachoma varies from 2—7 years. Repeated episodes of infection within the family leads to chronic follicular conjunctivitis, which in turn leads to tarsal conjunctival scaring. The scaring distorts the upper tarsal plates and leads to entropion and trichiasis which in turn results in corneal abrasions, corneal scarring, opacification and ultimately blindness.

Trachoma is an ancient disease; it is present in Chinese from the 27th century BC. In Egypt the features of trachoma were described in Ebers’ papyrus, a collection of writings by ancient Egyptian physician found by Ebers in 1889. In Egypt the device used for epilation of trichiasis (inward turning of eye lashes) was present in the Egyptian tomb in 19th century BC. Hipocrates has written prescription for trachoma treatment and its complications.

Global loss of productivity related to impaired vision and blindness from trachoma is thought to be as $ US 5.3 billion annually.

Transmission occurs from eye to eye via hands, clothing and other fomites. Flies have been identified as major vector for the infection’s spread. The
presences of open latrines favor the vector population. \(^4,5\) Factors associated with trachoma are age, socio-economic background and rural regions in which the extent to the water supply is limited, the distance from the water source, the amount of water used for washing purposes and overcrowding. \(^10, 11\)

**DATA COLLECTION PROCEDURE**

A meeting was held with the elders of the two villages. They were informed about the survey. They were requested to extend their full cooperation and to give support regarding the human resources. The survey team comprising of ophthalmologist, ophthalmic technicians, and the village volunteers conducted a door to door survey of every family in the village.

Each member of the family was screened for trachoma or its complications. In the younger age group both the upper eyelids were everted and examined for trachoma follicles and trachomatis inflammation with the help of the loupé.

The older age groups were examined for trachomatis scarring, trichiasis and corneal opacity. The family members absent were examined latter and every possible effort was made that no one could be missed. Questions regarding the water supply, sanitary conditions and disposal of wastes was also asked and entered in the Performa. Many people with active infection who were very poor given medicines free of cost.

**ETHICAL CONSIDERATION**

Permission was sought from the village (Malik) and Executive District Officer (Health). A meeting was arranged with community leaders of the village and they were informed about the nature of the survey. Before examining an informed consent was taken.

**LIMITATIONS OF THE STUDY**

The Financial resources were zero and the time limit was too short for the Conduction of the study. Talebanization and army operation was another major obstacle for free movement and team work.

**RESULTS**

The number of cases examined in village IPI were 1929 in which 1049 were male and 880 were female shown in figure no, 1. The prevalence of trachoma in village IPI was 22% in which 18% were male and 27% female shown in figure no, 2. The prevalence of trachoma is 35% in age group 0-9 years and 15% in age group 30 and above shown in table no, A. Age and gender wise distribution of trachoma signs in village IPI shown in tables no, B & C.

The numbers of cases examined in village Haider Khel were 3166 in which 1705 were male and 1461 were female shown in figure no, 3. The prevalence was 42.8% in age range 0 to 9 years & 16.7% in 30 years & above shown in table no, D. Age and gender wise distribution of trachoma signs in village Haider Khel shown in tables no, E & F.

**RESULTS OF VILLAGE IPI**

| Total Population | 2900 |
| Sample          | 1929 |

**RESULTS OF VILLAGE HAIDER KHEL**

| Total Population of Village | 4018 |
| Sample                      | 3166 |

**DISCUSSION**

Trachoma is considered as a public health problem in many developing countries, where as it has disappeared in the western world. North Waziristan Tehsil Mir Ali showed the high prevalence of trachoma in IPI and Haider Khel villages with rates of 22% and 26.46% respectively. Trachoma is considered therefore...
as a public health problem in Tehsil Mir Ali. The total population of village IPI and Haider Khel were 2900 and 4018 respectively. The missing people were either abroad or living in various parts of the country for various purposes that is education, employment and business etc. The result of both villages show that the prevalence of trachoma was more in females compared to males. The study also shows that in both the villages TF and TI were more common in younger age group (0—9 years) while ST, TT, and CO were more common in old age group (30 years above).

The present study showed high results with what was found in Shabwah district/ Yemen (17% of active trachoma by TRA)\textsuperscript{12}. However, these results are lower compared to many TRA performed in endemic countries. A TRA performed in the southern Zambia showed 55.5\% of children with active trachoma; and 2 years after the implementation of SAFE strategy, the overall percentage of trachoma was reduced to 10.6\%\textsuperscript{13}. The Ethiopian study mentioned 51.1\% of children having active trachoma\textsuperscript{14}. Another rapid assessment of trachoma done in Yemen showed a higher rate among rural children (73.2\%) compared to urban children (23.1\%)\textsuperscript{12}.

In the study it was found that out of 51 patients of TT, 10 patients had developed corneal opacities. Only 4 patients with trichiasis had surgery. If surgery is not performed on these TT patients, there is a risk of developing CO leading to visual loss and blindness. It was also found in our study that there is a correlation between active trachoma and unclean face. Unclean faces being observed in more than 40\% children in both the villages. This highlights the importance of focusing on health education. In our study, no correlation was found between active trachoma and the absence of latrines or water supply, as already mentioned in the rationale for the study that although water is plenty in these two villages but people are not using it for cleanliness.

**CONCLUSION:**

The prevalence of trachoma is because of multiple factors like
1. The villagers keep buffalos, cows, goats and sheep’s inside or adjacent to their living places.
2. Animals dung harbors the larvae of houseflies which are the main vector in transmission of trachoma.
3. Improper solid waste disposal and drainage systems in these areas are ideal places for increase breeding of flies.

**Recommendations:**

After having completed the study and knowing about some of the contributory factors involved in the transmission of trachoma in the villages of IPI and Haider Khel, we have few recommendations to put forward.
1) Health education should be given to the public using different media to create a general awareness regarding trachoma.
2) The community should be involved in the trachoma control because without involving them the task is impossible. It is only the community who can keep their environment clean.
3) The cases of red eye should not be taken lightly and proper eye examination should be done by a trained person.
4) All the people with trachoma visiting the hospital should be advised to take the drugs regularly and not to share their towels with others.
5) The cowsheds in the villages should be constructed a little distance away from the house.
Table (A) Age Wise Prevalence of Trachoma signs in Village IPI

<table>
<thead>
<tr>
<th>Age in Year</th>
<th>Total</th>
<th>TF</th>
<th>TI</th>
<th>TS</th>
<th>TT</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>681</td>
<td>117(26%)</td>
<td>61(9%)</td>
<td>2(0.3%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>30 &amp; above</td>
<td>1248</td>
<td>61(4.9%)</td>
<td>26(2.1%)</td>
<td>75(6%)</td>
<td>21(1.7%)</td>
<td>3(0.26%)</td>
</tr>
</tbody>
</table>

Table (B) Gender Wise Prevalence of Trachoma signs in Village IPI

<table>
<thead>
<tr>
<th>Age 0-9 Years</th>
<th>Gender</th>
<th>Total</th>
<th>TF</th>
<th>TI</th>
<th>TS</th>
<th>TT</th>
<th>Co</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>381</td>
<td>93(24.4%)</td>
<td>28(7.3%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Female</td>
<td>300</td>
<td>84(28%)</td>
<td>33(11%)</td>
<td>2(0.7%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table (C): Gender Wise Prevalence of Trachoma signs in Village IPI

<table>
<thead>
<tr>
<th>Age 30 years and above</th>
<th>Gender</th>
<th>Total</th>
<th>TF</th>
<th>TI</th>
<th>TS</th>
<th>TT</th>
<th>Co</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>668</td>
<td>31(4.6%)</td>
<td>6(0.9%)</td>
<td>23(3.3%)</td>
<td>6(0.9%)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table D: Age Wise Prevalence of Trachoma signs in Village Haider Khel

<table>
<thead>
<tr>
<th>Age in Yrs</th>
<th>Total #</th>
<th>TF</th>
<th>TI</th>
<th>TS</th>
<th>TT</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>1180</td>
<td>354(30%)</td>
<td>141(12%)</td>
<td>10(0.84%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>30 and above</td>
<td>1986</td>
<td>91(4.6%)</td>
<td>46(2.3%)</td>
<td>161(8.1%)</td>
<td>30(1.5%)</td>
<td>5(0.25%)</td>
</tr>
</tbody>
</table>

Table E. Gender Wise Prevalence of Trachoma signs in Village Haider Khel

<table>
<thead>
<tr>
<th>Age 0-9 years</th>
<th>Gender</th>
<th>Total Number</th>
<th>TF</th>
<th>TI</th>
<th>TS</th>
<th>TT</th>
<th>Co</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>578</td>
<td>179(31%)</td>
<td>58(10%)</td>
<td>6(1.00)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Female</td>
<td>602</td>
<td>222(37.8%)</td>
<td>72(12%)</td>
<td>4(0.66%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table F. Gender Wise Prevalence of Trachoma signs in Village Haider Khel

<table>
<thead>
<tr>
<th>Age 30 years and above</th>
<th>Gender</th>
<th>Total</th>
<th>TF</th>
<th>TI</th>
<th>TS</th>
<th>TT</th>
<th>Co</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>668</td>
<td>31(4.6%)</td>
<td>6(0.9%)</td>
<td>23(3.3%)</td>
<td>6(0.9%)</td>
<td>1(0.14%)</td>
<td>-</td>
</tr>
<tr>
<td>Female</td>
<td>580</td>
<td>30(5.1%)</td>
<td>20(3.4%)</td>
<td>52(8.9%)</td>
<td>15(2.5%)</td>
<td>2(0.34%)</td>
<td>-</td>
</tr>
</tbody>
</table>

and the cow dung should be disposed daily.

