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Methods: Study design and sampling methods should be mentioned. The selection of the observational or experimental subjects (patients or experimental animals, including controls) should be described clearly. The methods and the apparatus used should be identified and procedures described in sufficient details to allow other workers to reproduce the results and references to established methods. All drugs and chemicals used should be identified precisely, including generic names, doses, routes of administration.

Results: These should be presented in a logical sequence in the text, tables and illustrations. Only important observations should be emphasized or summarized.

Discussion: The author’s comments on the result, supported with contemporary references, including arguments and analysis of identical work done by others. Brief acknowledgement may be made at the end.

Conclusion: Conclusion should be provided under separate heading and highlighting new aspects arising from the study. It should be in accordance with the study.

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Astigmatism, derived from Greek meaning "without spot," refers to a common refractive condition with reduced visual acuity. Astigmatism results from asymmetry, typically in the anterior cornea, but it can also be caused by the posterior cornea and the lens as well. The asymmetry means that light is focused differently between the 2 meridians. As a result, the image does not focus at a single point.

Some level of detectable astigmatism is present in as many as 95% of eyes, almost half of the population has at least 0.5 D of astigmatism, 10% has at least 1 D, and 8% has 1.5 D or more. The prevalence of significant astigmatism has been reported to vary from 7.5% to 75%. Astigmatism also seems to increase with the advancing age. One study suggests that as many as 20% of eyes with cataract have at least 1.5 D of astigmatism.

Modern practice has developed multiple methods to treat astigmatism at both the corneal and the lenticular level. Glasses and contact lenses are the most common methods to correct astigmatism. Soft toric contact lenses or rigid gas permeable (RGP) contact lenses also provide correction of astigmatism. High astigmatism is often considered successful if the patient is able to see acceptably utilizing glasses or contacts. For irregular astigmatism or high astigmatism, RGP lenses usually provide the best vision, even in comparison with the newest surgical techniques. Astigmatic keratotomy (AK) an incisional keratotomy remains relevant today in the management of astigmatism.

Limbal incisions are technically easier to perform, rely less on pachymetry, and tend to stabilize more quickly as incisions are made at an optical zone of 8 to 10 mm. An accurate manifest refraction, topography, and keratometry are required. Ideally, they are in agreement on the amount and axis of the cylinder, but factors such as posterior corneal or lenticular astigmatism may cause disagreement. The potential drawbacks of incisional keratotomy include risk of perforation, infection, unpredictability of result, creation of irregular astigmatism, and disruption of the ocular surface. Younger patients usually experience less effect than older patients for a given incision, the expected result is decreased by 2%/year for ages below 30 and increased by 2%/year for ages over 30. For instance, a nasal incision induces greater with the rule astigmatism than a temporal incision with the same width. Another variation of incisional astigmatism management utilizes the femtosecond laser to make the incisions.

The femtosecond laser first demonstrated the ability to treat high levels of astigmatism with arcuate incisions after penetrating keratoplasty, which provides a larger reduction in astigmatism than a mechanized keratome with less misalignment. With the introduction of the femtosecond laser to cataract surgery, femtosecond arcuate incisions can now be made at the time of cataract surgery.

PhakicToric IOLs enable a lens-based surgical approach to the treatment of astigmatism, but at this time, only pseudo-phakic toric IOLs are available. Two most common models are the single-piece acrylic AcrySofToric and the silicone, plate-haptic Startoric. The surgeon performs phacoemulsification as usual. During lens placement, it is essential to make the IOL’s axis line up as closely to that of the steep curvature as possible. Published data have shown good outcomes from toric IOLs, but the outcome is highly dependent on the positioning of the lens. Toric IOLs may not be a good option for every patient with astigmatism, especially irregular astigmatism, but there are some reports of relatively successful use in eyes with keratoconus. Of all the methods of astigmatism correction, laser vision correction is the most precise.

LASIK allows for 3 D of myopic or 2.75 D of hyperopic astigmatism cylindrical correction and 5.75 D of mixed astigmatism cylindrical correction. Conventional LASIK (VISX) parameters increase to 5 D of cylinder for myopic astigmatism, 3 D for hyperopic
astigmatism, and 6 D for mixed astigmatism. Multiple series have demonstrated reduction of astigmatic cylinder after both photorefractive keratectomy (PRK) and LASIK. Modern laser treatments allow important advantages over other surgeries.

First, wavefront treatment technology maps multiple points on the cornea and creates a customized ablation profile. Second, Excimer laser software has iris registration, it automatically rotates the treatment to match the cyclo-rotation of the eye when the patient is in the supine position.

Furthermore, custom topography-guided PRK successfully decreased higher-order corneal aberrations and reduced both regular and irregular astigmatism after penetrating keratoplasty. Laser may therefore be a good alternative to incisional keratotomy, conductive keratoplasty (CK), wedge resections, or therapeutic suturing for post-penetrating keratoplasty astigmatism, especially if it is possible to capture a custom wavefront or topographic image.

Corneal inserts Intacs have now found increasing use for irregular astigmatism, particularly in cases of keratoconus or post-refractive laser ectasia. Although multiple inserts are available in other countries, in USA the available brand is Intacs (Addition Technology Inc.). These polymethyl-methacrylate segments cover an arc of 150 degrees with an external diameter of 8.1 mm and an internal diameter of 6.8 mm. Intacsintracorneal ring segments (ICRS) now come in a range of thicknesses: 0.25, 0.3, 0.35, 0.4, and 0.45 mm. The surgeon may create the channel for the ICRS either manually or with the femtosecond laser and should be placed at approximately 70% depth. The greater the difference in ICRS thickness, the greater degree of astigmatic asymmetry can be treated. The outcome from ICRS is best for milder cases of keratoconus or ectasia. In one prospective study, 80.5% of participants had improved uncorrected acuity and 68% had improved best corrected acuity. ICRS may stabilize and improve the irregular astigmatism associated with keratoconus or post-LASIK ectasia. However, its effect may be even more powerful in combination with collagen cross-linking with riboflavin (CXL) which stops progression, but it has also been reported to decrease the maximum keratometry reading by up to 2 D and the refractive cylinder by 1.14 D. Both ICRS and CXL offer the potential to stabilize and partially reverse ectatic astigmatism.

The idea of applying heat to reshape the cornea has existed for many years, with the most popular current method being Conductive Keratoplasty (CK). This utilizes a radiofrequency current and is approved for reduction of hyperopia and treatment of presbyopia. However, an extensive literature exists demonstrating its utility to treat astigmatism, including hyperopic astigmatism. It also has special utility in treating irregular astigmatism. CK also may be combined with ICRS, which allows even greater flattening in the areas of steepest curvature. CK has been used both outside the channels to allow asymmetric channel creation and also inside of the ICRS for additional flattening of the cone. It seems that additional effect can be obtained with the use of a combination of ICRS and CK in some patients. After placement of intracorneal ring segments in combination with conductive keratoplasty inside the ring, the astigmatism improved markedly. However, one of the major limitations of CK is the fact that its effectiveness decreases with time.

![Significant irregular astigmatism preoperatively (A). After placement of intra-corneal ring segments in combination with conductive keratoplasty inside the ring, the astigmatism improved markedly (B).](image-url)
Conclusion:

Ophthalmologists now enjoy a greater array of tools to correct astigmatism than ever before. They are able to target smaller amounts of astigmatism with greater accuracy, improving image quality and patient satisfaction. Furthermore, irregular astigmatism can be reduced in magnitude and made more regular. As the safety and effectiveness of modern astigmatism management continue to increase, both patient and surgeon expectations will rise as well.

REFERENCES:

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Role of B-Scan Ultrasonography in Detecting Posterior Segment Pathologies in Senile Mature Cataracts

Imran Ahmad FCPS¹, Junaid Faisal Wazir FCPS., M.Sc.², Muhammad Rafiq Afridi, FCPS³
Mubashir Rehman³, Muhammad Zeeshan Tahir³, Akbar Khan³

ABSTRACT:
Purpose: To document posterior segment pathologies in eyes with age related mature cataracts by using B-Scan ultrasonography.

Material and Methods: The study was conducted in Khyber Teaching Hospital Peshawar from August 2010 to July 2011. A descriptive observational study of 360 patients with age related mature cataracts underwent B-scan ultrasonography. 74.7% of the patients were between 51-70 years of age whereas the remaining were of more than 70 years with mean age of 66.25 years. Posterior segment pathologies on the basis B-scan ultrasonography were assessed.

Results: 53 eyes out of 360 (14.72%) had some ultrasonographically detectable posterior segment pathologies. In these pathologies posterior vitreous detachment were noted in 4.4%, vitreous hemorrhage in 4.2% and retinal detachment in 3.6% of patients.

Conclusion: B-scan ultrasonography should be performed in all patients with mature cataract in whom fundus is not visible with direct or indirect ophthalmoscopy to detect unseen posterior segment pathologies.

INTRODUCTION
Cataract is defined as any congenital or acquired opacity in the lens capsule or substance, irrespective of the effect on vision. It is the most common cause of reversible blindness in developing countries including Pakistan. It is responsible for visual impairment in 17.7 million people and is the largest single cause of blindness. An estimated 570,000 individuals are bilaterally blind from cataract in Pakistan and there are estimated to be 356,000 eyes with visual acuity of less than 6/60 as a result of cataract. In Pakistan the prevalence of mature cataracts in which the fundus details are not visible is about 30% through Mehr and Minassian classification system. The examiner is in dark about the possibility of posterior segment pathologies in mature cataract in which fundus is invisible to direct and indirect ophthalmoscopy. Ultrasonography is used as an additional diagnostic tool to evaluate the posterior segment pathologies.

Baun and Greenwood jointly reported the first application of “brightness modulated” B-Scan in ophthalmology. B-Scan USG examination is the safe, non-invasive, inexpensive, atraumatic and accurate means of evaluating the eye. Over the last 30 years ultrasonography has greatly advanced and this has enabled us to study posterior segment of the eye in the presence of opaque media. Most patients in developing countries have never had an ophthalmic examination till they present to the hospital with an advanced cataract for surgery. Its use in ruling out and diagnosing ocular pathologies has been described with high accuracy.

MATERIAL AND METHODS:
The study was carried out in outpatient department of Ophthalmology of Khyber Teaching Hospital, Peshawar from August 2010 to July 2011. 360 patients with mature cataracts in whom the fundus is not visible through direct or indirect ophthalmoscopy were included in the study through convenience sampling method.

RESULTS:
Patients with age more than 50 years with senile mature cataracts were selected for the study. In this age related cataracts, 269 patients (74.7%) were in the range of 51-70 years of age. Whereas 91 patients (25.3%) were of more than 70 years of age. The mean age was 66.25 years and standard deviation was +10.39. 199 eyes (55.3%) were male patients and 161 (44.7%) eyes were female patients. Out of 199 eyes of male patients, 25 eyes were having posterior segment pathologies.
making 47.17% of the total pathologies. Out of 161 eyes of female patients, 28 eyes were having posterior segment pathologies accounting for 52.83% of the total.

**Posterior Segment Pathologies:** 53 eyes out of 360 had some posterior segment pathologies. This was 14.72% of the total sample size. Posterior segment pathologies that were included in the study were retinal detachment, vitreous hemorrhage and posterior vitreous detachment. Other pathologies that were not included in my study but found on B-scan ultrasonography include Asteroid hyalosis in 5 patients (1.48%), Scleral thickening in 2 patients (0.55%) and posterior staphyloma in 1 patient. In this study the incidence of posterior segment pathologies increases with age. 91% of the posterior segment pathologies lie between 60 to 90 years of age in patients with mature cataracts.

**DISCUSSION**

Age related cataract occupies a major cause of decreased visual acuity in elderly 13. If the patient has some posterior segment pathology then examination and knowledge of these pathologies will help the surgeon in explaining the prognosis of cataract surgery to the patient preoperatively 10. In these age related cataracts most of the patients (74.45%) were in the range of 51-70 years of age. This is more than the study mentioned in American Academy of Ophthalmology, which showed that the prevalence of cataracts is 50% in people between the ages of 65 and 74 years 12. 9/360 patients (2.5%) were one eyed. These patients were handicapped due to mature cataract. They should be operated earlier by a senior surgeon and special care must be given to these patients.

Out of these 360 eyes with senile mature cataracts, 53 (14.72%) eyes were found to have posterior segment pathologies. These (14.72%) pathologies were close to the study done by Hanif M and colleagues that showed that 13.87% of the eyes were found to have significant posterior segment pathologies 9. In another study done by Ali SI and colleagues showed that 11% of the patients with non-traumatic mature cataracts have posterior segment pathologies 14. In the same study B-scan ultrasonography was performed of 82 post-traumatic mature cataract patients, which showed that 54/82 patients (65.85%) had ultrasonically detectable posterior segment pathologies. The figures of traumatic mature cataracts with posterior segment pathologies were much higher than non-traumatic mature cataracts.

The percentage of posterior segment pathologies in female patients was 52.83% and that of male eyes was 47.17% which showed no significant difference between the genders. A total of 13 eyes (3.6%) had retinal detachments which are almost equal to the study of Salman A, Parmer P and colleagues (4.1%). These patients were advised that they need retinal detachment surgery along with cataract extraction and only cataract surgery will not benefit the patient in terms of vision.

15 eyes (4.2%) had vitreous hemorrhage. The finding of vitreous hemorrhage of 4.2% is slightly lower than the study of Hanif M, Munir SM and colleagues (4.8%). Majority of the patients were having history of diabetes as vitreous hemorrhage is more common in proliferative diabetic retinopathy.