6) The poor people who cannot afford to construct latrine should be given financial assistance by the government from zakat funds or by any other Non Government Organization.

7) Trachoma control programme should be initiated in the trachoma endemic areas, so that a better attention is paid to this blinding disease.

REFERENCES:
INTRODUCTION

Regional anaesthesia is commonly used for cataract surgery. Peribulbar anaesthesia for cataract surgery was the popular technique in the last decade, but it is not completely free from complications. Retrobulbar anaesthesia, which was previously used, was associated with a number of potentially sight-threatening complications. Other anaesthesia procedures have been developed to reduce the risk of complications. Advances in cataract surgery including the use of a smaller, self-sealing incision have reduced the duration of surgery resulting in the use of shorter acting anaesthetic agents with less invasive methods of administration. In sub-tenon anaesthesia, transconjunctival infiltration of local anaesthetic agent directly to the subtenons space occurs. Before this local anaesthetic drop in the conjunctiva is instilled which takes away the pain of the needle prick. This technique has been used for conventional extracapsular cataract extraction (ECCE) with posterior chamber intraocular lens implantation (PCIOL) and phacoemulsification. Manual small incision cataract surgery (MSICS) has become popular in developing countries like Pakistan as it results in better uncorrected vision as compared to ECCE, and at an affordable cost. We designed this study to compare the two methods of anaesthesia in MSICS with respect to pain, akinesia, intraocular pressure control and complications, using a randomised control clinical trial.

MATERIAL AND METHODS

All the patients admitted for cataract surgery, were asked to participate in the trial. The first 100, who agreed to informed consent, were randomised to either subtenon or peribulbar technique.

The exclusion criteria were
1. Sensitivity to xylocain
2. History of convulsion or epilepsy
3. Patients who had previous intraocular surgery, injury or any inflammation
4. Inability to understand the visual analogue pain scale

The patients were asked to grade the pain they felt on a linear scale of 0-4 (No pain = grade 0, mild pain = grade 1, moderate pain = grade 2, severe pain = grade 3, extreme pain = grade 4).
grade 3 and maximum pain imaginable = grade 4). Patients were asked to grade separately for pain during administration of anaesthesia, pain during surgery and pain 4 hours after surgery. The last was taken when the patient was shifted to the wards. After each surgery the surgeon was asked to score for akinesia and to grade for positive pressure during surgery, chemosis, subconjunctival haemorrhage and overall ‘discomfort’. ‘Akinesia’ was scored on a scale designed to measure ocular movements in each quadrant (no movement = score 0, mild = 1, moderate = 2, severe = 3 in each quadrant, minimum score possible = 0, maximum score possible = 3 x 4 = 12). Intraoperative complications were noted. All patients underwent MSICS; any change in technique, if needed, was noted.

RESULTS:
In this study, we evaluated 93 eyes of 93 patients who presented with cataract and were admitted in our unit from 1st March 2011 to 30th July 2011. There were 27 (52.94%) male and 24 (47.05%) were female in the peribulbar group and there were 24 (57.14%) male and 18 (42.85%) female in the subtenon group. Average age in the two groups was 64 and 58 years respectively. Pain during anaesthesia is shown in Table I. Table II shows the various grades of pain during surgery. All patients of the peribulbar group reported no pain 4 hours after surgery compared to 2 patients in the subtenon group. The various scores of ocular movements after anaesthesia are shown in Table III.

DISCUSSION:
For cataract surgery, nowadays, various methods of local anaesthesia are in use. These includes retrobulbar, peribulbar, subtenon’s, subconjuctival and topical. Both retrobulbar and peribulbar anaesthesia involve blindly placing a sharp needle into the orbit to deliver the anaesthetic agent. The technique of peribulbar anaesthesia has been preferred to retrobulbar anaesthesia as it is associated with a smaller risk of globe perforation, retrobulbar haemorrhage, optic nerve damage, and injection of the anaesthetic solution into the subarachnoid space. However, the peribulbar method itself is not absolutely safe. Some serious complications has been reported frequently. Subconjuctival anaesthesia is an effective and safer alternative; however, this technique provides no akinesia. Topical anaesthesia has gained wide popularity particularly with the advent of phacoemulsification. However, it does not provide akinesia. Lack of akinesia can pose significant difficulty particularly when dealing with un-cooperative patients.

Subtenon anaesthesia was more comfortable for the patient at the time of anaesthetic administration. They also had good analgesia intraoperatively, but the surgeon had to operate with incomplete akinesia, which some may find discomforting. The surgery was started immediately after administration of anaesthesia in subtenon group. As lesser amount of the anaesthetic agent was used for subtenon, the chances of adverse effects are also minimized. In a large hospital or in a community eye care setting, the cost would also be less. There was no difference in positive pressure rise during surgery and postoperative pain between both the techniques of anaesthesia. An audit of subtenon and peribulbar anesthesia for cataract surgery in UK demonstrated sub-Tenon’s methods to be more effective than the peribulbar technique, with significantly fewer patients experiencing unacceptable levels of pain. It was significantly less uncomfortable on administration than the peribulbar methods and reduced the interval between administration of anaesthesia and surgery. On the range of 1-10, pain on...
administration of anaesthetic had a mean of 2.4 for the peribulbar group and 1.4 for the subtenon group. This correlated with results of our study. The subtenon technique appeared to be the safest method of introducing anaesthetic fluid into the retrobulbar space without the potential complication of a sharp needle injection. But a single case of globe perforation was reported in a patient who had underwent detachment surgery and had thinned sclera. It is likely that subtenon anaesthesia offers a significantly reduced risk of complication such as scleral perforation, retrobulbar haemorrhage, optic nerve injury and injection of anaesthetic solution into the subarachnoid space, as no sharp instrument is passed into the orbit. It should, however, be used with caution in patients with compromised and thin sclera. A randomised study in Denmark comparing retrobulbar, subtenon and topical anaesthesia for phacoemulcification found retrobulbar techniques had less discomfort/pain during surgery but patient preferred subtenon or topical anaesthesia, as it did not involve the needle prick during anaesthesia.

Subtenon anaesthesia has also been used for optic nerve sheath fenestration. Subtenon anaesthesia has been found to be more comfortable for the patient, reliable, long lasting and with deeper anaesthesia as compared to topical anaesthesia for phacoemulcification patients. It was also more comfortable for the surgeon with better pupillary dilatation. A randomised trial in the UK found the difference between the pain score in the subtenon and topical groups to be highly statistically significant, with subtenon being more pain free, for phacoemulcification patients. Limitations of the study include subjective nature of the visual analog pain scales. But past studies and postoperative visual acuity results indicate that it would not be significant.

CONCLUSION:
Sub-tenon’s anaesthesia is an effective and safe technique for manual small incision cataract surgery. Comparing this technique with peribulbar anaesthesia there was no significant difference in terms of pain perception during surgery.

REFERENCES:
Frequency and Types of Comitant Esotropia Among Patients Attending Eye OPD

Nuzhat Rahil¹, Kanwal Ahad², Rahil Malik³, Muhammad Sardar⁴

ABSTRACT

Objectives: To estimate the frequency and types of comitant esotropia among all age groups attending eye OPD.

Methods: This was a hospital based descriptive cross sectional study on hundred and twenty three patients attending eye department Lady Reading Hospital Peshawar during three months period in 2011.

Results: Total of 4884 (100%) patients with eye problems visited the eye OPD in three months. Among these patients of all age groups 123 (2.15%) patients had comitant esotropia. Of the total patients with esotropia 57 (46.34%) were males and 66 (53.65%) were females. Age wise the patients were grouped in to 3; In group 1, 0 to 10 years age there were 90 patients. In group 2, 10 to 20 years age there were 27 patients. In group 3, above 20 years age there were 6 patients. Among patients with Comitant esotropia, 78 (63.41%) had accommodative esotropia and 18 (14.63%) had infantile esotropia. Refractive errors were observed in 90 patients while 11 patients needed squint surgery.

Conclusion: It was concluded that the most common type of comitant convergent squint was accommodative esotropia followed by infantile esotropia. More than half of patients with comitant convergent squint (esotropia) were under the age of 10 years which showed that Comitant Convergent squint is more common in children than adults so its early detection and management with simple glasses in children can reduce the risk of amblyopia and constant esotropia.

Key Words: Comitant esotropia, Accommodative esotropia, infantile esotropia.

INTRODUCTION

Convergent squint is the most common form of strabismus constituting 1/2 to 2/3 of all misaligned eyes. Strabismus is a common disorder that affects 3% to 5% of children, with 126 400 new cases occurring year in the United States.

The prevalence of comitant convergent squint varies in different parts of the world. In United States of America, prevalence of esotropia constituted 75% of total cases. Similarly in Ireland (UK), it was found that esotropia was five times more common than exotropia. In northern Nigeria, esotropia was found in 62.5% cases.

In Pakistan, children under the age of 15 years account for 45% of the total population. The overall estimated prevalence of strabismus in Pakistan is 5.4%. Out of this 2.5% strabismus patients are under the age of the 5 years while 2.9% patients are over the age of 5 years. The national prevalence of squint of 5.4% suggests that there are 7.02 million patients with strabismus in a population of 130 million.

Binocular anomalies constituted 74% with comitant strabismus. Accommodative esotropia is the most common type of comitant convergent squint accounting for 36.4%. In total, 10% with paretic, 8% with decompensated heterophoria and 6% convergence insufficiency. All accommodative esodeviations are acquired with an onset generally between 6 months and seven years averaging nearly two and half years of age. It is attributed totally or partly to uncorrected refractive error (hypermetropia) or an abnormal accommodative convergence/accommodation (AC/A) relationship. Infantile esotropia is the second most common type of Comitant Convergent squint, occurs in early infancy, usually at 3 months to 6 months of age, and is rarely present at birth. When the infantile esotropia is constant and unilateral, it will likely develop amblyopia.

MATERIAL AND METHODS

This was a hospital based descriptive cross sectional study on hundred and twenty three patients attending eye department Lady Reading Hospital Peshawar during three months in 2011. After permission of an Ethical Committee of Postgraduate Medical Institution, Peshawar and written informed consent from the patients and the parents were taken. To estimate the frequency and types of comitant convergent squint among all age groups patients attending eye OPD at Lady Reading Hospital Peshawar were included in the study.

Patients with mental disorder, patients with other associated systemic illness and old patients were excluded from the study. All age group are selected and then are divided into 3 groups. Group 1 included patients between age 0 and 10 years, group 2
included 10-20 years and group 3 included 20 years and above. All the patients were examined and assessed with the help of refractionist and orthoptist. Type of esotropia, gender distribution, type of refractive error and amount of amblyopia were assessed. Nominal data of all the patients was recorded on a data collection performa. After completion of data collection, the data was analyzed using SPSS version 10.

RESULTS
Total of 4884 (100%) patients with eye problems visited the eye OPD in three months. Among these patients of all age groups 123(2.15%) patients had comitant esotropia. Of the total patients with esotropia 66 (53.65%) were females and 57 (46.34%) were males . Age wise the patients were grouped in to 3; In group 1, 0 to 10 years age there were 90 (73.17 %) patients. In group 2, 10 to 20 years age there were 27 (21.95 %) patients. In group 3, above 20 years age there were 6 (4.87%) patients.

Among patients with comitant convergent squint (esotropia), 78 (63.41%) had Accommodative esotropia, 18 (14.63%) had infantile esotropia, 9(7.31%) had Residual esotropia, 9 (7.31%) had Acquired Non-Accommodative esotropia and the remaining 9(7.31%) had constant esotropia with amblyopia. Refractive error was observed in 90 patients while 11 patients needed squint surgery.

DISCUSSION
Out of total 4884 ophthalmic patients, 123(2.51%) were patients with comitant convergent esotropia. In this study 53.65% of patients were female which is different from the study done by Kac et al in which esotropia was the most prevalent misalignment in his sample group (44.52%). There were more males in this group (p=0.001) with a predominance of the age group 0-2 years (p=0.009). E. In other studies of squint there were not much difference in the gender affected. More than half of patients with comitant convergent squint in our study were under 10 years (73.17%). The incidence of childhood esotropia from population-based study done by Greenberg et al is comparable with prevalence rates reported among Western populations. According to that study Esotropia is most common during the first decade of life, with the accommodative and acquired Nonaccomodative forms occurring most frequently. The congenital, sensory, and paralytic forms of childhood esotropia were less common in this population.

This is the period to develop amblyopia. Amblyopia causes more vision loss in individuals under the age of 10 years than do all other ocular diseases combined. So early detection is important for restoration of normal ocular alignment and establishment of binocular single vision will reduces the risk of amblyopia and constant squint.

In this study of 123 patients with comitant convergent squint 78 (63.41%) had accommodative esotropia. According to a study done by Kothari et al accommodative component can play a significant causative role in esotropia and needs to be ruled out in every esotropia. In our study 14.63% of patient had infantile esotropia and,3(7.31%) had residual esotropia, 3(7.31%) had non accommodative esotropia; the remaining 3(7.31%) patients had constant esotropia with amblyopia. According to a study done by Mohney who provides population-based data on the most prevalent forms of childhood strabismus. Accommodative esotropia, intermittent exotropia, and acquired non-accommodative esotropia were the predominant forms of strabismus in this Western population. According to another study, accommodative esotropia is the most common pediatric strabismus and must be differentiated from other pediatric esotropia. Although its average age of onset is 2.5 years, it can begin during the first year of life and is seen rarely in older children and teenagers. Refractive error was the main culprit for the esotropia in our study and 2/3 of the patients had some type of refractive error which is similar to the other international studies.

CONCLUSION:
It is concluded that the most common type of Comitant Convergent squint is Accommodative esotropia followed by infantile esotropia. More than half of patients with Comitant Convergent squint (esotropia) were under the age of 10 years which shows that Comitant Convergent squint is more common in

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### Distribution of Patients age-wise

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No of Patient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 age group</td>
<td>90</td>
<td>73.17%</td>
</tr>
<tr>
<td>10-20 age group</td>
<td>27</td>
<td>21.95%</td>
</tr>
<tr>
<td>20 years and above</td>
<td>06</td>
<td>4.87%</td>
</tr>
</tbody>
</table>

### Distribution of patients according to types of squint

<table>
<thead>
<tr>
<th>Types</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodative</td>
<td>78</td>
<td>63.41%</td>
</tr>
<tr>
<td>Infantile</td>
<td>18</td>
<td>14.63%</td>
</tr>
<tr>
<td>Residual</td>
<td>9</td>
<td>7.31%</td>
</tr>
<tr>
<td>Non-accomodative</td>
<td>9</td>
<td>7.31%</td>
</tr>
<tr>
<td>Constant</td>
<td>9</td>
<td>7.31%</td>
</tr>
</tbody>
</table>
children than adults so its early detection in children can reduces the risk of amblyopia and constant esotropia. The most leading cause of 2/3 patients with comitant convergent squint was refractive error (hypermetropia) which shows that management with simple corrective glasses can exclude more than half of esodeviations.

REFERENCES

Glioblastoma Multiforme (GBM) as a cause of Foster Kennedy Syndrome
(An interesting Case)

Inamul Haq Khan FCPS¹, Misbah Durrani, FCPS², Hafeez uddin FCPS³

ABSTRACT

Introduction

Foster Kennedy syndrome (FKS) is a rare condition. It is characterized by the presence of ipsilateral optic atrophy, contralateral papilloedema and ipsilateral anosmia. It was first described in 1911. Glioblastoma multiforme (GBM) is a constellation of tumors. Some of them if diagnosed early can save the patient from morbidity and mortality. This patient reported with symptoms of epilepsy at the age of 53, headaches and visual symptoms. Lack of education & financial constraints are the main reasons for the dreadful outcomes of many treatable diseases. This case is one of the many examples of this painful situation.

Keywords : Foster Kennedy syndrome; Papilloedema; Optic atrophy.

CASE REPORT

A 53-year-old, gentleman reported with loss of vision left eye in 03 months and deterioration of vision right eye 3 weeks. He had headaches from the last three months which are now severe and exacerbated by coughing and postural changes. There is history of partial and generalized seizures off and on in the last 06 months. The seizures commenced suddenly without an aura, progressing to involuntary jerking of the right arm and leg. There was history of tongue biting and incontinence. He is being treated for epilepsy. Loss of vision in left started 03 months back. Initially he noticed that there was generalized haziness when he closed his right eye, followed by complete loss of vision. From the last 03 weeks he is having similar symptoms in his left eye and he is afraid that he may lose vision in this eye as well.

On examination, right sided vision was 6/24 with generalized haziness; color vision was 12/15 on Ischiara color plates. Fundoscopy revealed disc swelling with no venous pulsations (figure 1a). Left sided vision was perception of light, RAPD (relative afferent pupillary defect) and optic atrophy (figure 1b). He had left sided anosmia as well.