16 eyes (4.4%) had PVD. This figure of 4.4% is equal to the study done by Hanif M, and colleagues which showed the percentage of PVD in mature cataracts to be 4.3%. Other posterior segment pathologies found through B-scan ultrasonography were asteroid hyalosis in 5 eyes (1.38%), scleral thickening in 2 patients (0.55%) and posterior staphyloma in 1 eye. In these asteroid hyalosis are not

<table>
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<tr>
<th>Posterior Segment Pathologies</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
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</table>
Role of B-Scan Ultrasonography in Detecting Posterior Segment Pathologies in Senile Mature Cataracts

affecting vision, scleral thickening might be because of scleritis should be treated preoperatively and surgery should be delayed. In patients with posterior staphyloma extra care must be given while injecting local anesthesia because of the chances of globe perforation.

**Limitations:** As for as limitations of the study are concerned sometime mild vitreous hemorrhage may confuse with other vitreous opacities. In such cases the sensitivity of B-scan (gain) must be increased with better image resolution. It is some time difficult to differentiate between thick membrane and an RD. Vitreous membrane can attach to or near the optic nerve head and display a high reflectivity. Using the special technique of quantitative echography, one can differentiate between these two entities.

**CONCLUSION**
If we routinely do B-scan ultrasonography to patients with age related mature cataracts preoperatively when posterior segment examination is not possible through direct or indirect ophthalmoscopy, it will help us in the diagnosis of posterior segment pathologies. Knowledge of these hidden posterior segment pathologies will help the surgeon in explaining prognosis and expected outcomes of surgery to patients. He can modify his plan of surgery according to the posterior segment pathology and to take measures to combat various predictable complications.

**REFERENCES:**
ABSTRACT:

Aim: To identify the possible causes and modes of trauma to the anterior segment of the eye and its visual outcome.
Methods: It was a prospective case series of 200 patients with anterior segment ocular trauma, admitted to the Helpers Eye Hospital, Quetta, during a period of 12 month from 1st January 2010 to 31st December 2011. Blunt and perforating injuries which involve the anterior segment (cornea, conjunctive, corneo-sclera, iris, pupil, ciliary body and lens) were included in this study.
Results: 200 cases of anterior segment ocular trauma were studied in 12 months duration. The largest number of injuries occurred in 0-15 years age group (53-50%) available facilities. Blunt trauma was accounted for 48.50% and perforating injuries accounted for 51.50%. In Blunt injuries, traumatic cataract occurred in 44 patient, hyphema occurred in 18 patients, subluxation of cataractous lenses occurred in 4 patients and lens rupture occurred in 5 patient. By far the commonest agent was stone, twig sticks especially in children. In 103 cases of perforating injuries, 40 patients comes with traumatic cataract, (51.50%), 21 patient with traumatic hyphema, 1 patient with lens dislocation and 2 patient with lens rupture. The cornea being the most exposed portion showed the maximal site of perforation (76 cases), next was corneo-sclera (13%). The second frequent lesion was the lens changes (48%) and then uveal involvment in the form of uveal tissue prolapse, iridocyclitis, mydriasis, iris sphincter tears etc. visual acuity at the time of admission and discharge. Out of 200 eyes 144 (72%) showed very poor vision i.e 6/60 or less, 24 eyes showed vision below 6/18 and only 32 (16.0%) of eyes showed initial good vision. At admission 15 patients had no perception of light, which increased to 20 patients (10%) because of complication like Endophthalmitis and phthisis bulbi.
Conclusion: Ocular trauma is preventable cause of blindness and can result in serious loss of vision especially if treatment is delayed. Thus measures should be done to aware general population regarding preventive measures of ocular trauma.
Keywords: Trauma, ocular, preventable

INTRODUCTION:

Injuries to the eye are one of the most important health issue faced globally. Ocular trauma has always been a neglected subject when epidemiological data is concerned compared to other ocular problems such as cataract, trachoma and glaucoma etc., especially in Pakistan. Among the few studies available regarding the causes of blindness, ocular trauma is among the important ones, especially monocular blindness. According to one study the incidence of ocular trauma is 55 millions, 750 thousands of these require to be admitted in hospitals. Around 200 thousands have open globe injuries. The important thing about ocular trauma is to understand the fact that it is preventable cause of blindness. The importance of this study is to show the world not only about the frequencies of ocular trauma, but also to identify the possible sources of it as well, thus creating awareness regarding the risk factors of possible ocular trauma. It also helps in identifying the occupations that might make individuals more prone to ocular trauma. This study will also help in identifying the factors that might further worsen the visual consequences after ocular trauma. The aim of this study is to identify the possible causes and types of ocular trauma along with the type of ocular damage that can occur as a result of such consequences and its visual outcome.

MATERIAL AND METHODOLOGY:

It was a prospective case series of 200 patients with anterior segment ocular trauma, admitted to the Helpers Eye Hospital, Quetta, during a period of 12 months from 1st January 2010 to 31st December 2011. Blunt and perforating injuries which involve the anterior segment (cornea, conjunctive, corneo-sclera, iris, pupil, ciliary body and lens) were included in this study. Corneo-scleral perforation with uveal prolapse, traumatic cataract and hyphema, were dealt with utmost detail. Ocular finding in choroid, vitreous and well, thus creating awareness regarding the risk factors traumatic cataract and hyphema, were dealt with.
examination under general anesthesia (when needed), X-ray of orbit (antero-posterior and lateral views) and ultrasonography but computerized tomography (CT-scan) were not easily accessible because of financial reasons. The treatment regimen included bed rest, patching of involved eye, analgesia, topical antibiotics, cycloplegics, corticosteroid and intraocular pressure lowering drugs as and when required. Perforating injuries of the anterior segment were dealt with surgically using 8-0 virgin silk/ Vicryl/ 10-0 synthetic (ethicon) under microscope. Traumatic Cataract was removed by both intracapsular and extracapsular extraction. Traumatic primary hyphema was treated with bed rest and unocular patching. Secondary hyphema were treated surgically by anterior chamber washout, (paracentesis) when the eyes were endangered by glaucoma and corneal staining. Activity at the time of injury was classified as follows:

Play and sports, occupational, domestic, fire arm injuries and blast injures, fighting and assault, road traffic accident. Those in whom the injury could have been due to variety of activities or the history was not clear were designated as miscellaneous.

RESULTS

200 cases of anterior segment ocular trauma were studied in 12 months duration. Male (84%) were affected more than female (16%), a ratio of 5:1. Children were most commonly affected, the incidence in age group 0-15 years was (53.50%), 16-30 years, (27.50%), 30 years (19.0%). The largest number of injuries occurred in 0-15 years age group (53.50%), most of these patients were male child. The next large numbers were in 16-30 years age group (27-50%); most of these patients were men. The incidence of eye injury fell rapidly after 40 years of age, with only a handful of patients in 60-70 years age group. Table-1 shows gender distribution with respect to age groups.

The interval between trauma and consultation varied considerably. 25% of the patients were seen within 24 hours of the eye injury. 28% of the patients were seen within 2-7 days. 47% of the patients were seen after one week. This long interval between injury and consultation was due to difficulty in getting expert medical attention in time or failure of the patients to make use of available facilities. Difficulty in financing long journeys was also a problem in Baluchistan. Trauma were classified as blunt and perforating. Blunt trauma accounted for 48.50% and perforating injuries accounted for 51.50%. In blunt injuries, traumatic cataract occurred in 44 patient, hyphema occurred in 18 patients, subluxation of cataractous lenses occurred in 4 patients and lens rupture occurred in 5 patient. By far the commonest agent were stone, twig sticks especially in children. In 103 cases of perforating injuries, 40 patients comes with traumatic cataract, (51.50%). 21 patient with traumatic hyphema, one patient with lens dislocation and two patient with lens rupture. The cornea being the most exposed portion showed the maximal site of perforation (76 cases), next was corneo-sclera (13%). The second frequent lesion was the lens changes (48%) and then uveal involvement in the form of uveal tissue prolapse, iridocyclitis, mydriasis, iris sphincter tears etc. The incidence of hyphema was 22%. The most common cause of anterior segment trauma was accident during play in children (97 patients, 48.50%). Out of 97 patients, 88 were under 15 years of age, in which 66 were male and 22 female. Only 9 cases were effected during play and sports in adults. At all ages the prominent sex was male, this is mainly because of children being engaged in aggressive activities like throwing stone (24 cases male, 15 female), hitting with stick (20 cases) pieces of glass, metal, sharp, instrument (knife), air-gun (5 cases), mud-ball (4 cases), disposable syringe (2 cases), finger, fist (3 cases), cricket ball (2 cases).

The second major group fell into the category of occupational (12.50%). The commonest cause was flying particles while using a hammer and chisel and majority patient had intraocular foreign body. Out of 25 cases, 17 were male 6 female above 16 years age, only 2 cases were below 16 years of age. The third major group was fire injuries due to explosion (12.00%). Out of 24 patients, 22 patients were injured by bomb blast, mine blast etc. very few patient were injured by shotgun and bullet, explosions usually affected both eyes and often caused serious damage, Corneo-scleral perforation was the most prevalent injury and intraocular or intra-orbital foreign body was present in majority of patient. Rate of infection was higher. Most of the patient were in the 16-30 or above 30 years of age group. The delay between injury and admission varied from 2-7 days. Primary repair was possible in 15 patient while 10 were eviscerated because of irreparable damage. Traumatic cataract was dealt surgically. The fourth major group was domestic injuries (10.50%). Common causes of domestic injuries were knives, scissors, stone, needles, children fingers and toys etc. 8.50% resulted from accidents in the home. Injuries during fighting and assault accounted for 10.0%. Road traffic accidents accounted for 6.50% of all cases. Road traffic accidents usually affected both eyes. Table 3 shows visual acuity at the time of admission and discharge. At admission 15 patients had no perception of light. This (7.50%) increased to 20 patients (10%) after surgery. This increase was because of complication like...
Endophthalmitis and phthisis bulbi which occurred later on at the time of discharge instead of appropriate treatment. In six patients (3%) visual acuity could not be assessed due to young age. Out of 200 eyes 144 (72%) showed very poor vision i.e 6/60 or less, 24 eyes showed vision below 6/18 and only 32 (16.0%) of eyes showed initial good vision.

<table>
<thead>
<tr>
<th>Table 1: Sex distribution among 200 patients.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age category</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>0-15 Years</td>
</tr>
<tr>
<td>16-30 Years</td>
</tr>
<tr>
<td>&gt;30 Years</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Of 200 cases only 12 cases (6.0%) had spastic miosis. There were 14 cases (7.0%) of pupillary margin tears. The iris stromal tears occurred in 19 cases (9.50%). Tears of the pupillary margin involved the sphincter muscle. And multiple tears resulted in abnormal pupillary function. 18 (9%) eyes had iridodialysis which varied from small to large defects. Thirteen eyes (6.50%) had hole in iris. Most of these cases were affected from bomb blast injuries. There were 52 cases (26.0%) of iris prolapse from the corneal tear. Traumatic hyphema, occurred in 44 patients (22.0%) out of 200 patients. Highest number of patients presented with grade II (14, 7.0%), and grade III hyphema (11, 5.50%). Frequencies and percentages of hyphemas shown in table 4. Number of patient with total hyphema were 6, (3%). In 30 patients hyphema absorbed within a week.

Eighteen patients (90.00%) developed raised ocular tension. Corneal staining occurred in 6 patients (3.0%). Of these, majorities came with re-bleeding (10 Patients). Gonioscopy was routinely performed on follow up examination. Only 80 patients came for follow up. Out of these, gonioscopy was performed on 60 eyes. Twenty eight eyes showed recession of Angle. All cases were associated with hyphema. During follow up, which ranged from 2 months to 12 months, no eye with angle recession developed glaucoma. Traumatic cataract was observed in 84 eyes (42.0%), 44 cases were associated with blunt trauma and 40 cases occurred with perforating injuries. In 5 cases of blunt trauma and two cases of perforating the anterior capsule was ruptured and free lens matter was lying in the anterior chamber. 5 cases (2.50%) had subluxation of lens.

3 sub-luxated lenses developed cataract. Extracapsular extraction was performed in 40 cases (20.0%) and intracapsular extraction in 16 cases (8.0%). Intraocular lens implant was done only in two cases. Remaining twenty six eyes did well with conservative treatment.

<p>| Table 2: Cause of injury with regards to age and sex. |</p>
<table>
<thead>
<tr>
<th>Age category</th>
<th>Cause</th>
<th>M</th>
<th>F</th>
<th>M</th>
<th>F</th>
<th>M</th>
<th>F</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15 years</td>
<td>Play and sports</td>
<td>66</td>
<td>22</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>97</td>
<td>48.50</td>
</tr>
<tr>
<td></td>
<td>Stone</td>
<td>24</td>
<td>15</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>20.00</td>
</tr>
<tr>
<td></td>
<td>Stick</td>
<td>20</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>11.50</td>
</tr>
<tr>
<td></td>
<td>Air gun</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>Toy Pistol</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Mud ball</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Cricket ball</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1.00</td>
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<tr>
<td></td>
<td>Disposable Syringe</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>Finger and Fist</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>6.50</td>
</tr>
<tr>
<td></td>
<td>Piece of glass and metal</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Occupational</td>
<td>2</td>
<td>0</td>
<td>17</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>12.50</td>
</tr>
<tr>
<td></td>
<td>Domestic</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>1</td>
<td>21</td>
<td>10.50</td>
</tr>
<tr>
<td></td>
<td>Fire arm injury</td>
<td>4</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>24</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td>Bullet</td>
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<td></td>
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<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Gun Shot</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Bomb blast</td>
<td>3</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>22</td>
<td>11.00</td>
</tr>
<tr>
<td></td>
<td>Fight and assault</td>
<td>2</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>20</td>
<td>10.00</td>
</tr>
<tr>
<td></td>
<td>Road Traffic Accident</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>13</td>
<td>6.507</td>
</tr>
<tr>
<td></td>
<td>Miscellaneous</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00</td>
</tr>
</tbody>
</table>

Total 200

M = Male, F = Female
Ocular Trauma in Balochistan

DISCUSSION

Ocular trauma has always been and will remain a problematic challenge to the ophthalmologist. In this violent and sophisticated age of the motor car and the urban guerilla both number and severity of these injuries are increasing. Eye injuries are the most common cause of monocular blindness, a lifelong disfiguring disability. The source of traumatic hazard will vary according to the local environment. Agricultural areas can be compared with industrial areas nor one industry with another. In developed countries many injuries are due to road accidents and sporting mishaps. In developing countries with a lower density of population, very different proportions are seen. Manual work rather than automation increases occupational injury. The age distribution of this study as well as in many other studies indicate that anterior segment ocular injuries mainly occur in young people. A study by Panda, et al in India also indicates that more than half injuries (52.4%) occurred in the 0-14 years age group, the percentage given by different authors was 34-47%. A study by Khan, et al in the Province of Khyber Pukhtunkhawa problems of Pakistan (1988) also indicate that maximum numbers of cases of ocular injuries occurred in the age group 0-15 years (43.73%). In our study of 200, the incidence in age group (years) was 53.50%.