He was advised MR imaging of the brain with contrast. Unfortunately the patient vanished, went to “quacks” He reported again after 02 months with loss of vision in right eye as well, loss of some memory and personality changes. On Examination visual acuity right eye was perception of light, disc was now pale looking (fig 2a). visual acuity left eye was no light perception and optic atrophy (fig 2b). MRI brain with contrast was done, which showed a rim enhanced, predominantly multicystic mass lesion with enhancing solid component noted in leftfrontoparietalregion. The mass lesion also show a haemorrhagic component showing high signal on TIW and low signal on T2W.
sequences. There is extensive surrounding vasogenic edema extending along genu of corpus callosum to contralateral side, subfalcine herniation as well as effacement of ipsilateral frontal, temporal and body of lateral ventricle. MR findings of this patient suggested the diagnosis of Glioblastomamultiforme. He was advised CT guided biopsy and Neuro surgical consultation.

**Biopsy** of the lesion was done which showed “Clusters of neoplastic cells. These cells have pleomorphic hyperchromatic nuclei with high N/C (nuclear/cytoplasm) ratio & fibrillar cytoplasmic extensions focally. There is no evidence of tuberculosis in the material examined. Findings are suggestive of Anaplastic astrocytoma (WHO grade III)” “The relatives of the patients refused further intervention.

**DISCUSSION**

FKS is an uncommon condition and even due to advancement in imaging techniques, computed tomography and MR imaging, the condition is still rarely seen. The syndrome was rst described in 1911 by the Robert Foster Kennedy, a British neurologist, who spent the majority of his working life in America (1884-1952). He presented a series of six patients with the triad of ipsilateral optic atrophy, contralateral papilloedema and ipsilateral anosmia. It is rarely caused by a frontal lobe tumor but is common with tumors arising from the olfactory groove. Histology invariably shows a meningioma.

The etiological mechanism of this syndrome is unclear. Foster Kennedy originally hypothesized that ipsilateral optic atrophy resulted from direct pressure on the optic nerve, and the contralateral papilloedema from long-standing elevated intra-cranial pressure. An analysis of 36 reported cases showed that in 22% the above applied, in 33% there was bilateral optic nerve compression, in 5% there was long-standing, increased intracranial pressure and in 40% the mechanism was unclear.

The order of precedence of papilloedema and atrophy is uncertain and depends on the site and size of the tumour. A typical example of such influence is in optic neuroglioma en-tering the cranium. In this condition the ipsilateral optic atrophy occurs well in ad-ance of any evidence of the oedema. On the other hand a meningioma may exhibit the oedema on the contralateral side before the atrophic changes on ipsilateral side. In 1909 Paton re-reported a case of unilateral papillo-edema with contralateral blindness without optic disc involvement. How-ever, two years later frontal lobe tumor was detected during autopsy. In five cases of frontal lobe tumor and one of frontal lobe abscess Foster Kennedy thought the optic atrophy to be due to a toxic factor and papill-oedema to be due to raised intracranial tension. Mehra et al consider it to occur in about 2% of all cerebral tumors. Depending on the site and size of the tumor, various changes in the two eyes will be found. In the early phase the atrophy may be missed. Early pallor, good vision and corresponding field defect on the ipsilateral side with normal disc on the contralateral side is to be expected. Gradual develop-ment of papilloedema on the contrala-teral side with increase in optic atro-phy on the ipsilateral side follows. Ultimately, the second eye develops post-papilloedematous atrophy.

Various causes have been assigned to this condition. Tumors are the most common factor. Amongst the non-neoplastic condi-tions, optochiasma larchnoiditis, sclerosis of the internal carotid artery, syphilitic basal meningitis and Paget’s disease of the skull, craniostenosis, tubercular meningitis, and frontal lobe ab-scess have been reported.

The tumors are mostly gliomas in connection with frontal lobe & olfactory groove, chiasmal, sphenoidal ridge meningioma are also seen. It is worth mentioning that not all such cases de-velop the Foster-Kennedy syndrome. In Bynke’s (1958) series only 17 out of 1400 cases of gliomas, this syndrome was seen and only in 1 out of 180 patients of frontal lobe tumor, FKS was present. Similarly in Huber’s (1961) series 2 out of 25 cases of sphenoid wing tumor and 3 out of 16 cases of meningioma of the olfactory groove, had this syndrome. This case report supports the original hypothesis of Foster Kennedy, as there was direct
compression of the left optic nerve and clinical features of raised intracranial pressure.

**Pseudo-Foster Kennedy syndrome** is defined as one-sided optic atrophy with papilloedema in the other eye but with the absence of a mass. FKS should be differentiated from **Pseudo-Foster Kennedy syndrome** in which there is disc swelling on one side and optic atrophy on the other. It is due to anterior ischemic optic neuropathy (AION). Recurrences of AION in the same eye are rare. However AION develop in the fellow eye in 25% of cases. Usually months to years after the initial involvement. When this occurs a **Pseudo-Foster Kennedy syndrome** develops.

**MANAGEMENT AND PROGNOSIS**

Both depend on the underlying tumor. There is no single treatment for the syndrome. However, there are medications that are given to manage the signs and symptoms as well as the four major diseases that make up the syndrome. In cases where surgical resection is not possible, surgical intervention in the form of resection or needle biopsy is the mainstay of treatment. Radiotherapy represents one of the standard adjuvant treatment modalities in cases of low-grade oligodendrogliomata. Chemotherapy is reserved for those with recurrence following radiotherapy. The median survival periods range from 8 to 10 years in cases of low-grade oligodendrogliomata. Large series have reported no plateau in survival, so radiotherapy has been proposed to optimize surgery and to delay recurrences. However, there has been no randomized trial assessing the optimal timing and the beneficial role of radiotherapy. Some advocate radiotherapy at an early stage of the disease, while others follow a non-aggressive management, with irradiation only at the time of progression.

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Glioblastoma Multiforme (GBM) as a cause of Foster Kennedy Syndrome
INTRODUCTION:

Arthritic disease of the knee is a disabling condition, negatively affecting life style in active aging population. It ranges from involvement of a single compartment to end-stage tricompartmental disease. Involvement of the medial compartment with a genu varum deformity is a common occurrence in this disease \(^1,2,3\). The symptoms of the knee osteoarthritis are disabling pain, deformity and restriction of movements. During early stages the disease is treated conservatively by encouraging weight loss, physiotherapy, avoid squatting, life style modifications, quadriceps strengthening exercises and low impact activity \(^4,5\).

Most commonly, varus deformity develops when the disease progresses to its end stage. High tibial osteotomy, unicompartmental arthroplasty and total knee arthroplasty are various surgical options to treat this condition \(^6\). Other surgical options described in the literature are synovectomy, arthroscopic joint debridement and wash, arthrodesis, patellectomy, petalloplasty and meniscectomy \(^8\).

Tibial osteotomies were introduced in 1950s \(^7\). These osteotomies have shown variable results as shown in (table-1) \(^22\). Lateral closing wedge high tibial osteotomy is more famous osteotomy as compared to medial opening wedge osteotomy for medial compartmental disease. It shifts the weight bearing axis from medial to lateral compartment \(^8\). Venous decongestion is another factor for pain relief apart from axial realignment \(^10\). The damaged articular weight bearing regions of the medial compartment heals with fibrocartilage after axial realignment as obvious from biopsy and second look arthroscopy \(^10,11,12\).

It has been proved that the results of these osteotomies deteriorate with the passage of time \(^14\) but...
good short and medium term results of lateral closing wedge high tibial osteotomy advocates its use in young enthusiastic patients who wants to keep active life style.

The objective of this study was to see the short term results of lateral closing wedge high tibial osteotomy, in terms of patient satisfaction and pain relief, for medial compartmental OA.

**MATERIAL AND METHODS:**

The study was conducted in Orthopaedics unit of Khyber Teaching Hospital, Peshawar and Khyber Medical Center, Dabgari Gardens, Peshawar from February 2008 to February 2011. We included 40 patients in our study, out of which 15 (37.5%) were females and 25 (62.5%) were males. All the patients were admitted through out-patient department. Routine investigations were performed. This problem occurs in older age group, the patient’s fitness for general anesthesia was routinely taken into account. Scanograms were taken to calculate the tibio-femoral angle and to measure the mechanical axis deviation.

**Inclusion criteria were:**
1. Medial compartmental osteoarthritis.
2. Age < 60 years.
3. Active life style.

**Exclusion criteria were:**
1. Involvement of the lateral compartment and patella-femoral joint.
2. Inflammatory arthritis.
3. Range of motion < 90.
4. Flexion contracture > 15.
5. History of previous lateral meniscectomy.
6. Lower limbs ischemia.

All the ostotomies were performed by the same surgeon. The lateral closing wedge osteotomy was performed with the aim to shift the weight bearing axis to lateral compartment from medial compartment and to exaggerate the tibio-femoral angle to 10 from a normal tibio-femoral angle of 5-7. The main steps of procedure were supine positioning of the patient and tourniquet application. Proper scrubbining and draping. Posterolateral hockey stick incision, identification and protection of common peroneal nerve, resection of anteromedial part of fibular head to gain better access to osteotomy site, proper siting of the osteotomy (superior transverse cut was at the level of proximal tibio-femoral joint and parallel to joint surface) proper sizing of the wedge (calculated from = 0.03 x width of tibia x correction required), closure and fixation of the osteotomy with staples, assessment of valgus/varus stability, deflation of the tourniquet, securing hemostasis and wound closure. The lower limb was kept immobilized in long leg cylinder cast for 6 weeks.

The patient was kept touch down weight bearing for four weeks, partial weight bearing for next six to eight weeks and full weight bearing at 12 weeks. The range of motion exercises were encouraged after the removal of pop at 6 weeks. The quadriceps strengthening exercises were encouraged during the whole post-operative period.

Results of the study were evaluated at six weeks, six months and one year and were categorized into good, fair and poor as shown in table 2.

**RESULTS:**

Preoperatively, all patients had loss of normal knee valgus. The tibio-femoral angle ranged from 2 valgus to 8 varus. Joint space narrow was more on medial then on the lateral side. The range of motion of the knee were restricted in 32 (80%) of the patients. 20 patients (50%) had restriction of flexion, eight patients (20%) had restriction of extension and four patients (10%) had restriction of both flexion and extension.

There was no non-union in our study which, we think, was because of good healing potential of metaphyseal area. All the osteotomies united in 6-9 weeks tibio-femoral angle improved in all the cases. The correction persisted till the end of one year. All the patients showed dramatic relief of pain which persisted till the end of one year. Range of motion improved in 80% of the patients. There was full range of motion of the knee in 20 patients (50%) at the end of one year. The range of motion deteriorated in three patients. One patient had superficial infection of the wound site at three weeks while two patients had deep infection leading to knee stiffness. The functional outcome, according to table 2, at the end of one year of study was good in 30 patients (75%), fair in seven patients (17.5%) and poor in three patients (7.5%). Complications (poor results) observed were in the form of superficial infection in one patient which was treated with oral antibiotics. Deep infection in two patients which was treated with staple removal, debrima, wash and injectable antibiotics. Both the patients had poor range of knee motion and poor patient satisfaction.

**DISCUSSION:**

Osteoarthritis is a common disease of articular cartilage in adults above 60 years of age. Distal and proximal inter-phalangeal joints of the hand are the most common joints involved followed by knee joint. Involvement of the knee joint ranges from mild reduction of the joint space to complete obliteration and osteophyte formation by then the patient is usually severely disabled. Pain, swelling and deformity of the knee joint are the usual complaints and the cause of functional deficit. Treatment of this disease ranges from conservative in mild disease to surgical in advanced involvement.
Involvement of the medial compartment with varus deformity is the most common presentation in advanced cases. Flexion contracture, limitation of range of motion, knee instability, loss of medial compartmental subchondral bone and subluxation of the knee joint are sequel to medial compartmental osteoarthritis.

Uni-condylar or total knee arthroplasty is the treatment of choice for medial compartmental osteoarthritis in the west. Patients in our part of the world are subjected to squatting for toilet and other purposes. Moreover, knee arthroplasty is a difficult undertaking due to socioeconomic reasons. Patients in this part of the world are subjected to manual labour. Due to these reasons high tibial osteotomy is an acceptable way of managing this disease as the patients do not have to change the work profile. High tibial osteotomy shift the weight bearing axis from involved medial compartment to the less affected lateral compartment leading to relief of symptoms and patient satisfaction. Sacrifice of the proximal tibiofibular joint and deterioration of results with the passage of time has made these osteotomies unpopular18.

The outcome of our study was good in 30 patients (75%), fair in 7 patients (17.5%) and poor in 3 patients (7.5%) at one year which is comparable to studies conducted by Ivarsson20, Naudie et al23, Tang and Henderson and Papachristou et al22.

CONCLUSION:
High tibial osteotomy is a better, simpler and cost effective procedure in medial compartmental osteoarthritis of the knee joint in early stages. It prolongs life of the damaged knee, relieve pain and disability and delay the need for future total knee replacement.

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Table 1: Survivorship of HTO in the literature review

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Survivorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naudie et al.</td>
<td>1999</td>
<td>75% at 5 years, 51% at 10 years &amp; 30% at 20 years.</td>
</tr>
<tr>
<td>Sprenger and Doerzbacher</td>
<td>2003</td>
<td>65– 74% at 10 years.</td>
</tr>
<tr>
<td>Koshino et al.</td>
<td>2004</td>
<td>97.3% at 7 years &amp; 86.9% at 15 years.</td>
</tr>
<tr>
<td>Tang and Henderson</td>
<td>2005</td>
<td>89.5% at 5 years, 74.7% at 10 years.</td>
</tr>
<tr>
<td>Papachristou et al.</td>
<td>2006</td>
<td>80% at 10 years &amp; over 52.8% at 17 years.</td>
</tr>
<tr>
<td>Flecher et al.</td>
<td>2006</td>
<td>85% at 20 years.</td>
</tr>
<tr>
<td>Gstöttner et al.</td>
<td>2008</td>
<td>94% at 5 years, 79.9% at 10 years.</td>
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<tr>
<td>Akizuki et al.</td>
<td>2008</td>
<td>97.6% at 10 years and 90.4% at 15 years</td>
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Table 2: Evaluation of results

<table>
<thead>
<tr>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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<tr>
<td>Complete relief of pain</td>
<td>Partial relief of pain</td>
<td>No relief of pain</td>
</tr>
<tr>
<td>Normal union of osteotomy</td>
<td>Normal union of osteotomy</td>
<td>Delayed Union</td>
</tr>
<tr>
<td>Movements either improved or</td>
<td>Movements decreased e°20° of</td>
<td>Movements decreased e°20°</td>
</tr>
<tr>
<td>retained at pre-op level</td>
<td>pre-op level</td>
<td></td>
</tr>
<tr>
<td>Joint stable</td>
<td>Joint stable</td>
<td>Joint unstable</td>
</tr>
<tr>
<td>Patient fully satisfied</td>
<td>Patient partially satisfied</td>
<td>Not satisfied</td>
</tr>
</tbody>
</table>
Short Term Results of Closing Wedge High Tibial Osteotomy

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Comparison of Normal and Abnormal Umbilical Artery Waveforms with Early Neonatal Outcome in Asymmetrical Intra-Uterine Growth Retardation (IUGR)

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ABSTRACT
Background: Fetuses with intrauterine growth retardation (IUGR) are delivered if they have evidence of distress, as manifested by abnormalities in the fetal heart rate and umbilical-artery blood flow. We studied whether umbilical-artery Doppler waveform correlates with early neonatal outcomes.

Study design: Descriptive (case series) study.

Setting: The study was conducted at the Department of Medical Imaging, Rawalpindi Medical College & Allied Hospitals, Rawalpindi.

Duration of study: The study was conducted from November 2009 to March 2010.

Sample size: A total of 105 fetuses with Doppler diagnosis of IUGR were included in the study.

Methods: We measured hemoglobin and lactate concentrations, oxygen content, pH, blood gas levels, and base deficit in umbilical-vein blood and correlated these measurements with the heart rate and umbilical-artery wave forms recorded by Doppler velocimetry in 56 fetuses with growth retardation. Twenty-one fetuses had normal heart rates and normal results of velocimetry, 24 had normal heart rates and abnormal results of velocimetry (indicative of decreased diastolic flow), and 11 had abnormal heart rates and abnormal results of velocimetry.

Results: The study included 105 patients with diagnosed asymmetric fetal growth restriction on ultrasound criteria. The mean maternal age was 25.30±2.78 years. 62 (59%) patients had an abnormal doppler flow in umblical artery. The mean birth weight in the abnormal Doppler flow group was 2.20 ±0.565 kg vs 2.84 ±0.43 kg in the normal Doppler flow group; p = 0.000. The mean apgar score at 05 minute was significantly lower in the abnormal Doppler flow group; 7.366 ±0.648 vs 9.23 ±0.648; p = 0.000.

Conclusions: Assessment of fetal umbilical artery Doppler waveform can help us predict the neonatal outcome. Fetuses with abnormal waveform have a poorer outcome as compared to those with normal waveform.