In our study male children were affected more than the female with a ratio of 5:1. The predominance of male children could be due to more outdoor games being played by boys and higher ratio in adults was perhaps because of the male population being the wage earing group and hardly any female working in industries.

In our province like Baluchistan where poverty supervenes, it was expected that children injuries would predominate. The cause being the types of aggressive games played by children and lack of supervision of parents in medium and low class families. Similar situation has been observed in Khyber

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Table 3: Visual acuity (200 cases).

<table>
<thead>
<tr>
<th>Visual acuity</th>
<th>At admission No</th>
<th>Percentage</th>
<th>At discharge No</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/6 - 6/12</td>
<td>20</td>
<td>10.00</td>
<td>32</td>
<td>16.00</td>
</tr>
<tr>
<td>6/18 - 6/24</td>
<td>13</td>
<td>6.50</td>
<td>24</td>
<td>12.00</td>
</tr>
<tr>
<td>6/24 - 6/60</td>
<td>20</td>
<td>10.00</td>
<td>37</td>
<td>18.50</td>
</tr>
<tr>
<td>CF</td>
<td>31</td>
<td>15.50</td>
<td>51</td>
<td>25.50</td>
</tr>
<tr>
<td>HM</td>
<td>32</td>
<td>16.00</td>
<td>14</td>
<td>7.00</td>
</tr>
<tr>
<td>PL</td>
<td>63</td>
<td>31.50</td>
<td>16</td>
<td>8.00</td>
</tr>
<tr>
<td>NPL</td>
<td>15</td>
<td>7.50</td>
<td>20</td>
<td>10.00</td>
</tr>
<tr>
<td>Can't be assessed</td>
<td>6</td>
<td>3.00</td>
<td>6</td>
<td>3.00</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Distribution of the cause of traumatic hyphema, cataract and perforating ocular trauma.

<table>
<thead>
<tr>
<th>Cause of injury</th>
<th>HYPHEMA</th>
<th>CATARACT</th>
<th>perforating ocular trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play &amp; sports</td>
<td>21 (47.73%)</td>
<td>34 (40.48%)</td>
<td>50 (48.54%)</td>
</tr>
<tr>
<td>Fight &amp; assault</td>
<td>4 (9.09%)</td>
<td>13 (15.48%)</td>
<td>12 (11.65%)</td>
</tr>
<tr>
<td>Domestic</td>
<td>4 (9.09%)</td>
<td>14 (16.67%)</td>
<td>9 (8.74%)</td>
</tr>
<tr>
<td>Occupational</td>
<td>3 (6.82%)</td>
<td>10 (11.90%)</td>
<td>16 (15.53%)</td>
</tr>
<tr>
<td>Fire arm injury</td>
<td>5 (11.36%)</td>
<td>10 (11.90%)</td>
<td>10 (9.71%)</td>
</tr>
<tr>
<td>Road Traffic Accident</td>
<td>5 (11.36%)</td>
<td>2 (2.38%)</td>
<td>5 (4.85%)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1 (2.27%)</td>
<td>1 (1.19%)</td>
<td>1 (0.97%)</td>
</tr>
</tbody>
</table>

Table 5: Effect on lens

<table>
<thead>
<tr>
<th>Cause of injury</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>104</td>
<td>52.00</td>
</tr>
<tr>
<td>Dislocation</td>
<td>5</td>
<td>2.50</td>
</tr>
<tr>
<td>Cataract</td>
<td>84</td>
<td>42.00</td>
</tr>
<tr>
<td>Rupture</td>
<td>7</td>
<td>3.50</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Management of cataract

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOL Implant</td>
<td>2</td>
<td>1.00</td>
</tr>
<tr>
<td>ICCE</td>
<td>16</td>
<td>8.00</td>
</tr>
<tr>
<td>ECCE</td>
<td>40</td>
<td>20.00</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>29.00</td>
</tr>
</tbody>
</table>
Ocular Trauma in Balochistan

Pukhtunkhawa Province of Pakistan and in India. In our study of 200 cases, majority of injuries occurred during play (97 cases, 48.50%). The common causes of injuries in children were stones, stick, pieces of glass, metal, sharp object (like scissor, knife) air-gun, balls etc. The second major cause of anterior segment trauma was due to occupation. In developing countries like ours, the industrial accidents are mostly hours and little leisure time also increases accidents due to fatigue, in developed countries, on the other hand industrial accidents are declining due to better working condition and safety measures, in our study the commonest cause was flying object while using a hammer and chisel without any safety measures. The third major group was firearm injures due to explosive material (11.0%). Explosions usually affected both eyes and often caused serious damage. 22 patient (11%) were affected and majority of them (11 patient,50%) belong to 16-30 years age group. 20 patient ware male and 2 female. The reason for bomb blast injury was typically seen in wars and only occasionally in civilian life where they occur during industrial accidents, quarrying and mining. 20% of the ocular injuries in hilly areas of northern India have been reported to have resulted from blasting operation. Perforating injuries were the commonest type of injury in this study, while in other studies in ocular trauma, non perforating injures were more common.

A similar high incidence of perforating injuries was reported in a study of civilian blast injuries from India. The fourth major group was domestic injuries (10.50%). The injuries sustained during domestic work were much less in children (3%) in comparison to adults (7.50%). Similar situation has been observed in India.

Injuries during fighting and assault accounted for 10.0%. Twenty patients were affected and all were male. Majority of them (10 patients, 50.0%) belong to 16-30 years age group and 8 patients belong to > 30 years age group. In adult common causes were fighting with stone, stick, fists and kicking. Road traffic accidents accounted for 6.50% of total injuries. The typical ocular damage following road traffic accidents, a perforating eye injury associated with facial laceration is generally sustained by front seat who does not wear a seat belt. Mackey found that 70% of serious eye injuries in road traffic accident were attributable to splintering of toughened glass wind screens. While in those countries using laminated glass wind screen reported almost no eye injuries. Use of sea-belt and laminated wind screens to all vehicles is strongly recommended.

In developed countries many injuries are due to road accidents mishaps and most prevalent cause of bilateral injury in UK at present is the road accident. One recent and dreadful injury was caused by disposable but not properly disposed needles. They are picked up by young children to squirt water at each other and during the process insert the needles in either their own or their playmates eyes. Two such injuries were recorded and both lost their eyes because of endophthalmitis.

Visual acuity of 144 (72.0%) showed very poor vision, 24 (12.0%) eyes showed vision below 6/18 and only 32 (16.0%) of eyes showed initial good vision. Majority of case (72.0%) showed poor vision in traumatized eye. The cause may be due to central involvement, hyphema, total cataract or posterior segment involvements. The high rate visual disabilities in our study may be due to following factors:

Study was limited to severe forms of eye injuries and the hospital being a referral one, is the only big Eye Hospital (as the tertiary hospital) in Baluchistan, most of the patient were referred quite late. Damage to the eye at the time of injury was so severe that useful vision could not be restored. Blindness from injury can best be prevented by removing the cause of the injury but once injury has occurred, the prevention of blindness depends on the efficiency of management.

It needs to emphasize that most of perforating anterior segment trauma are not absolute emergencies, the patient can be put to bed, proper test done, pre-operative antibiotics and steroid given and best team present for surgical repair. Management of trauma has greatly improved due to advent in microsurgery, finer instruments and suture material, antibiotic, better sterility and earlier patient's ophthalmologist contact. In our study the management of trauma was very poor because of non-availability of modern facilities, delay in attending doctor, and dealing of the trauma emergencies by inexperienced surgeons on call. Therefore not only constant efforts should be made to improve its management, major attention should be given to its prophylaxis. Khan (1991) drawn our attention to the value of prevention of ocular injuries which may be achieved through the following Recommendation:

a) To obtain wide statistics on the magnitude of the problems, a trauma registry should be maintained in all department of Ophthalmology throughout the country.

b) The repetitive natures of certain trauma should be recorded and reported.

c) Few ocular trauma centers should developed in the country which should not only offer excellent services but should also conduct research into the
causes, mechanism, effects and prophylaxis of eye injuries,

d) Public awareness should be created through public health education against hazardous toys and games like BB Guns, explosives, golidanda, catapults, sharp needles and sharp kitchen and other house hold effects. Certain classes of society like young parents, school teachers, managers at work and sports should be made special targets of such public health education campaign.

e) General education with special emphasis on social values should help in return of the society to a more civilized behavior.

f) The ophthalmological Society should constantly remind the government of its responsibilities by sending its yearly reports and recommendations. In the light of which the government may voluntarily or through pressure of public campaign enact and enforce mandatory laws in favor of such proven prophylaxes like seat belts, protective devices in sports, at work and in such undesirable states like wars. Certain dangerous games and practices may be banned through such laws or at least modified to make it less dangerous.

REFERENCES


Ultraviolet Keratitis
Seema Garg, MD, PhD, & Matej Polomsky, MD,
University of North Carolina,

A 66-year-old man presented with sudden bilateral pain and decreased vision 12 hours after repairing a defective ultraviolet light box at work. He had decided not to use protective eyewear because the estimated time of exposure was less than one minute. Visual acuity had decreased to 20/60 in both eyes.

Slit-lamp examinations (1A and 1B) of the left eye demonstrated bilateral conjunctival injection in the interpalpebral fissure and diffuse punctate epithelial erosions. The patient was treated conservatively with topical lubricating ointment. By the following day, the pain had completely resolved, and the visual acuity improved to 20/30 in both eyes. Repeat examination was consistent with almost complete resolution of the bilateral conjunctival injection and punctate epithelial erosions.

The diagnosis was ultraviolet keratitis. The brief exposure to ultraviolet light caused significant conjunctival and corneal epithelial cell loss in the interpalpebral fissure, leading to symptoms of severe pain and decreased vision. Notably, the portions of the conjunctiva and cornea under the eyelids were unaffected because they were protected from direct exposure. Fortunately, ultraviolet keratitis is usually self-limiting, and the corneal epithelium responds well to supportive therapy. (Courtesy: EyeNetAAO)
Advances in the Surgical Correction of Presbyopia

George O. Waring IV, MD, Duncan E. Berry, BA
International Ophthalmology Clinic

ABSTRACT
Presbyopia is a common visual disability of the aging eye. Worldwide, corneal inlays, presbyopia-correcting intraocular lenses (PC-IOLs), conductive keratoplasty, presbyLASIK, intrastromal correction with the use of femtosecond technology (INTRACOR), and scleral modifications are available for this emerging subspecialty. The purpose is to provide an overview of the surgical procedures and related devices currently in use or in development for the treatment of presbyopia.

Inlays for Presbyopia

Background: Our understanding of corneal physiology has matured largely because of studies on tolerance of intrastromal prosthetic devices. In general, an intrastromal implant for the management of presbyopia should possess the following characteristics: thin, small diameter, high nutrient fluid permeability and should be implanted relatively deep in stroma depending on the intended mechanism of action.

Large, impermeable intrastromal inlays can impede metabolic or dehydration processes in the cornea as adequate glucose supply from the aqueous humor anterior to the inlay is essential to prevent anterior stromal necrosis. Superficial implantation can also lead to unintended abrupt surface curvature changes and possible extrusion by mechanical means.

Surgical Technique and Theory:

With the exception of intended depth of inlay placement, the surgical principles for implanting corneal inlays are similar among devices. Patients that are near dominant may prefer to have the inlay implanted in their distance dominant eye. Inlays may be placed in a stromal pocket or under a lamellar flap. The pocket technique provides a number of potential advantages. First, the majority of peripheral corneal nerves are preserved, which allow for maintained corneal sensitivity and potentially quicker visual recovery. Like all surgical procedures, less manipulation typically leads to quicker recovery and better outcomes. Placement depth will vary for each inlay design as each have different material properties and dimensions that must respect the physiology of the cornea. Depth of implantation plays a role in the corneal remodeling process and can affect inlay performance. Inlays designed to intentionally alter surface curvature tend to be implanted more superficially. Other inlays designs that utilize a different index of refraction or small aperture are typically implanted deeper to avoid surface curvature changes.

Small Aperture Inlay: The KAMRA inlay (by AcuFocus Inc.) is a small aperture corneal inlay for treatment of presbyopia. The inlay utilizes the pinhole effect to increase depth of field by selecting for central light rays and minimizing refraction. The KAMRA inlays are implanted into a femtosecond laser enabled pocket at a depth of 200 μm. It is a 5-μm-thin biocompatible polyvinylidene fluoride disc. The 1.6-mm central annulus acts as a pinhole. A combined LASIK and KARMA implantation procedure is gaining popularity for the simultaneous treatment of ametropia and presbyopia, where the inlay is placed under a 200-μm LASIK flap after an Excimer ablation. The KAMRA continuously compensates for the progressive loss of accommodative amplitude by means of improvement in depth of focus with a small aperture.

Acknowledgment: Ophthalmology Update is highly gratified to Dr. George O Waring, for permitting to publish the excerpts from his original article.

Figure 1. Postoperative slit-lamp photo of a KAMRA small aperture inlay.
Tomita and colleagues reported 6-month data on 128 eyes evaluating the safety and efficacy of bilateral LASIK with simultaneous implantation of a KAMRA inlay in the non-dominant eye. The mean logMAR UCNA in the eye with the inlay improved 7 lines in hyperopic eyes, 6 lines in emmetropic eyes, and 2 lines in myopic eyes. The Raindrop corneal inlay, formerly known as the Presbylens and then the Vue+ (ReVision Optics, Lake Forest, CA), was developed in 2007 for the treatment of plano-presbyopia. The Raindrop is a permeable hydrogel lenticule, which allows for fluid and nutrient flow. The proprietary hydrogel-based material has a water content and refractive index similar to that of the human cornea. The inlay is inserted under a LASIK flap or into a corneal pocket at a depth of approximately 120 to 130 μm in the non-dominant eye. The lenticule improves near and intermediate by inducing a differential surface curvature change resulting in a multifocal cornea. All subjects reported that they were satisfied with the surgery and able to perform typical near tasks without glasses.

The Flexivue Microlens (Presbia, Amsterdam, the Netherlands) is the only corneal inlay in development, utilizing refractive add power. The Microlens is composed of a hydrophilic acrylic polymer, measuring 3 mm in diameter with an edge thickness of 20 μm. This bifocal optical inlay has separate distance and near focal points. The central zone is free of refractive power, and the peripheral zone has a standard refractive power with an index of refraction higher than that of the cornea generating +1.25 to +3.00 D of add power. The Microlens is inserted into a stromal pocket with an insertion device into the non-dominant eye concentric with the estimated line of sight.

Multifocal Refractive Inlay: The Icolens (Neoptics AG, Hunenburg, Switzerland) is the most recent corneal inlay in development. This hydrophilic acrylic hydrogel lens combines a neutral central zone with a peripheral optical zone of 3 D. This bifocal design delivers 2 images on the retina simultaneously, like a multi-focal intraocular lenses (IOL). Distance vision is preserved with combined refractive effects of the pupil surrounding the lens and the central (neutral) zone of the lens. The peripheral positive refractive power of the lens provides near vision correction. This lens uses a proprietary inserter to deploy the inlay into a femtosecond enabled corneal pocket.

**PC-IOLS**: The current choices in PC-IOLS include refractive multifocal IOLS, diffractive multifocal IOLS and accommodating IOLS. A proper clinician understanding of the advantages and shortcomings of each IOL design, as well as thorough patient counseling, is necessary to attain the most desirable outcome. PC-IOLS can also be combined, 1 in each eye, to increase a patient's range of near-intermediate vision, although this trend is becoming less common with advancements in IOL designs.

**Multifocal IOLS**: As the name implies, multifocal IOLS have multiple focal points, which produce multiple images at different focal ranges. It has been confirmed clinically that the patient primarily perceives only the focused image of interest. The two broad categories of multifocal IOLS in use today are refractive and diffractive lenses.

**Diffractive Multifocal IOLS**: Diffractive multifocal IOLS are based on the principle of diffraction, whereby IOLs utilize microscopic steps, or diffractive zones, across the lens surface. Diffractive multifocal IOLS can be further subcategorized as *apodized* or *non-apodized*.

**Apodized Diffractive Multifocal IOLS**: The critical feature of an apodized lens is the gradual reduction in diffractive step heights from center to periphery. The AcrySof ReSTOR (Alcon Lab Inc., Fort Worth, TX) is an apodized, diffractive, single-piece, foldable, hydrophobic acrylic, posterior chamber IOL (Alcon Lab Inc.). The ReSTOR has a central 3.6-mm apodized diffractive optic region and a refractive peripheral portion. The combination of the apodized diffractive region and the peripheral refractive region favors distance vision in mesopic conditions. The add power of ReSTOR is +4 D at the lens, which provides roughly 3.2 D of add at the spectacle plane. A toric version of the ReSTOR is also available.

**Non-apodized Diffractive Multifocal IOLS**: Non-apodized diffractive multifocal IOLS utilize diffractive
Mplus LS-312 (Oculentis GmbH), consists of a surface-embedded near section that makes the IOL independent of pupil sizes >2.0 mm. It is a single-piece, square-edged IOL composed of a hydrophilic acrylic material with a hydrophobic surface and is available with a +3 D or +1.5 add.

The newest design based on the concept of rotation asymmetry is the FineVision IOL (Liège, Belgium) that is a trifocal design based on the idea of combining 2 diffractive profiles, 1 for distance and near and 1 for distance and intermediate. The lens features 2 kinoform patterns—1 for intermediate vision and 1 for near vision. The first pattern has a +3.5 D add as the first diffraction order and the second pattern has a vergence of 1.75 D in the first order and 3.50 D in the second order. Investigators demonstrated that the FineVision IOL provided an intermediate addition of 1.75 D.

Refractive Multifocal IOLs: There are 2 general types of accommodating IOLs on the market, single-optic and dual-optic. Single-optic accommodating IOLs aim to correct presbyopia by altering the focal length of the IOL-eye optical system primarily by anterior movement of the lens and changes in the lens architecture. The dual-optic accommodating IOL design is based on the observation that the degree to which an IOL can contribute to accommodation depends not only on the amplitude of axial displacement, but also on the power of the displaced IOL. Hara et al. hypothesized that by adding a second optic of opposite power, a greater accommodation range can be reached.

Single-optic Accommodating IOLs: The Crystalens accommodating IOL (Fig. 4; Bausch+Lomb, Aliso Viejo, CA) is an FDA-approved single-optic lens that features flexible hinges at the plate-style haptic to facilitate anterior motion. The original clinical trial reported about 1 D of accommodation. The lens has demonstrated good clinical outcomes with 88% of patients achieving 20/40 vision or better for their distance, intermediate, and near vision as compared with 36% of standard IOL patients. One mechanism that has been suggested to contribute to the observed accommodation, or pseudo-accommodation is flexing of the optic itself as is seen during accommodation of the natural crystalline lens. This mechanism contributed to the design of the Tetraflex accommodating IOL (Lenstec, St Petersburg, FL) that is a single-piece posterior chamber IOL with flexible 10-degree anteriorly angulated closed-loop haptics and a spherical optic. Sanders et al. demonstrated that functional reading ability was better with the Tetraflex as compared with the Crystalens with a statistically higher proportion of patients.
curvature central to the band. The amount of corneal steepening is controlled by treating placement, intensity, and duration. In theory, the energy delivery is self-limiting as denaturation of collagen increases resistance to the current flow. The advantages of conductive keratoplasty over laser reshaping of the central cornea are that it preserves the optical clarity of the visual axis and does not involve any tissue removal. It is used to correct low to moderate levels of hyperopia and astigmatism in ammetropes as well as eyes made ammetropic because of LASIK or cataract surgery. More recently, it is also used to induce mono-vision in presbyopes.

**Surgical Technique and Theory:** The conductive keratoplasty system consists of a radiofrequency (RF) energy-generating console, reusable corneal marker, lid speculum, hand piece, disposable keratoplasty tip, and a foot pedal controller (Fig. 5). Conductive keratoplasty treatment spots are evenly spaced in a ring pattern of 6, 7, and/or 8 mm in diameter (Fig. 6). The CK procedure can be performed under topical anesthesia. In standard conductive keratoplasty (CK), the probe tip depresses the corneal surface 5 to 7 mm while applying radiofrequency (RF) energy. This causes a mechanical stretching effect on the corneal fibers that resists the natural tendency of the tissue being drawn toward the pulse of RF energy. In LightTouch CK, pressure of the probe on the cornea is neutral, or about 2 mm. This low-compression technique may produce more robust results by minimizing the corneal stretching associated with the standard CK technique.

**Dual-optic Accommodating IOLs:** The dual-optic accommodating IOL uses 2 lenses, 1 of high power and 1 of negative power, typically with the higher power lens anterior and the negative power lens posterior along the visual axis. For example, the Synchrony IOL (Visiogen, Abbott Park, IL) has a +32 D front optic connected by spring haptics to a posterior optic of variable negative power. In clinical trials, it has demonstrated a mean accommodative range of 3.22±0.88 D. The Synchrony requires a larger 3.8-mm incision that induces postoperative astigmatism.

**Other Accommodating IOLs:** IOL optics that can change their curvature with accommodation such as the NuLens (Nulens, Herzliya Pituah, Israel) and the FluidVision Lens (PowerVision Inc., Belmont, CA) as well as electro-active optics such as the Elenza (PixelOptics, Roanoke, VA) are in clinical trials.

**Conductive Keratoplasty:**

Over the years, a variety of methods have been used to induce refractive change by selective heating of the cornea, including radial thermal keratoplasty, holmium-YAG laser thermo-keratoplasty, CO₂ laser thermo-keratoplasty, and diode laser thermo-keratoplasty. The most recent incarnation of thermo-keratoplasty developed by Mendez et al is conductive keratoplasty - the application of low-frequency radio waves to “shrink” collagen fibrils within the cornea. The low-frequency radio waves are delivered through a fine tipped probe applied to the corneal stroma. Corneal refractive change is produced by localizing the energy delivery to spots along a circumferential band in peripheral cornea. As the collagen shrinks, the band constricts and there is a steepening of the corneal curvature.

**Figure 4. Crystalens (Bausch+Lomb) single-optic accommodating intraocular lens.**

**Figure 5. The ViewPoint conductive keratoplasty System (Refractec Inc. Bloomington, MN)**

---

<table>
<thead>
<tr>
<th>Treatment Spots</th>
<th>Treatment Zone Diameter (mm)</th>
<th>Correction (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>7</td>
<td>0.75-0.875</td>
</tr>
<tr>
<td>16</td>
<td>6 and 7</td>
<td>1.00-1.0625</td>
</tr>
<tr>
<td>24</td>
<td>6, 7, and 8</td>
<td>1.75-2.25</td>
</tr>
<tr>
<td>32</td>
<td>6, 7, 8, and in between at 7</td>
<td>2.375-3.0</td>
</tr>
</tbody>
</table>
For peripheral presbyLASIK, the largest published study included 296 eyes and demonstrated that binocularly, 98% of patients achieved UDVA of 20/20 or better and 100% achieved 20/32 or better; 96% achieved UCNVA of J2 and 99% could read J3 or better. Several other studies have demonstrated similar findings. For central presbyLASIK, the results of UCVA are in between 0.8 and 1.0 for distance vision and J2 for near vision in the majority of patients.

Intra-stromal femtosecond ring incisions: Although the primary application of the femtosecond laser has been its use in the creation of the LASIK flap, its precision and safety make it a useful tool in many types of corneal refractive surgery, including the intrastromal correction of presbyopia (INTRACOR; Technolas Perfect Vision GmbH, Munich, Germany). This procedure was first described in 2009 by Ruiz and colleagues and creates a hyperprolate, multifocal cornea by making a series of intrastromal corneal ring incisions. The accepted pattern for presbyopia correction consists of 5 concentric rings that are cut in an area between 2.0 and 4.0 mm from the line of sight, which is marked before surgery using the first Purkinje image.

In the longest follow-up to date, Holzer et al recently reported that at 18 months, the median uncorrected near visual acuity (UNVA) improved significantly from 0.7 logMAR preoperatively to 0.2 logMAR (P<0.001). All 83 (100%) eyes had improved UNVA, with minimal or no change in UDVA. At 12 months, 22 eyes had UNVA improved to J1 with improvement in mean UDVA as well.

Corneal manipulation can be associated with a risk for keratectasia. Several cases of corneal ectasia have been reported after LASIK and photorefractive kerectomy. However, Holzer et al reported stable corneal steepening and found no significant changes in median pachymetry at the thinnest point over 12 months postoperatively.

Scleral Modifications:

Scleral spacing is based on the theory that the lens is under increased equatorial zonular tension during accommodation, and thus, any procedure that increases the distance between the lens equator and the ciliary muscle (thereby increasing tension) should reverse presbyopia.

There are 2 technologies under development that aim to correct presbyopia by modification of the sclerociliary complex—PresVIEWTM Scleral Implant (Refocus Group, Dallas, TX) and the LaserACE system (Ace Vision Group, Silver Lake, OH). The LaserACE procedure has received the CE mark and utilizes the VisioLite erbium-YAG laser (Ace Vision Group) to...
ablative 600-μm laser spots in the sclera which are presumed to free the ciliary muscle to contract normally. The spots delivered in a diamond matrix pattern of 9 laser spots into each oblique quadrant. At the 2011 ASCRS meeting in San Diego, Hippley and colleagues presented data from 134 eyes and reported a restoration of 1.25 to 1.5 D of accommodation which remained stable through 18 months. They also reported that 89% of patients had near UCVA of J3 or better postoperatively, 89% had intermediate UCVA of J3 or better and there was no statistically significant loss of distance visual acuity.

CONCLUSIONS

Advances in the surgical treatment of presbyopia are occurring at a rapid pace, and the refractive surgeon has many options for the surgical treatment of presbyopia. In fact, a new subspecialty of presbyopia-correcting surgeons is emerging, and rapid innovations in technology are sure to continue. With this multitude of new options available, understanding the design and mechanism of each will allow clinicians to match the most appropriate option for the patients' needs, anatomy, and optics to ultimately provide the best outcomes.

REFERENCES

Comparison of efficacy between Intra-vitreal (IVT) & Posterior Sub-tenon (PST) injection of Triamcinolone Acetonide (TA) for the Treatment of diffuse Diabetic Macular Edema (DME)

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Muhammad Arshad FCPS,1 Muhammad Farhan Saleem MBBS,1
Muhammad Tariq Aslam MBBS,3 Uraiba Naeem MBBS,3 Irfan Talib MBBS3
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ABSTRACT

Purpose: To compare the efficacy of IVT injection to the PST injection of TA for the treatment of diffuse DME.