INTRODUCTION
IUGR is a "sonographic estimated fetal weight below the 10th percentile gestational age." Incidence of IUGR is 3% if the 3rd or 5% if the 5th centile is chosen. In the etiology of the IUGR, fetal factors such as infection, chromosomal and structural anomalies, placental factors and maternal factors like toxin or drug exposure, illicit drugs use and medical conditions such as anemia and hypertension are responsible. IUGR is associated with the increased risk of perinatal mortality, morbidity and impaired neurological development outcomes. IUGR fetuses have increased risk of intrauterine death and asphyxia at birth. Correct detection of the compromised IUGR fetus to allow timely intervention is a main objective of antenatal care.

In management of IUGR Doppler ultrasound play an important role in fetal surveillance. In IUGR fetuses with absent or reversed blood flow velocity in the umbilical artery, there is increased risk of cesarean section, respiratory distress, chronic lung disease, acute renal function, necrotizing enterocolitis or death. There is ample evidence that Doppler indices from the fetal circulation can reliably predict adverse perinatal outcomes in an obstetric patient population with a high prevalence of complications such as fetal growth restriction. IUGR is a clinical situation at highest risk of intrauterine hypoxia or acidosis. IUGR fetuses with abnormal PI of umbilical artery had 15% incidence of acidosis and IUGR fetuses with normal PI of umbilical artery had 34% incidence of acidosis.

Assessment of fetal growth and well-being is one of the major purposes of antenatal care. Small for gestational age fetus is either constitutionally small or has failed to meet its growth potential and thus becomes growth restricted. Fetal growth restriction has high risk of perinatal mortality and morbidity.

The purpose of this study was to know that umbilical artery Doppler can accurately predict acid-base status at the time of birth to improve fetal surveillance.

MATERIALS AND METHODS

Sampling technique: Consecutive sampling.
SAMPLE SELECTION:

Inclusion Criteria: Singleton pregnancy, Fundal height 3 cm less than gestational age, longitudinal lie, Gestational age > 28 weeks,

Exclusion criteria: Twin pregnancy, congenitally abnormal fetuses, premature rupture of membranes, Diabetes with pregnancy, Eclampsia, Placental abruption.

Data collection:

Before conducting this study, approval from Hospital Ethical Committee was taken. Informed written consent was taken from patients included in study. Patients were selected coming to Medical Imaging Department of RMC & Allied Hospitals recruited into the study after 28 weeks of gestation (fulfilling inclusion criteria). All these patients underwent obstetric ultrasonography and if there is suspicion of asymmetrical IUGR i.e. discrepancy between dates and fetal parameters (elevated ratio of head circumference to abdominal circumference, confirmed by a senior consultant) then they will undergo Doppler of umbilical artery. The outcome variables noted at delivery (by a 3rd or 4th year obstetric resident) were the state of baby (still birth/ alive), birth weight (measured on standard neonatal weighing scale) and Apgar score at five minutes after delivery. All the findings were noted on performa.

Data Analysis:

Results were analyzed by using SPSS (V.10). Mean and standard deviation will be used for numerical variables i.e. age. Frequency and percentages were presented for categorical variables i.e. neonatal outcome (live or stillbirth), birth weight (normal, LBW, VLBW), abnormal Doppler flow (absent or reversed) and APGAR score (<7, >7) at 5 min.

Chi-square test was used to compare birth weight and APGAR score at 5 min in normal and abnormal umbilical artery wave forms. Independent sample t-test will be used to compare APGAR score value in both groups. P value less than 0.05 was considered significant.

RESULTS

The study included 105 patients with diagnosed asymmetric fetal growth restriction on ultrasound criteria. The maternal age ranged from 18 to 30 years with a mean age of 25.30±2.78 years. Doppler flow waveform in umbilical artery 62 (59%) patients had an abnormal Doppler flow in umbilical artery whereas 43 (41%) patients had a normal Doppler flow in umbilical artery.

Birth weight: The mean birth weight in the abnormal Doppler flow group was 2.20±0.565 kg and the mean birth weight in the normal Doppler flow group was 2.84 ± 0.43 kg, the difference in weight was statistically significant between the two groups; p = 0.000. Only 13 (21%) babies had normal weight in the abnormal Doppler flow group as compared to 37 (86%) in the normal Doppler flow group. 42 (67.7%) babies were low birth weight (1500-2500 gm) in the abnormal Doppler flow group as compared to 6 (14%) in the normal Doppler flow group. 7 (11.3%) babies were low birth weight (1500-2500 gm) in the normal Doppler flow group as compared to 6 (14%) in the normal Doppler flow group.
were very low birth weight (<1500 gm) in the abnormal Doppler flow group as compared to none in the normal Doppler flow group. This difference was statistically significant; p = 0.00.

Apgar score at 05 minutes. The mean apgar score at 05 minute in the abnormal Doppler flow group was 7.366 ± 2.13 and the mean apgar score at 05 minute in the normal Doppler flow group was 9.23 ± 0.648, the difference in 05 minute apgar score was statistically significant between the two groups; p = 0.00.

In the abnormal Doppler flow group 40 (64.5%) babies had an apgar score of > 7 at 05 minute as opposed to 43 (100%) in the normal Doppler flow group. In the abnormal Doppler flow group 22 (35.5%) babies had an apgar score of 0-6 at 05 minute as opposed to none in the normal Doppler flow group. This difference was statistically significant; p= 0.00.

DISCUSSION

Fetal growth restriction is a syndrome characterized by failure of the fetus to reach its normal growth potential; fetuses with fetal growth restriction therefore represent a subset of those designated as small for gestational age (SGA). Fetal growth restriction is the second leading cause of perinatal death and is associated with significant morbidity, including increased rates of meconium aspiration, hypoglycemia, respiratory distress syndrome, intrapartum asphyxia, developmental delay, and stillbirth. Unfortunately, fetuses with fetal growth restriction are often difficult to differentiate from fetuses that are merely small owing to constitutional or genetic causes.

Doppler sonography is a non-invasive method of evaluating utero-placental circulation. Changes in the velocimetric values seen on serial Doppler examinations may be helpful in documenting improvement in flow with therapy or in determining the need for delivery.

Doppler provides the clinician with the best way to evaluate the condition of the growth restricted fetus.

The umbilical artery waveform provides information about placental resistance, which, in turn, reflects the degree of fetal compromise. Lastly, recent investigation suggests that decreased velocity during arterial contraction noted in the inferior vena cava and ductus venosus correlates well with the presence or absence of metabolic acidemia, the best correlate of neurological outcome. A combination of the above Doppler parameters can be used today to separate the deprived from the ‘normal’, but biometrically compromised, fetus to detect early hypoxia in IUGR, and to precisely time delivery to avoid neurological sequelae in the acidotic fetus.

Doppler velocimetry of the umbilical artery (UA) provides a noninvasive measure of the feto-placental hemodynamic state. UA Doppler indices indirectly reflect impedance of downstream circulation. Abnormality of the Doppler index has been correlated to feto-placental vascular mal-development. There is a significant association between abnormal Doppler indices and fetal hypoxia, fetal acidosis, and adverse perinatal outcome. Most randomized trials of UA Doppler ultrasound in high risk pregnancies show improved outcome when this technique is used in pregnancies complicated by growth restriction. Clinical management should integrate the Doppler approach with existing modalities of antepartum fetal monitoring. The most important diagnostic characteristic of the UA Doppler waveform is the state of the end diastolic velocity: absent end-diastolic velocity (AEDV) is an ominous finding and reversed end-diastolic velocity (REDV) should be interpreted as a preterminal finding. In pregnancies complicated by fetal growth restriction or preeclampsia at 32 weeks of gestation, prompt delivery is recommend rather than expectant management in the setting of AEDV or REDV.
Doppler has revolutionized the field of obstetrics since its introduction in late 1950’s. Useful information is obtained during second half of pregnancy and pregnancies with high resistance can be determined. The cut off values of Doppler indices for defining abnormal Doppler waveform are controversial. 100 patients were studied in Combined Military Hospital, Rawalpindi in 2003.\(^1\) Doppler examination was performed and the range of normal indices determined from all the four vessels. For umbilical artery mean PI was 1.48 (range = 0.92-1.91), RI was 0.78 (range = 0.64-0.84) S/D ratio was 4.68 (range = 3.84-5.6). We used a RI of >0.6 as the cut off level for abnormal Doppler waveform. Using a lower cut off value may have had an impact on the outcome in our data.

Local data on the subject is sparse. Similar results have also been documented from few local studies. At MCH center, PIMS, Islamabad\(^2\) a study was carried out to assess the role of umbilical artery Doppler examination in the management of high-risk pregnancies. 54 women with singleton pregnancies at high risk of IUGR delivered in 2004. Normal Doppler group showed 31% emergency C sections performed compared to 38% in abnormal Doppler group, 26.3% patients in normal Doppler group and 33% in abnormal Doppler group delivered vaginally. At 5 min of birth Apgar scores of 5-10 were seen in all the babies belonging to mothers of normal Doppler group and in the other group 95% babies showed the same score. NICU admissions were 15% in the normal Doppler group and in the other group they were 22%. Our study in fact showed a much higher NICU admission rate of 80% in the abnormal Doppler group, however rate of NICU admission rate of normal Doppler group was similar (18%) in our study when compared to this local study.

To evaluate the role of Colour Doppler Ultrasound in the management of small for gestational age fetus or IUGR pregnancies, a study was performed in Allied Hospital, Faisalabad\(^3\) in 2006. 45 growth restricted fetuses were evaluated; 33.3% with normal end-diastolic flow were delivered at 37 weeks; 44.47% with absent or reversed end-diastolic flow were delivered at 34-35 weeks. We did not document the gestational age at the time of delivery and hence no data is available for comparison. Perinatal mortality was 8.8% mostly due to extreme prematurity. There was one fetal death but no perinatal mortality in our group.

**CONCLUSION**

Growth restricted fetuses with abnormal umbilical artery Doppler waveform have a poor neonatal outcome in terms of significantly lower birth weight and lower apgar scores at 5 minutes.

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Weight loss, Exercise, or Both improves Physical function in Obese Older Adults*

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ABSTRACT:
Background: Obesity exacerbates the age-related decline in physical function and causes frailty in older adults; however, the appropriate treatment for obese older adults is controversial.

Period of Study: April’2005 to August’2009

Place of Study: Washington University School of Medicine, Washington

Material & Methods: In this 1-year, randomized, controlled trial, we evaluated the independent and combined effects of weight loss and exercise in 107 adults who were 65 years of age or older and obese. Participants were randomly assigned to a control group, a weight-management (diet) group, an exercise group, or a weight-management-plus-exercise (diet–exercise) group. The primary outcome was the change in score on the modified Physical Performance Test. Secondary outcomes included other measures of frailty, body composition, bone mineral density, specific physical functions, and quality of life.

Results: A total of 93 participants (87%) completed the study. In the intention-to-treat analysis, the score on the Physical Performance Test, in which higher scores indicate better physical status, increased more in the diet–exercise group than in the diet group or the exercise group (increases from baseline of 21% vs. 12% and 15%, respectively); the scores in all three of those groups increased more than the scores in the control group (in which the score increased by 1%). Moreover, the peak oxygen consumption improved more in the diet–exercise group than in the diet group or the exercise group (increases of 17% vs. 10% and 8%, respectively); the score on the Functional Status Questionnaire, in which higher scores indicate better physical function, increased more in the diet–exercise group than in the diet group (increase of 10% vs. 4%); Body weight decreased by 10% in the diet group and by 9% in the diet–exercise group, but did not decrease in the exercise group or the control group. Lean body mass and bone mineral density at the hip decreased less in the diet–exercise group than in the diet group (reductions of 3% and 1%, respectively, in the diet–exercise group vs. reductions of 5% and 3%, respectively, in the diet group. Strength, balance, and gait improved consistently in the diet–exercise group.

Conclusions: These findings suggest that a combination of weight loss and exercise provides greater improvement in physical function than either intervention alone.

INTRODUCTION

Obesity in older adults is becoming a serious public health problem in the world,1,2,3 as the number of obese older adults is increasing markedly.5,6 Currently, approximately 20% of adults around 65 years of age or older are obese, and the prevalence will continue to rise as more and more become senior citizens.3,7 In older adults, obesity exacerbates the age-related decline in physical function, which causes frailty, impairs quality of life.8-12 Given the increasing prevalence of obesity, the most common phenotype of frailty in the future may be an obese, disabled, older adult.4,13

Although obesity is an important cause of disability in older adults,14,15 there is little evidence from clinical trials regarding the benefits and risks of weight-loss interventions to guide the care of population.6,17 In fact, the clinical approach to obesity is controversial, given the reduction in relative health risks associated with increasing body-mass index (BMI) in this group.7 It has been suggested that it may be difficult to achieve successful weight loss because of life long diet and

*The study was approved and monitored by the Institutional Review Board & Monitoring Board and carried out in Washington University School of Medicine, Intensive Research Unit of the Institute of Clinical & Translational Sciences.

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Acknowledgement: Ophthalmology Update acknowledges with thanks Dr. Dennis T. Villareal, M.D., permitting us to take the excerpts from his original article.
activity habits. Moreover, there is major concern that weight loss could worsen frailty by accelerating the usual age-related loss of muscle that leads to sarcopenia. In a preliminary, short-term study, we report the results of a randomized, controlled trial that was designed to determine the independent and combined effects of sustained weight loss and regular exercise on physical function, body composition, and quality of life. We hypothesized that weight loss and exercise would each improve physical function and that the combination of the two would result in the greatest improvement in physical function and amelioration of physical frailty.

MATERIAL & METHODS

We conducted the study from April 2005 through August 2009 at the Washington University School of Medicine. The study was approved by the institutional review board and was monitored by an independent data and safety monitoring board. Volunteers were recruited after written consent. Potential participants underwent a comprehensive medical screening procedure. Volunteers were eligible for inclusion in the study if they were 65 years of age or older and obese, if they had a sedentary lifestyle, if their body weight had been stable during the previous year and if their medications had been stable for 6 months before enrollment. All participants had to have mild-to-moderate frailty, on the basis of meeting at least two of the following operational criteria: a score on the modified Physical Performance Test (in which the total score ranges from 0 to 36, with higher scores indicating better physical status) of 18 to 32; a peak oxygen consumption (VO\textsubscript{2peak}) of 11 to 18 ml per kilogram of body weight per minute; or difficulty in performing two instrumental activities of daily living or one basic activity of daily living. Persons who had severe cardiopulmonary disease; musculoskeletal or neuromuscular impairments or a history of cancer, as well as persons who were receiving drugs that affect bone health and metabolism or who were current smokers, were excluded.

The primary outcome was the change from baseline in the score on the modified Physical Performance Test. Secondary outcomes included other measures of frailty, body composition, bone mineral density, specific physical functions, and quality of life.

BASELINE ASSESSMENTS:

i) Physical Function: Frailty was assessed with the use of the modified Physical Performance Test, the measurement of VO\textsubscript{2peak}, and the Functional Status Questionnaire. The modified Physical Performance Test includes seven standardized tasks (walking 50 ft, putting on and removing a coat, picking up a penny, standing up from a chair, lifting a book, climbing one flight of stairs, and performing a progressive Romberg test) plus two additional tasks (climbing up and down four flights of stairs and performing a 360-degree turn). The score for each task ranges from 0 to 4; a perfect score is 36. A low score on the Physical Performance Test is associated with a high BMI, and the score increases in response to weight-loss therapy. VO\textsubscript{2peak} was assessed during graded treadmill walking, as described previously. Information regarding the ability to perform activities of daily living was obtained with the use of the Functional Status Questionnaire (on which scores range from 0 to 36, with higher scores indicating better functional status). We also assessed specific physical functions such as strength, balance, and gait and determined one-repetition maximums (the maximal weight a person can lift at one time). We assessed static balance by measuring the time the participant could stand on a single leg and dynamic balance by measuring the time needed to complete an obstacle course. Fast gait speed was determined by a measurement of the time needed to walk 25 ft.

ii) Body Composition and Bone Mineral Density: Fat mass, lean body mass, and bone mineral density of the whole body and at the lumbar spine and total hip were measured with the use of dual-energy x-ray absorptiometry. Thigh muscle and fat volumes were measured with the use of MRI.

iii) Health-Related Quality of Life: The Medical Outcomes: 36-items Short-Form Health Survey (SF-36) was used to evaluate quality of life. The subscales we used were those for the physical component summary and the mental component summary. Scores on these two subscales range from 0 to 100, with higher scores indicating better health status.

FOLLOW-UP ASSESSMENTS

All baseline assessments were repeated at 6 months and 12 months, with the exception of the MRI, which was repeated only at 12 months. Participants assigned to the control group did not receive advice to change their diet or activity habits and were prohibited from participating in any weight-loss or exercise program. They were provided general information about a healthy diet during monthly visits with the staff.

Participants assigned to the diet group were prescribed a balanced diet that provided an energy deficit of 500 to 750 kcal per day from their daily energy requirement. The diet contained approximately 1 g of high-quality protein per kilogram of body weight per day. Participants met weekly as a group with a diettian for adjustments of their caloric intake and for behavioral therapy. They were instructed to set weekly behavioral goals and attend weekly weigh-in sessions. Food diaries were reviewed, and new goals were set on the basis of diary reports. The goal was to achieve a weight loss of...
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There was a substantial decrease in body weight in the diet group (a weight loss of 9.7±5.4 kg, representing a 10% decrease from baseline) and in the diet-exercise group (a weight loss of 8.6±3.8 kg, representing a 9% decrease), but not in the exercise group (a weight loss of 1.8±2.7 kg, representing a 1% decrease) or the control group (a weight loss of 0.9±1.5 kg, representing <1% decrease). Lean body mass decreased less in the diet-exercise group than in the diet group (a decrease of 1.8±1.7 kg, representing a 3% change from baseline, vs. a decrease of 3.2±2.0 kg, representing a 5% change). The lean body mass increased by 1.3±1.6 kg in the exercise group (a 2% increase from baseline). Fat mass decreased by 6.3±2.8 kg in the diet-exercise group (a 16% change from baseline), by 7.1±3.9 kg in the diet group (a 17% change), and by 1.8±1.9 kg in the exercise group (a 5% change). Similar changes were observed with respect to thigh muscle and fat.