Methods: Sixty patients with diabetes mellitus, presenting with diffuse diabetic macular edema were recruited for the study from 1 September 2012 to 1 March 2013. In the same patients one eye was assigned to 4.0 mg (0.1ml) IVT injection of TA and the fellow eye was treated with 40 mg (1.0ml) PST injection of TA. We measured visual acuity, Intraocular pressure (IOP), as well as the thickness of the macula with the help of optical coherence tomography (OCT) before treatment and at one, three and six months after the treatment.

Results: Eyes treated with PST showed 1-3 lines improvement in Snellen's acuity from their pre-injection baseline visual status. The eyes in IVT group showed 1-3 lines improvement in Snellen's acuity in 80% of eyes but 20% of the eyes did not display any benefit at all at the end of six months. This difference in acuity between an IVT injection and PST injection becomes significant six months after the treatment (p < 0.05). Macular thickness of the eyes treated with IVT injection was significantly reduced after one (222.7 ± 13.4 μm; p < 0.001) and three months (228.1 ± 10.6 μm; p < 0.001) of treatment.

Discussion: The eyes treated with PST injection displayed a slow response and significant improvement in macular thickness was observed only after three months (231.3 ± 10.9 μm; p < 0.001). The difference between the eyes treated with IVT injection (385.2 ± 11.3 μm) and those treated with PST injection (235.4 ± 8.7 μm) becomes significant six months after the treatment (p < 0.001). The IOP of the eyes treated with IVT injection was significantly increased after one (17.7 ± 1.1 mm/Hg; p < 0.020), three (18.2 ± 1.2 mm/Hg; p < 0.003) and six months (18.1 ± 1.320 mm/Hg; p < 0.007) when compared to baseline value (16.1 ± 1.4 mm/Hg). The eyes treated with PST injection displayed a slow and significant increase in the IOP after one month (16.4 ± 1.2 mm/Hg; p < 0.450), three (16.3 ± 1.1 mm/Hg; p < 0.630) and six months (16.2 ± 1.1 mm/Hg; p < 0.720) when compared to the baseline values (16.2 ± 1.3 mm/Hg).

Conclusion: PST injection is equally effective yet safer than IVT injection of TA for the management of diffuse DME.

Keywords: Diabetes Mellitus, Diabetic Macular Edema, Optical Coherence Tomography, Triamcinolone Acetonide.

INTRODUCTION:

Macular edema is the main cause of visual impairment in diabetic patients.1 Based on the observations of the Early Treatment Diabetic Retinopathy Study (ETDRS), diabetic macular edema (DME) has been classified as clinically significant if well-defined, specific clinical features are associated with retinal thickening at or within 1 disc diameter of the center of the macula or with definitive hard exudates in this region. For such a subgroup of patients, a clear benefit of focal laser photocoagulation has been demonstrated.2 However, the paucity of clinically significant gains in visual acuity after laser therapy as well as recrudescence or persistence of DME after appropriate laser treatment, particularly in eyes presenting diffuse macular edema2,3 has led investigators to seek alternative treatments for the management of DME.

Among alternative treatments currently under investigation for DME, the administration of triamcinolone acetonide (TA), either by intravitreal (IVT) injection4-11 or by posterior subtenon (PST) injection,12,13 has demonstrated somewhat promising results for the management of diffuse DME, whether refractory or primary.

Intravitreal triamcinolone injections are however associated with many ocular complications (i.e. elevation of intraocular pressure, endophthalmitis, intraocular hemorrhages, detachment of the retina)5,7,8. Posterter subtenon injection of steroids appears to offer a good alternative for the treatment of diabetic macular edema.10,11. This approach is less invasive than intravitreal injection and may deliver equivalent therapeutic quantities of TA to the macula.

The purpose of this study was to compare the efficacy between the intravitreal (IVT) injection and the posterior subtenon (PST) injection of TA for the treatment of diffuse diabetic macular edema (DME).

MATERIAL AND METHODS:

Permission for the study was taken from the local ethical committee of our hospital. Sixty patients(120
eyes) with diabetes mellitus and having diffuse diabetic macular edema were included in this study from 1st September 2012 to 1st March 2013. Twenty patients were males and forty were females with an age range 61 to 74 years (mean 68.3). A written informed consent was taken from all the patients before the commencement of the study, after explaining the procedures and the aims of the study. Patients with history of uveitis, previous ocular trauma, whether accidental or surgical, and the patients having history of glaucoma were excluded from this study.

All the patients participating in our study underwent a thorough clinical ophthalmic examination before the treatment. The best corrected visual acuity was assessed using Snellen’s chart. Anterior and posterior segment examination was performed using an ophthalmic slit-lamp and a +90D indirect fundus viewing lens. Intraocular pressure (IOP) was recorded using Goldman applanation tonometer. Macular edema was defined by macular thickening revealed with biomicroscopy using a +90D lens. Macular thickness was quantified by optical coherence tomography (OCT).

In the same patients one eye was assigned with a random method generated by a computer to intravitreal (IVT) injection of TA. One week after the IVT treatment of the first eye, and after excluding the appearance of complications (i.e. raised IOP, vitreous hemorrhage, endophthalmitis), the fellow eye was treated with posterior subtenon (PST) injection of TA. To avoid post-operative IOP rise, the patients undergoing IVT injection were prescribed a systemic treatment with acetazolamide, 250 mg two times daily, for two days before the injection.

For the IVT injection, the patient was placed supine and we performed a surface anesthesia with topical 0.5% proparacaine eye drops (Alcaine) followed by a preparation of the area with 5% povidone iodine. A volume of 0.1 ml (4 mg/0.1ml) preservative-free TA (Kenacort, Bristol-Myers Squibb) was injected through the inferotemporal pars-plana (4.0 mm posterior to the limbus), using a 30-gauge needle. Indirect ophthalmoscopy was used to confirm correct intravitreal localization of the suspension. After the injection topical 0.5% moxifloxacin eye drops (Vigamox) were prescribed for three days.

For the PST injection, the patient was placed supine and after topical 0.5% proparacaine (Alcaine) surface anesthesia, 1.0 ml (40 mg/ml) triamcinolone acetonide (Kenacort, Bristol-Myers Squibb) was given in the superotemporal quadrant using a 27-gauge needle on a 2.5-ml syringe. The patients were directed to look in the extreme inferonasal field of gaze. The conjunctiva and the Tenon’s capsule were penetrated with the bevel of the needle facing the globe. The needle was advanced toward the macular area, taking care that the bevel of the needle remains in contact with the sclera until the hub was firmly pressed against the conjunctival. The corticosteroid was then slowly injected. After the injection, topical 0.5% moxifloxacin (Vigamox) eye drops were prescribed to the patients. Subsequently, visual acuity and IOP were measured clinically and the macular thickness was quantified with the help of OCT at one, three and six months of treatment. The data was analyzed through computer software SPSS (Version 11). Chi-square test was used as a test of significance. Results were considered statistically significant at a p-value of < 0.05.

RESULTS:

The comparative improvement in Snellen’s acuity from baseline in terms of number of lines in both groups at the end of six months after TA injection is given in Table-II. The large number of eyes in both groups showed significant improvement in Snellen’s acuity up to 3-lines (50% in PST group versus 40% in IVT group) although the difference was not significant. The benefit of 2-lines acuity was seen in equal number of eyes (20%) in both the groups and 1-line improvement again was seen in 30% of PST group and 20% of IVT group, which again was not significant (Graph-I and II). In PST group there was not a single eye that showed no benefit from injection in terms of visual acuity improvement as compared to IVT group in which twelve patients (20%) failed to show an improvement in visual acuity of even one line (Table-I, Graph-III). This was statistically significant (p < 0.05). The eyes treated with IVT showed a rapid gain in visual acuity in first month as compared to PST group but then showed significant worsening of visual acuity with the passage of time whereas eyes treated with PST displayed a gradual response and showed a maintained visual acuity improvement (Graph-I, II, III). This response of late worsening of acuity in IVT group and gradual but sustained improvement in PST group was quite correlated with the changes in macular thickness values on OCT in both groups.

The macular thickness values before triamcinolone acetonide injection and after one, three and six months of injection are shown in Table-II. In IVT TA group thickness values were significantly reduced both after one month (222.7 ± 13.4 μm; p < 0.001) and after three months (228.1 ± 10.6 μm; p < 0.01) when compared to the baseline values (231.3 ± 12.4 μm). The eyes treated with PST injections displayed significant improvements in macular thickness after one month (220.1 ± 15.1 μm; p < 0.001) and after three months (231.3 ± 20.2 μm; p < 0.05) when compared to the baseline values (386.3 ± 24.2 μm).
Comparison of Efficacy Between Intra-vitreal (IVT) & Posterior Sub-tenon (PST) Injection of Triamcinolone Acetonide (TA)

± 10.9 μm; p < 0.001) of treatment when compared to the baseline values (384.1 ± 18.9 μm). Here too the difference in macular thickness of the eyes treated with IVT (385.2 ± 11.3 μm) and those treated with PST (235.4 ± 8.7 μm) becomes significant six months after the treatment (p < 0.001). Fig-I illustrates the changes in the macular thickness values on OCT in the PST injection group.

The mean intraocular pressure (IOP) before triamcinolone acetonide injection and after one, three and six months are shown in Table-IV. The IOP of the eyes treated with IVT injection was significantly increased after one month (17.7 ± 1.1 mm/Hg; p < 0.020), three months (18.2 ± 1.2 mm/Hg; p < 0.003) and six months (18.1 ± 1.32 mm/Hg; p < 0.007) when compared to baseline value (16.1 ± 1.4 mm/Hg) but glaucoma medication was not needed to control this rise in IOP. The eyes treated with PST injection displayed no significant increase in the IOP after one (16.4 ± 1.2 mm/Hg; p < 0.450), three (16.3 ± 1.1 mm/Hg; p < 0.630) and six months (16.2 ± 1.1 mm/Hg; p < 0.720) when compared to the baseline values (16.2 ± 1.3 mm/Hg). The difference of IOP between eyes treated with an IVT injection and those treated with a PST injection becomes significant at three (p< 0.026) and six (p<0.030) months (Graph-IV and V).

Figure-I: OCT Images of DME:
2A = Macular OCT before PST injection of TA.
2B= Macular OCT three months after PST injection TA.

### Table: I Gender Distribution of patients.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number (eyes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PST</td>
<td>IVT</td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
</tr>
<tr>
<td>Female</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

### Table: II Changes in Visual Acuity of treated patients:

<table>
<thead>
<tr>
<th>Gain in Visual Acuity</th>
<th>Number Of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PST Group</strong></td>
<td><strong>IVT Group</strong></td>
</tr>
<tr>
<td>3 Lines</td>
<td>30 (50%)</td>
</tr>
<tr>
<td>2 Lines</td>
<td>12 (20%)</td>
</tr>
<tr>
<td>1 Line</td>
<td>18 (30%)</td>
</tr>
<tr>
<td>No Line</td>
<td>0* (0%)</td>
</tr>
</tbody>
</table>

* p<0.05 (statistically significant)

### Table: III Macular thickness (μm) before and after IVT and PST TA injection.

<table>
<thead>
<tr>
<th>Macular Thickness (μm)</th>
<th>IVT TA Group</th>
<th>PST TA Group</th>
<th>p &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>386.3 ± 12.4</td>
<td>384.1 ± 18.9</td>
<td>0.721</td>
</tr>
<tr>
<td>1 month</td>
<td>222.7 ± 13.4</td>
<td>220.1 ± 15.1</td>
<td>0.625</td>
</tr>
<tr>
<td>3 months</td>
<td>228.1 ± 10.6</td>
<td>231.3 ± 10.9</td>
<td>0.580</td>
</tr>
<tr>
<td>6 months</td>
<td>385.2 ± 11.3</td>
<td>235.4 ± 8.7</td>
<td>0.001</td>
</tr>
</tbody>
</table>

### Table: IV Intraocular pressure (mm/Hg) in the intravitreal (IVT) and posterior subtenon (PST) injected eye.

<table>
<thead>
<tr>
<th>IOP (mmHg)</th>
<th>(IVT Group)</th>
<th>(PST Group)</th>
<th>p &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>16.1 ± 1.4</td>
<td>16.2 ± 1.3</td>
<td>0.140</td>
</tr>
<tr>
<td>1 month</td>
<td>17.7 ± 1.1</td>
<td>16.4 ± 1.2</td>
<td>0.062</td>
</tr>
<tr>
<td>3 months</td>
<td>18.2 ± 1.2</td>
<td>16.3 ± 1.1</td>
<td>0.026</td>
</tr>
<tr>
<td>6 months</td>
<td>18.1 ± 1.3</td>
<td>16.2 ± 1.1</td>
<td>0.030</td>
</tr>
</tbody>
</table>

Results: Visual Acuity-IVT

Graph-I
Comparison of Efficacy Between Intra-vitreal (IVT) & Posterior Sub-tenon (PST) Injection of Triamcinolone Acetonide (TA)

DISCUSSION:

Macular edema is the main cause of loss of visual acuity in diabetic patients.\textsuperscript{13,14} It may occur at any stage of the retinal disorder and is the most common cause of sight reductions in these subjects. In the edema, the blood-retinal barrier is damaged by an alteration in the tight junctions between the retinal capillary endothelial cells and the pigmented epithelial cells (RPE) with the consequent leakage of water and electrolytes into the retinal tissue.\textsuperscript{3,15-17}

As has been seen in numerous studies, including the Early Treatment Diabetic Retinopathy Study (ETDRS), macular photocoagulation treatment is effective in the treatment of clinically significant macular edema.\textsuperscript{2,18,3} Thus the laser photocoagulation for diabetic macular edema (DME), although successful in preventing the further visual loss in 50% of patients, is unable to cause substantial gains in visual acuity already lost.\textsuperscript{24} Moreover, laser photocoagulation is not very effective in eyes with diffuse macular edema.\textsuperscript{19,20}

The extent of the restoration of the hemato-retinal barrier function following laser treatment is debated as many studies indicate an increase in the edema following laser photocoagulation\textsuperscript{20} probably as a result of the release of pro-inflammatory molecules. Indeed, the initial clinical pattern of diabetic retinopathy, with vasodilatation, increased blood flow, tissue edema and an increase in the vascular permeability presents the characteristics of chronic inflammation. This hypothesis is supported by recent studies, which have highlighted the appearance of leukostasis in diabetes\textsuperscript{25} with adhesion of activated molecules to the endothelium,\textsuperscript{24} increased production of prostacyclin,\textsuperscript{25} vascular endothelial growth factor (VEGF) and macrophagic cellular component.\textsuperscript{26} Further support for the thesis of inflammation as one of the causes of onset of diabetic retinopathy is provided by experimental studies in animals which demonstrate
Perforation of the globe, occlusion of the central retinal artery and cataract formation. Other complications described are blepharoptosis, orbital fat atrophy, strabismus and conjunctival necrosis. IOP is not increased by the use of this approach with the exception of steroid responder patients.

This study was performed in order to compare these two injection routes i.e the IVT and the PST, in terms of their efficacy, ease of administration and the resultant complications like IOP rise after the injection.

Our study demonstrates that three months after the intravitreal injection of TA and the subtenon injection of TA there is a statistically significant improvement in visual acuity and an equally significant reduction in retinal thickness. Six months after IVT injection, the patients presented a recurrence of macular edema with loss of visual acuity whereas six months after PST injection retinal thickness and visual acuity remained stable. After one, three and six months we observed a statistically significant rise of the IOP in the eyes treated with IVT injection whereas in the PST injection group, no statistically significant variations of the IOP were found. None of patients developed cataract or needed anti-glaucoma drugs during the entire follow-up period.

There were some limitations inherent in our study, i.e the small sample size, a limited follow-up period and the non-randomized nature of the trial. Large prospective, randomized, multi-centered clinical trials are necessary to establish the long-term efficacy and safety of PST approach for TA injection in patients having diffuse diabetic macular edema.

**CONCLUSION:**

The changes in visual acuity and central macular thickness observed after the treatment suggest that the PST injection technique is as effective as IVT injection technique in patients with diffuse diabetic macular edema. Therefore, posterior subtenon approach is an easy, safe and valid alternative to the intravitreal route of steroid administration for the patients having diffuse diabetic macular edema.

**REFERENCES:**


ABSTRACT

Objective: To determine the frequency of cataract in children having congenital malformations of the eyes coming to tertiary care eye hospital.

Study type, settings and duration: Descriptive study done at Al Shifa Trust Eye Hospital, Rawalpindi from January 2004 to December 2006.

Materials and Methods: Retrospective case record analysis of all children coming to hospital with cataract along with other malformations of eyes was included in the study. The cases of traumatic cataract were excluded.

Results: Congenital malformations of eyes were seen in 514 cases (289 males and 225 females). The age distribution was from birth to 15 years, with majority seen between 0-2 years. Out of 514 cases, 126 had abnormalities of lens with 22.6% (116) having cataract. The visual impairment was the major presentation.

Conclusions: The cataract was the commonest among congenital malformations of the eyes.

Keywords: Cataract, Congenital cataract, Congenital malformations.

INTRODUCTION:

A cataract is any light scattering opacity of the lens. These are usually associated with aging processes but congenital cataracts occur in newborn babies. The lens develops from the lens vesicle, a derivative of the surface ectoderm. Abnormal lens vesicle invagination, separation, or defects in the lens epithelium or capsule would result in a cataract (with or without anterior or posterior lenticonsus).

Some cataracts are present at birth (congenital cataract) and others develop during the first few months or years in life (pediatric cataract). Congenital cataracts can occur when, during pregnancy, the mother develop infections such as measles or rubella (the most common cause), herpes simplex, influenza, toxoplasmosis etc and the drugs e.g. tetracycline antibiotics to treat infections. Some cataracts will be inherited, and others will be related to metabolic i.e. galactosemia, hypocalcaemia etc or systemic abnormalities. Eye anomalies may occur in isolation, in combination, or as a part of a systemic malformation syndrome (Cataracts may be a part of syndromes, the most common being trisomy 21). The finding of a congenital eye anomaly should be followed by a search for other systemic anomalies. The inheritance, in cataract, is most often autosomal dominant although it can be X-linked or autosomal recessive. In many cases the cause is unknown.

The congenital cataract may be missed easily by general practitioners. Determination of the visual significance of congenital cataract depends upon measurement of the size of opacity, cyclopegic refraction and assessment of red reflex. The congenital ocular anomalies that are not always readily diagnosed at birth should consider the potential influence on disease frequency of diagnostic practice as well as of underlying disease risk. Red reflex testing is an essential of the neonate, infants, and child physical examination for early detection of vision and potentially life-threatening abnormalities such as cataract, glaucoma, retinal abnormalities etc. In congenital cataract the most investigators recommend surgery within the first two months of life but there has been evidence to suggest that before one month of age, the risk of aphakic glaucoma is increased. The prenatal diagnosis of the cataract that causes visual impairment can be made.

MATERIALS AND METHODS.

The three year data (January 2004 to December 2006) of congenital malformations of eyes was retrospectively collected from pediatric department of Al-Shifa Trust Eye Hospital Rawalpindi. The traumatic cataracts among children were excluded.

RESULTS

During three years, 514 congenital malformations of eyes were seen at the pediatric department. There were 289 (56.2%) males and 225 (43.8%) females whose ages ranged from day 1-15 years. Majority (222) of the patients were between 0-2 years (120 males, 102 females). Age distribution is shown in Table-1.
Common congenital abnormalities of the eyes were, cataract in 116 (22.6%) cases, lacrimal apparatus anomalies in 103 (20%), ptosis in 45 (8.8%), pigmentary retinal degeneration in 35 (6.8%), microophthalmos/anophthalmos in 26 (5%), optic atrophy in 23 (4.5%), followed by other abnormalities (Table 2).

<table>
<thead>
<tr>
<th>S. No</th>
<th>Disease</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Cataract</td>
<td>116</td>
<td>22.6</td>
</tr>
<tr>
<td>02</td>
<td>Lacrimal apparatus anomalies</td>
<td>103</td>
<td>20.0</td>
</tr>
<tr>
<td>03</td>
<td>Ptosis</td>
<td>45</td>
<td>8.8</td>
</tr>
<tr>
<td>04</td>
<td>Pigmentary retinal degeneration</td>
<td>35</td>
<td>6.8</td>
</tr>
<tr>
<td>05</td>
<td>Micro-ophthalmos/anophthalmos</td>
<td>26</td>
<td>5.0</td>
</tr>
<tr>
<td>06</td>
<td>Optic atrophy</td>
<td>23</td>
<td>4.5</td>
</tr>
<tr>
<td>07</td>
<td>Duane’s Syndrome</td>
<td>20</td>
<td>3.89</td>
</tr>
<tr>
<td>08</td>
<td>Congenital glaucoma</td>
<td>17</td>
<td>3.30</td>
</tr>
<tr>
<td>09</td>
<td>Coloboma (uveal, retinal, lid)</td>
<td>15</td>
<td>2.91</td>
</tr>
<tr>
<td>10</td>
<td>Maculopathy</td>
<td>14</td>
<td>2.72</td>
</tr>
<tr>
<td>11</td>
<td>Albinism</td>
<td>13</td>
<td>2.33</td>
</tr>
<tr>
<td>12</td>
<td>Retinoblastoma</td>
<td>1</td>
<td>0.21</td>
</tr>
<tr>
<td>13</td>
<td>Ectopia lentis</td>
<td>09</td>
<td>1.75</td>
</tr>
<tr>
<td>14</td>
<td>Blepharophimosis</td>
<td>08</td>
<td>1.55</td>
</tr>
<tr>
<td>15</td>
<td>Dermoid cyst</td>
<td>06</td>
<td>1.16</td>
</tr>
<tr>
<td>16</td>
<td>Double elevator palsy</td>
<td>06</td>
<td>1.16</td>
</tr>
<tr>
<td>17</td>
<td>Mesodermal dysgenesis</td>
<td>06</td>
<td>1.16</td>
</tr>
<tr>
<td>18</td>
<td>Persistent hyperplastic primary vitreous</td>
<td>06</td>
<td>1.16</td>
</tr>
<tr>
<td>19</td>
<td>Congenital retinal detachment</td>
<td>06</td>
<td>1.16</td>
</tr>
<tr>
<td>20</td>
<td>Other causes</td>
<td>43</td>
<td>8.37</td>
</tr>
</tbody>
</table>

The frequency of eye malformations was almost similar in both genders but optic atrophy, congenital glaucoma and coloboma were more in males.

Out of 514 patients, lens anomalies were seen in 125 (24.3%) children, with all but 9 having cataract anomalies 116 (22.6%). Most 82 (70.7%) of these cases were between 0-5 years. In 61 patients the cataract was unilateral (32 right eyes, 29 left eyes), while in 55 cases it was bilateral.

DISCUSSION

Out of 12 million persons blind in the world, two hundred thousand children, blind from congenital cataract. Infantile cataracts are a significant cause of treatable blindness in infants worldwide, accounting for 12% to 15% of visually impaired children in countries as diverse as Finland and India.

The cataract is the commonest congenital anomaly among eye malformations in our study. Stoll's study in France also reported congenital cataract as the most frequently occurring anomaly in their series. In South-Eastern Nigerian study, out of 54 cases of congenital eye anomalies, 42.6% were cataract and 22.2% were congenital glaucoma. Onwasigwe study (101 cases), the cataract was the most common occurring anomaly (47.6%). A Nigerian study reported congenital cataract (38%), congenital nasolacrimal duct obstruction (12.9%) and congenital glaucoma (9.7%) in Zaire. In 42,275 children resident of New York, 497 congenital eye malformations were detected. The cataract were 112 (22.5%), Anophthalmos/microphthalmos in 57 (11.5%) and congenital glaucoma in 51 (10.3%). In a Spanish study, among 112,4654 consecutive births, 414 had congenital malformation of eyes (anophthalmos/microphthalmos most common followed by cataract and coloboma). Another study on congenital malformations of eyes reported that out of 109 eyes 38% had buphthalmos, 35% had cataract and 14% had nasolacrimal duct obstruction. In Egypt, 13543 congenital malformations detected among 660,280 children. Out of these 521 were congenital malformations of eye which include, optic atrophy in 100 (24.9%), microphthalmia 117 (22.4%), lens anomalies 85 (16.3%). In Cameroon, out of 2254 malformations, 150 (6.66%) presented as eye malformations. The most frequent eye malformations were nasolacrimal duct obstruction (66.66%), congenital cataract (10.9%) and congenital glaucoma (10.9%).

CONCLUSIONS:
The cataract was the commonest among congenital malformations of the eyes.

REFERENCES
2. Ori JI, Yoshikai T, Yoshimur S. Posterior lenticonus with
24. Bermejo E, Matines-Frias ML. Congenital eye malformations: Clinical- Epidemiological Analysis of1,

Anaemic Retinopathy.
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To Compare Recurrence following Pterygium Excision & Limbal Conjunctival Autograft with and without adjunctive Therapy with Mitomycin C

ABSTRACT
Objective: To compare the recurrence in primary and recurrent Pterygium, following excision and limbal conjunctival autograft, with and without adjunctive therapy with MMC.

Material and Methods: A randomized clinical trial was conducted at a tertiary referral center from June 2009 – December 2010. 85 consecutive cases in 65 patients of pterygium were included, 75 primary and 10 recurrent, between the ages of 30-65 years, mean 42.2 +/- 10.6 years. They were divided randomly into 3 subgroups:

Group A: (28 primary cases) had pterygium excision with Bare Sclera Technique + MMC application Intra-operatively, 0.2mg / ml x 2 min.

Group B: (28 primary cases), had pterygium excision with limbal conjunctival autograft.

Group C: (29 cases, 19 primary, 10 recurrent), had pterygium excision + limbal conjunctival autograft + MMC intraoperative, 0.2mg / ml x 2 min in primary cases and for 3 min. in recurrent cases. Post-operative follow-up was for 18 months to note recurrence and MMC related complications.

Results: Over 18 months follow up, recurrence was noted in Group A, 7 cases (25%), p value 0.002; in group B, 2 cases (7.14%), p value 0.001 and in group C, 1 case (3.45%), p value 0.001.There was no recurrence in 10 cases of recurrent pterygium.Dellen formation was noted in 4 cases of Group B; there was no other complication.

Conclusion: The intra-operative use of MMC 0.2 mg/ml for 2 min. as an adjunctive therapy to limbal conjunctival autograft is safe and markedly reduces recurrence. MMC helps in quick uptake of graft at the recipient site, reduces post-operative inflammation hence minimizing recurrence.

Key words: pterygium, limbal conjunctival autograft, mitomycin C, recurrence.

INTRODUCTION
A pterygium is a wing-shaped growth of fibrovascular conjunctiva onto the cornea. Its incidence varies across geographical locations and is seen mostly in outdoor workers exposed to ultra-violet ray e.g. farmers, gardeners, automobile drivers, serfers, etc. The ultraviolet rays induce metaplastic changes in the limbal stem cells, mainly on the nasal side, where U-V rays are more concentrated due to the nasal bridge, and these cells are programmed to grow over the cornea unless they are stopped by a barrier of healthy limbal stem cells.

The indications for surgery include reduced vision due to encroachment on the visual axis and irregular astigmatism, chronic irritation, chronic inflammation, and a red eye, restrictive ocular motility, and cosmetic purposes. Numerous surgical techniques including bare sclera excision with or without the use of adjuncts like beta irradiation, thiotepa eye drops, per-operative or post-operative mitomycin C (MMC), amniotic membrane transplantation, and conjunctival autograft have been described.