Bone mineral density at the total hip decreased by 0.011±0.026 g per square centimeter (a decrease of 1.1% from baseline) in the diet-exercise group, as compared with 0.027±0.021 g per square centimeter (a decrease of 2.6%) in the diet group, whereas it increased, by 0.013±0.014 g per square centimeter (a 1.5% increase), in the exercise group.

The total one-repetition maximum (i.e., the sum of the maximal weights lifted in the biceps curl, bench press, seated row, knee extension, knee flexion, and leg press exercises) increased in the diet-exercise group (an increase of 164±124 lb [75±56 kg], representing a 35% change from baseline) and in the exercise group (an increase of 174±166 lb [79±75 kg], representing a 34% change), whereas it was maintained in the diet group (an increase of 1±85 lb [0.5±39 kg], representing a 3% change). The time needed to complete the obstacle course was reduced by 1.7±2.2 seconds in the diet-exercise group (a reduction of 12%), by 1.1±1.1 seconds in the diet group (a reduction of 10%), and by 1.5±1.4 seconds in the exercise group (a reduction of 13%). The duration of the test, the participant could stand on a single leg increased by similar amounts in those groups. Gaitspeed increased in the diet-exercise group (an increase of 16.9±42.3 seconds, representing a 23% change from baseline) and in the exercise group (an increase of 8.2±15.5 seconds, representing a 14% change). The physical-component summary score of the SF-36 (which was used to measure quality of life) increased by 8.6±9.3 points in the diet-exercise group (a 15% increase from baseline), by 8.4±10.1 points in the diet group (a 14% increase), and by 5.7±8.0 points in the exercise group (a 10% increase).

**DISCUSSION**

In this 1-year, randomized, controlled trial involving obese older adults, weight loss plus exercise improved physical function and ameliorated frailty more than either weight loss or exercise alone, although...
each of those was beneficial. Currently, evidence-based data to guide the treatment of obese older adults are limited. The few clinical trials that have been conducted typically addressed cardiovascular risk factors rather than physical function. However, frailty is an important problem in the elderly because it leads to loss of independence and increased morbidity and mortality. Our study suggests that weight loss alone or exercise alone can reverse frailty but that the combination of weight loss and exercise is more effective than either individual intervention. Therefore, weight loss and exercise may be an important therapy for frail, obese older adults. Moreover, one study has shown that weight loss and exercise reduce knee pain and improve physical function in overweight and obese older adults with osteoarthritis of the knee.

Physical frailty in obese older adults is associated with low muscle mass relative to body weight (relative sarcopenia) despite a greater absolute amount of muscle mass. In the current study, relative sarcopenia was reduced in all the intervention groups — owing to the larger reduction in fat mass relative to lean body mass in the diet and diet–exercise groups and owing to the decrease in fat mass and increase in lean body mass in the exercise group. These positive changes in body composition could underlie the improvement in physical function in the participants. However, because the greatest improvement occurred in the diet–exercise group, adding an exercise program to a diet regimen, which results in the preservation of lean body mass in addition to the reduction in fat mass induced by a diet, may be the best approach. Accordingly, the diet–exercise group had not only the greatest increase in scores on the Physical Performance Test but also the most consistent improvements in strength, balance, and gait.

A potential adverse effect of our interventions was the reduction in lean body mass and bone mineral density at the hip in the diet groups. However, the addition of exercise to diet attenuated the losses of lean tissue and further augmented physical function. Although the clinical importance of the modest loss of bone mineral density is unclear, strategies to prevent this loss in participants involved in future studies might include prescribing higher doses of calcium and vitamin D than those used in this study. An additional health concern is raised by findings from observational studies that suggest that weight loss may be associated with an increased risk of death. However, these studies did not rigorously distinguish intentional from non-intentional weight loss. Follow-up data from a randomized, controlled trial involving overweight and obese older adults suggest that intentional weight loss may reduce the risk of death.

A limitation of our study is that it was not powered to determine potential differences in the outcomes between sexes. Because we selected volunteers who were able to participate in a lifestyle program, the results may not necessarily apply to the general obese, older adult population. Nonetheless, they provide evidence that successful weight loss is achievable in this population. Further studies are needed to determine whether weight loss can be maintained beyond 1 year and prevent institutionalization of obese older adults. Our sample size was small, and most of the participants were women, white, well educated, and older with mild-to-moderate frailty thus limiting broader inferences of our results. Our study did not address the usefulness or safety of these interventions for markedly obese older persons with severe frailty.

CONCLUSION: our findings suggest that weight loss alone or exercise alone improves physical function and ameliorates frailty in obese older adults; however, a combination of weight loss and regular exercise may provide greater improvement in physical function and amelioration of frailty than either intervention alone. Therefore, weight loss combined with regular exercise may be beneficial in helping obese older adults maintain their functional independence.

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Probing the Floor of the Optic Nerve head in Glaucoma

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Spectral domain optical coherence tomography (SD-OCT) applied to the eye is rapidly expanding its scope of usefulness. The authors have described the use of “Enhanced Depth Imaging” (EDI) to explore the optic disc, and in particular the lamina cribrosa, in the context of glaucoma. The lamina cribrosa is of special interest because the excavation of the optic nerve head, so characteristic of glaucoma in contrast to other optic atrophies, is related to the collapse and posterior bowing of the lamina cribrosa with widening of the scleral opening.

The EDI method has been used to evaluate the choroid in glaucoma, with the finding that the choroid becomes thinner with age, but is seemingly not affected by glaucoma. In a previous study with standard SD-OCT, the anterior portion of the lamina cribrosa was visible only in the cup, but not under the rim of neuroretinal tissue. In 42% of the eyes the posterior boundary of the lamina cribrosa could not be identified, even in the region of the cup, so thickness could be measured in only 58% of the eyes and for the most part only at the center.

Park et al of the Catholic University of Korea, made measurements at 3 locations along the vertical midline of the disc (in the cup), to avoid shadows caused by blood vessels and other overlying tissue. They reported that among 137 eyes with glaucoma, the front surface of the lamina cribrosa could be seen in all, even with the standard mode. The posterior surface was adequately seen in only 66% with the standard mode, but in 93% with EDI. They also found a greater repeatability when measuring the lamina cribrosa thickness with EDI than in the standard mode. With regard to glaucoma, they found that the lamina cribrosa was thickest in healthy eyes, less thick in eyes with high-pressure glaucoma, and thinner yet in eyes with normal-tension glaucoma, particularly in those in which disc hemorrhages were seen.

In 76% of the eyes, pores of the lamina cribrosa could be seen in regions of the disc, mainly centrally or temporally. They made note of other structures as well. The central retinal vessels could be seen in all eyes, and in 86% at least one short posterior ciliary artery was seen. In a minority, other details were observed, including the anterior termination of the subarachnoid space, a patch of absent lamina cribrosa, and an instance of a nonvascular cavity within the choroid. The authors thus illustrated new, but perhaps very infrequent, features that accompany glaucomatous disease.

Thus, EDI has not only enabled study of the choroid (and possibly sclera), but is beginning to open new windows to the depths of the optic nerve head. Already details are emerging about the collapse and thinning of the lamina cribrosa, posterior migration of its insertion into the sclera. These events seem to occur in the early stages of glaucomatous cupping. Although histological verification that structures are correctly identified would be valuable.

In addition, while EDI is a major step forward, the image of deeper structures is still imperfect. The ultimate hope is that we not only come to understand the pathogenic process, but can use the information in making clinical evaluation and decisions.

Based on evidence, observation and clinical judgment, Dr. S.S. Hasnain, a Pakistani scientist who is practicing Ophthalmology for the last 40 years in California, has challenged the old paradigm of ‘Cupped disc’ in glaucoma by a new hypothesis, ‘Optic disc may be sinking’. Dr. Hasnain has made a relentless effort to establish this new paradigm, indicating that why are the arcuate axons selectively destroyed first in the initial stages of Glaucoma? He strongly thinks that this is the only core issue in resolving the pathogenesis of glaucoma. He considers that the loss of neurons in Lateral Geniculate body and loss of ganglion cells in the retina simultaneously supports his hypothesis of ‘sinking disc’ resulting in the axons being axotomized and not atrophied as in glaucoma. He considers that axotomy of axons result in excavation of disc, a feature of chronic glaucoma.

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