Simple pterygium excision carries a high recurrence rate ranging from 24%–89%. The addition of mitomycin C (MMC) in various concentrations has been reported to be effective in preventing recurrence. It is an alkylating, anti neoplastic agent which prevents cellular division and replication by inhibiting DNA synthesis. Determinants of its effectiveness include its concentration and the time for which it is applied and whether the sclera is covered with conjunctiva. Intraoperative MMC is preferred and a concentration of 0.02% MMC for 5 minutes has been found to be effective. However, it may result in devastating complications such as scleral necrosis and microbial infections.

Another alternative adjunct is conjunctival graft. The limbal epithelium acts as a junctional barrier to conjunctival overgrowth and pterygium is considered to represent a “local limbal deficiency”. The inclusion of limbal epithelium in conjunctival graft would restore the barrier function of the limbus. Recent studies have reported the effectiveness of limbal conjunctival autograft transplantation in the prevention of pterygial recurrence.

The purpose of this study is to assess and compare the recurrence following pterygium excision combined with limbal stem cell autograft in primary and recurrent
pterygia with and without adjunctive therapy of MMC in a very low dose applied for a shorter time period. Advantages of this technique include MMC application directly to the area of pathology rather than to the entire ocular surface.

**MATERIALS AND METHODS**

A randomized controlled trial was conducted at a tertiary referral center, Mughal Eye Trust Hospital, from June 2009 to December 2010. A total of 85 consecutive cases, including 65 patients, of pterygium were included; there were 75 primary and 10 recurrent cases, between the ages of 30-65 years, mean of 42.2 +/- 10.6 years. The patients with primary pterygium were randomly distributed amongst the three groups as shown in Table 1, those with a history of recurrent pterygium were included in Group C to give them a maximum benefit of treatment. Exclusion criteria were that any patient with collagen vascular disease, ocular surface infection or limbal conjunctival pathology was excluded from the study. A fully informed consent was taken.

**Group A** (28 cases, all primary) had pterygium excision with Bare Sclera Technique + MMC 0.2 mg/ml application Intra-operatively for 2 min.

**Group B** (28 primary cases), had pterygium excision with limbal conjunctival autograft.

**Group C** (29 cases, 19 primary, 10 recurrent), had pterygium excision + limbal conjunctival autograft + MMC intraoperative, 0.2 mg/ml for 2 min. in primary cases, and for 3 min. in recurrent cases.

The patients had a detailed ophthalmic examination prior to surgery, regarding visual acuity, refraction, intraocular pressure, slit-lamp and fundoscopy. All cases were operated by 2 surgeons (the authors) using the same technique. Post-operative follow-up was done at 1st day, 10th day, 1 month, 3rd month, 6th month, 12th month and after 18 months to note recurrence (defined as fibrovascular growth over cornea for >1.5mm) and MMC related complications.

**Surgical technique:**

The operations were performed by 2 surgeons (the authors), under local anesthesia with 2% xylocaine with adrenaline injected under the head of pterygium as well as sub-conjunctivally at the supero-temporal limbus (the graft site). The pterygium head was detached and the body dissected from the overlying conjunctiva. In group A, intraoperative MMC (0.2 mg/ml) was applied with a sponge soaked in it and placed under the caruncle for 2 minutes. The site of application was then thoroughly irrigated with at least 100 ml of balanced salt solution. Subconjunctival pterygial tissue was excised to achieve a clear margin at the limbus and a bare sclera.

In group B, the pterygium was excised, the cornea and the adjacent sclera were cleared up of any adhesions; hemostasis was secured by cautery to avoid hematoma formation at the graft site. A 4 x 6mm conjunctival graft was taken from the supero-temporal limbus, extending into the clear cornea. The graft was carefully transferred to the nasal limbus at the site of pterygium excision, taking care that the limbal side of the graft faces the limbus. It was secured in place by three 10/0 nylon sutures, their knots rotated and buried in the cornea. These sutures were removed at tenth post-operative day.

In group C, after pterygium excision, MMC in concentration of 0.2 mg/ml was applied under the caruncle for 2 min. in primary cases and for 3 min. in recurrent cases. It was then washed off by balanced salt solution. The cornea and limbal sclera was then scraped off any adhesions. The limbal conjunctival autograft was then taken and secured in place by three 10/0 nylon sutures.

Antibiotic ointment and pressure dressing was applied in all the groups for 24 hours. The next day, if the abraded cornea had healed, an antibiotic-steroid combination eye drops / two hourly and chloramphenicol ointment 3x/day were prescribed for the next ten days. At the tenth post-op day, if the graft was felt to be secure with no swelling or underlying hematoma, the nylon sutures were removed. The eye drops were reduced in frequency to 4x/day for the next one month. However, if graft didn't seem secure in place, or with an underlying hematoma, (seen in 4 cases in group B), then the sutures were left in place for one more week and then taken out. On every follow-up visit, intraocular pressure was checked. Steroid drops were gradually tapered over the next one month and stopped after 2 months post-op. All patients were then started on artificial tears 4x/day and instructed to wear dark glasses outdoor. They were followed-up at 3 months, 6 months, 12 months and 18 months post-op.

**RESULTS**

At each follow-up visit, any evidence of recurrence was noted; it was defined as fibro-vascular proliferation invading the cornea >1.5 mm. Student's t test was used to analyze recurrence rates, and a p value less than 0.05 was considered significant.

Over the 18 months follow up, recurrence of pterygium (shown in Table 2), was noted in Group A, 7 cases (25%), p value=0.002; in group B, 2 cases (7.14%), p value=0.001 and in group C, it was seen in only 1 case (3.45%), p value=0.001. No recurrence was noted in the 10 cases of recurrent pterygia included in the study. A hematoma was noted under the limbal conjunctival autograft in 4 cases of group B along with dellen formation on the adjacent cornea; the graft took longer.
To Compare Recurrence following Pterygium Excision & Limbal Conjunctival Autograft with and without adjunctive Therapy with Mitomycin C

Table 1: Patient distribution into management groups:

<table>
<thead>
<tr>
<th>Group</th>
<th>No</th>
<th>Type of Surgical Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>28</td>
<td>Bare Sclera excision + MMC intra-op</td>
</tr>
<tr>
<td>B</td>
<td>28</td>
<td>LimbalConjunctivalAutograft</td>
</tr>
<tr>
<td>C</td>
<td>29</td>
<td>primary= 19 Limbalconj, autograft + Recurren= 10 MMC intra-op</td>
</tr>
</tbody>
</table>

Table 2: Study Results regarding Pterygium Recurrence:

<table>
<thead>
<tr>
<th>Group</th>
<th>No of cases</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>28</td>
<td>7 cases, (25%), p=0.002</td>
</tr>
<tr>
<td>B</td>
<td>28</td>
<td>2 cases, (7.15%), p=0.001</td>
</tr>
<tr>
<td>C</td>
<td>29</td>
<td>1 case, (3.45%), p=0.001</td>
</tr>
</tbody>
</table>

than group C cases to become flat and avascular. No MMC related complications were noted in any case. The donor site of graft healed spontaneously within 3-4 days without any complications.

DISCUSSION

Pterygium is a very common condition, particularly in central Asia, with a long, hot summer and prolonged period of exposure to U-V rays. This is an agricultural country and people are not educated enough to protect their eyes with dark glasses, hence it is seen with equal frequency amongst the young as well as the elderly. It is associated with a lot of ocular morbidity especially when it recurs. A recurrent pterygium is more aggressive, highly vascular and deeply adherent to the cornea; when it is removed, it leaves a deep corneal opacity. Since it is more common on the nasal side, a nasal corneal opacity markedly hampers near vision. Hence every attempt should be made to prevent its recurrence following surgery. The surgical technique described in this study highlights the steps we have taken to reduce recurrence as well as MMC related complications.

As noted in this study, MMC was applied intra-operatively in a low concentration of 0.2 mg/ml for only 2 min in our group A cases; it reduced recurrence rate even in bare sclera technique from almost 80% in some studies to 25% in our study. The recurrence was due to an absent barrier of healthy limbal stem cells which can prevent pterygium for growing over the cornea once it had been excised.  

Our group B cases highlight the fact that the presence of a barrier of healthy limbal stem cells reduces recurrence even further (7.14%), but without MMC, the graft was associated with more post-operative inflammation and vascularization which promoted recurrence. Also, the graft took longer to stabilize on its bed. On the other hand, in group C, limbal conjunctival autograft was combined with MMC application; in only 1 case (3.45%), a minor recurrence up to 1mm over the cornea was noted. This patient had stopped the eye drops after 2 weeks and maybe that promoted the recurrence. There were 10 cases of recurrent pterygium in this group and no recurrence was noted in any case. The graft in all group C cases was avascular, flat and firmly settled on its bed within one week post-operatively.

We took added precautions to reduce MMC related complications like corneo-scleral melt. We applied MMC-soaked sponge under the caruncle and away from the graft bed. We cleared the cornea and the adjacent sclera of left-over pterygium adhesions after washing away the MMC to avoid its toxic affects at this site.

Another important point in our technique was that the graft size was of a fairly small size, (4x6mm), hence there was no need to suture the donor site. Even a small barrier of healthy stem cells is sufficient to prevent recurrence; there is no need for large grafts or to cover the whole bare sclera. The corneal sutures to secure the graft bed were rotated and buried in the corneal stroma while the suture ends of the third stitch on the scleral side of the graft were rotated under the graft, hence no pain or irritation was felt by any patient.

CONCLUSION

Pterygium excision combined with MMC and limbal conjunctival autograft is the procedure of choice to prevent recurrence. It has a short learning curve but the benefits outweigh the effort and time spent in learning and practicing this technique only.

REFERENCES

10. Rubinfeld RS, Pfister RR, Stein RM, Foster CS, Martin NF, Stoleru S, Talley AR, Speaker MG. Serious complications of... CONT...


A DOYEN OF OPHTHALMOLOGY

Dr. Zaheer uddin Aqil Qazi
Chief Consultant Ophthalmologist at LRBT Free Eye Hospital, Lahore.
A recipient of Tamgha-i-Imtiaz

Dr. Qazi is the Chief Consultant Ophthalmologist at LRBT Free Eye Hospital, Lahore. He has recently been bestowed the most prestigious national honor of Tamgha-i-Imtiaz by the President of Pakistan in view of his meritorious services, invaluable contributions to research, with professional excellence in the field of Ophthalmology. He has indeed, a brilliant record of academic eminence which speaks volumes of his dedication and devotion in serving the people of Pakistan, and earning a prestigious place in the Ophthalmic community in a very young age.

Born in 1961, he qualified MBBS from Rawalpindi Medical College in 1985. He was adjudged our best Rawalian student and was awarded the Presidential Gold Medal. He did his post-graduation (FCPS) from the college of Physicians & Surgeons, Pakistan in 1992.

Ever since Dr. Qazi has joined the LRBT Hospital, Lahore he realized the insufficiency of services with paucity of beds as a mammoth challenge and through his sheer hard work and dedication he raised this institution in a record period of 3 years, from the secondary to tertiary level hospital with 74 beds with postgraduate resident training Institute, fully recognized by the CPSP (Dr. Qazi being its supervisor as well as examiner to FCPS examinations.) So far 170 national and international postgraduates have undergone full training under his guidance. This hospital has also the credit of performing 3000 major surgeries in one year with latest state-of-the-art equipment. He had the honour to perform the surgery on the eyes of our most respected teacher, an ophthalmic legend and the founding Patron of Ophthalmological Society of Pakistan Prof. Dr. Raja Mumtaz., Ali Quli Khan.

Dr. Qazi is actively conducting research and is associated with the International Center for Eye Health, London as well as FDA (USA), and published his original research work in national and international journals. He has been awarded many national and international honors like Susruta Lecture Award from Korea, Noval Christy Gold Medal by Ophthalmological society of Pakistan, from APAO, Presidential Gold Medal as a medical student and Tamgha-i-Imtiaz.

The Editorial Board of Ophthalmology Update wishes him the happiest moments in his future life. May Allah bless him enough strength and vigor to continue serving the nation and the ailing humanity to his best. Amin! ........ Chief Editor
Supra-brow Single Stab incision Frontalis Sling for Ptosis correction

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ABSTRACT

Purpose: To determine the cosmetic, surgical outcome and complications after suprabrow single stab (SBSS) incision frontalis sling.

Methods: Interventional case series of 38 eyes of 30 patients were selected on non-probability purposive basis from Oculoplasty clinic, Isra Post Graduate institute of Ophthalmology. All the patients with congenital ptosis with poor levator function were included, excluding those having poor Bell's phenomenon and associated pathology like jaw winking, 3" nerve misdirection, squint, impaired corneal sensitivity and neoplastic lesions. Patients were diagnosed clinically on the basis of history, old photographs and clinical examination. Preoperative assessment included complete history, ocular, general examination and detailed ptosis examination with proper measurements. Informed consent was taken. Local anesthesia was used in adult patients while general anesthesia was used in children. All patients underwent suprabrow single stab (SBSS) incision frontalis sling using polypropylene (prolene) 2/0 suture as sling material in a pentagon manner. Postoperatively measurements were taken at regular intervals, complication were noted and managed accordingly.

Results: Thirty eight eyes of 30 patients were included in this study. Twenty two patients (73.33%) had unilateral ptosis, while 8 (26.66%) patients had bilateral ptosis. Age of the patients ranged from 4 years to 46 years (average-18.73 years). 17(56.66%) patients were male while 13(43.33%) were female. Levator function ranged from 0-4 mm (average2.8 mm). 28(73.68%) eyes had good outcome, 5(13.15%) had fair outcome and 3(7.89%) had under correction but as the patients were satisfied cosmetically, no second procedure was attempted. 13(34.21%) eyes had lagophthalmos, which subsided with time without any further sequel. 2(5.26%) eyes had knot exposure, which were corrected by revising the wound. No significant delayed failure or sling material related complication such as extrusion, infection or granuloma formation was noted.

Conclusion: Supra-brow single stab incision technique is a promising modification of conventional fox pentagon for frontalis sling. It shows good functional results with superior cosmetic outcome.

INTRODUCTION

Ptosis is defined as drooping of upper lid. It is due to inadequate lift by the malformed Levator palpabrae superioris (LPS) muscle. Ptosis may be caused by damage or trauma to the muscle that raises the eyelid, damage to the nerve that controls the muscle, namely the oculomotor nerve, or damage to the superior cervical sympathetic ganglion.

Simple congenital ptosis, which is the most common variant in children and young adults, is probably caused by failure of neuronal migration or development of LPS. The prevalence of congenital ptosis as described by various ophthalmic epidemiologists ranges from 62-88% among all types of ptosis. 92% of cases are unilateral while 8% are bilateral.

The diagnosis is made on history indicating its presence from birth which can be confirmed by previous photographs. On examination there is ptosis, absence of upper lid crease and moderate to poor levator function.

Ptosis gives rise to two main problems. The commonest one is cosmetic while the other is rarer but more serious is stimulus deprivation amblyopia which usually affects children with a unilateral, severely ptotic lid. The treatment of ptosis is indicated in the pre-school age when accurate measurements can be obtained but however if ptosis is severe and there is a threat for image deprivation amblyopia then earlier intervention is indicated.

The management of simple congenital ptosis is mainly surgical. The choice of procedure depends upon degree of ptosis and levator function. Usually congenital ptosis tend to occur with a poor levator function and in majority of cases frontalis muscle has to be included in the muscle syncytium to potentiate the elevation of lid. The tarsus of the upper lid is attached to the frontalis muscle by means of a sling, which can be obtained from various autologous and synthetic sources.

There are various techniques for frontalis sling procedures. The most commonly used is the fox pentagon technique which is usually reserved for artificial sling material. In conventional fox pentagon
there are a total of 5 stab incisions among which three are given superior to brow line. In our study we will perform a modified pentagon technique with a single stab suprabrow incision (SBSS) and study its outcome in terms of surgical success and overall cosmesis.

The advantage of this technique is that with minimal skin incisions and less surgical time, the clinical outcome of a conventional frontalis sling procedure is obtained. As compared with the suprabrow single-stab incision technique, the conventional procedure involves a total of five stab incisions (three supra-brow and two lid margin) and creates more bleeding intra operatively and more edema in the postoperative period. Postoperative lid edema, pain and suture-related complications due to multiple sutures can be avoided with the new technique. The technique can be performed in all eyes with ptosis and poor levator function that necessitate a frontalis sling. The stab incision used is only about 2 mm. The sling may be curved to pass smoothly in case of difficulty while changing the direction. The sling accurately follows the path of the Fox pentagon because it is anchored supero-medially and supero-laterally at the orbital septum. It thus creates a good physiological upward direction of traction that gives superior cosmetic results as compared with conventional sling techniques.

Objectives: To determine the cosmetic and surgical outcome and complications after suprabrow single stab incision frontalis sling.

Operational Definitions: Outcome will be graded according to the post-operative MRD in comparison with the normal (normal 4-4.5mm). It will be graded as follows:

- **Good**: within 1 mm of normal
- **Fair**: within 2 mm of normal
- **Under corrected**: less than 2 mm from normal
- **Over corrected**: more than 2 mm from normal

MATERIAL AND METHODS

Settings: Oculoplasty department, Al-Ibrahim Eye Hospital, Isra Postgraduate Institute of Ophthalmology, Karachi.

Duration: 6 months (May 2012 to October 2012) and 6 months follow up period after the last enrolled case.

Sample Size: 38 eyes of 30 patients

Sampling Technique: Non probability purposive

Inclusion Criteria: All the patients reporting to Al-Ibrahim Eye Hospital, diagnosed as having simple congenital ptosis with poor levator function.

Exclusion Criteria: Patients having poor Bell's phenomena, jaw winking, 3rd nerve misdirection, squint, impaired corneal sensitivity and neoplastic lesions of the lids.

Study Design: Interventional case series.

Data Collection Procedure: Patients with simple congenital ptosis were diagnosed clinically on the basis of history, old photographs and clinical signs i.e. ptosis, absence of lid crease and defective levator function.

Pre-operative assessment included a proper history including personal biodata, relevant information and an informed consent. A detailed ocular and general examination was performed with special emphasis on the lid measurements such as Palpabrel fissure height (PFH), Marginal reflex distance (MRD), Levator function (LF) and Marginal limbal distance (MLD). Associated features such as Bell's phenomena, jaw winking, corneal sensitivity status and evidence of any pre-existing inflammatory, infectious or neoplastic lesion of the eyelids were noted. Pre-operative photograph were taken. All the information was recorded on a proforma.

Patients in whom procedure was done in general anesthesia, a detailed physical examination was done and relevant investigations such as complete blood count, random blood sugar and x-ray chest were done in correspondence with an anesthetist. SBSS frontalis sling was done in all patients who included marking of the pentagon angles, incisions over the superior tarsus. Single stab incision was given on the frontalis muscle. A 2/0 Polypropylene (Prolene) suture was used as the sling material. Sling was introduced through the tarsal incision and then brought out at the suprabrow incision following the marks at the eyebrow, deflecting beneath the skin and orbicularis muscle without piercing them and passing through the superior orbital septum. The two ends of the sling were fixed as per desired correction and suprabrow incision was closed with a single 5/0 prolene suture with the knot buried my making a shelving facial pocket. The upper lid was supported with a frost suture from the lower lid in cases of larger corrections.

Post-operatively patients were given oral antibiotics and NSAIDs. Bandage was removed on the following day. Topical ointment containing antibiotics were prescribed to be applied over the wound. Frequent lubrication in form of artificial tears and gel was prescribed to counter lagophthalmos. Follow up was done on 1st post-operative day then at 1st week, 3rd week and finally at 6th month. At all visits PFH and MRD was measured, photographs were taken and any complication was looked for. The various complications that have been reported in literature are under correction, overcorrection, exposure keratitis, lid...
crease abnormalities, abnormalities of eyelid margin contour, lagophthalmos, ectropion and entropion.\textsuperscript{1,14}

RESULTS

Thirty eight eyes of 30 patients were included in this study. Twenty two patients (73.33\%) had unilateral ptosis, while 08 (26.66\%) patients had bilateral ptosis. Age of the patients ranged from 4 years to 46 years (average-18.73 years). 17(56.66\%) patients were male while 13(43.33\%) were female. Levator function ranged from 0-4 mm (average 2.8 mm) 28(73.68\%) eyes had good outcome (within 1 mm of normal), 05(13.15\%) had fair outcome (within 2 mm of normal) and 3(7.89\%) had under correction (table 1) but as the patients were satisfied cosmetically, no second procedure was attempted. 13(34.21\%) eyes had lagophthalmos, which subsided with time without any further sequel. Exposure keratitis was not noted in any patient as the lagophthalmos was not serious or prolonged. Frequent post-operative lubrication was also very important in avoiding exposure keratitis. It was usual for lagophthalmos to improve after one week as the lid edema would resolve significantly by then, but even then lubrication with ointment at bed time was continued. 2(5.26\%) eye had knot exposure (table 2), which showed up on the 1\textsuperscript{st} post-operative week and was corrected by re-correcting the wound. All patients were followed up for at least 6 months years and no significant delayed failure or sling material related complication such as extrusion, infection or granuloma formation was noted.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Outcome</th>
<th>No. of Eyes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good</td>
<td>28</td>
<td>73.68</td>
</tr>
<tr>
<td>2</td>
<td>Fair</td>
<td>05</td>
<td>13.15</td>
</tr>
<tr>
<td>3</td>
<td>Under corrected</td>
<td>03</td>
<td>7.89</td>
</tr>
<tr>
<td>4</td>
<td>Overcorrected</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

**Table 1: Outcome of SBSS frontalis sling**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Complication</th>
<th>No. of eyes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lagophthalmos</td>
<td>13</td>
<td>34.21</td>
</tr>
<tr>
<td>2</td>
<td>Under correction</td>
<td>03</td>
<td>7.89</td>
</tr>
<tr>
<td>3</td>
<td>Overcorrection</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>4</td>
<td>Knot exposure</td>
<td>02</td>
<td>5.26</td>
</tr>
<tr>
<td>5</td>
<td>Granuloma formation</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>6</td>
<td>Sling related infection</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>7</td>
<td>Sling exposure</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>8</td>
<td>Hypertrophied scar</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>9</td>
<td>Late failure</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

**Table 2: Post-operative complications**

DISCUSSION

Suprabrow single stab incision (SBSS) frontalis sling is a novel modification of the conventional 3 stab incision fox pentagon, first described by Susan J and Agarwal A in 2012. This was appealing as the conventional pentagon was usually associated with three clear marks on the forehead which was limited to only one in SBSS technique. Also due to multiple incisions the forehead usually caused an irregular furrowing, which was cosmetically concernig for a lot of patients.

Single incision technique has also been described by Batheria M\textsuperscript{15} but the technique was different as it was a triangular pattern rather than a pentagon.

SBSS proved to be a very easy modification which didn’t need any special instrument. Susan J and Agarwal A used Seiff frontalis suspension set (BD Visitec) for sling while we used polypropylene 2/0 as sling which was put in place by Wright’s spatulated facial needle.

The main outcome of this study was cosmetic against the conventional three suprabrow incision fox pentagon. However as ptosis is usually a cosmetic surgery so the surgical and cosmetic outcome are synonymous. The main cosmetic advantage of this modification apart from lesser number of incisions is the less amount of furrowing of the forehead which in turn is secondary to the single suture.

The surgical time was also observed to be less than the conventional technique; however the surgical time was not included in the variables of this study. This study is a simple consecutive case series, not a comparative one. However as we have been doing conventional fox pentagon for a long time, we can get some comparisons from our previous studies.\textsuperscript{16} The surgical outcome in this study was similar to that of one of our study previously published in which fox pentagon was used using same sling material.

As far as complications are concerned, they are also comparable with our results in the previous study. Lagophthalmos being on top was not severe enough to cause any further problem such as exposure keratitis. Lagophthalmos was usually improved within few weeks after surgery in almost all of the cases.

Three patients had undercorrection but they were cosmetically satisfied and repeat sling was not required. None of the patient showed over correction. Two patient showed knot exposure, which was treated by deepening the pocket with further deep burial of the knot. None of the patient showed knot failure or sling sensitivity. We did not notice any other complication such as extrusion, infection or granuloma formation.

Our study shows promising pattern for this new technique. We think that this study is more of a pilot study to assess the effectiveness of this modified technique in our settings. We are planning for a randomized comparative study with a larger number of
patients in the near future.

CONCLUSION

Suprabrow single stab incision technique is a promising modification of conventional fox pentagon for frontalis sling. It shows good functional results with superior cosmetic outcome.

REFERENCES

Amblyopia: Myths Broken

Sameera Irfan, F.R.C.S. (Edin)*

Changes in cell structure are reversible only if the deprived eye is forced to be used during the critical period,7 which may help in planning the treatment strategies.

Amblyopia — a lazy eye,1 characterized by poor vision is otherwise a physically normal eye affecting 1-5% of the population,3 and has not changed much over the years.6 It is a developmental defect of spatial visual processing2 that occurs in the central visual pathways. Two important pathogenic mechanisms have been proposed, each contributing differently to specific type of amblyopia:

Abnormal binocular interaction or competition:2
This occurs when incompatible images are formed on the fovea of either eye that cannot be fused and the distorted image from the affected eye is suppressed. Neurons from the two eyes compete for control over cortical connections during the developmental period; those from the better eye gain control at the expense of neurons from the affected eye (active inhibition of that eye by the good eye resulting in amblyopia). This can be seen under the following circumstances:

i) A normal image is formed in one eye and a blurred image in the other eye (stimulus deprivation).

ii) Images of different objects are projected from the foveae (strabismic amblyopia, commonly seen in esotropia, vertical deviations).

iii) Distorted image is superimposed on the image projected from a normal fovea (anisometropic amblyopia, seen in myopia of more than 4.5 D, hypermetropia of more than 1.5 D and astigmatism of more than 1 D). This is the commonest form of amblyopia in children which is both preventable and treatable.

Deprivation of formed vision:4 This occurs when there is little or no stimulation of fovea of one eye with no sensory input from ganglion cells and resultant shrinkage of cells of lateral geniculate body (LGB) and cerebral cortex, corresponding to that eye. Studies have also confirmed that some of the changes in cell structure are reversible only if the deprived eye is forced to be used during the critical period,7 which may help in planning the treatment strategies.

- The development of normal visual acuity which occurs from birth to age 5.5 years; most important period is between 2-18 months during which binocular vision and stereopsis develops. It is a period of highest risk for deprivation amblyopia, and the recovery can be obtained even from adult years.

The myths regarding amblyopia:

- It cannot be treated after the age of 10-11 years as the ophthalmologists do not embark on treating it after the age of 6-7 years. The scientists believe that only partial visual recovery is possible. No visual improvement is possible in teenagers if a failed amblyopia therapy has been tried during childhood. Full-time occlusion therapy may result in occlusion (disuse) amblyopia of the good eye.

Why amblyopia should be treated: It needs to be detected and treated as early as possible because of the following reasons:

- It is a major cause of monocular visual loss in adults.3,4 Person with one amblyopic eye is at a higher risk of becoming blind because of potential loss to the sound eye from other causes e.g. trauma, cataract, glaucoma etc.4 Hence, visual loss in amblyopia is treatable provided it is diagnosed at an early age and therapy instituted appropriately.

- In patients with amblyopia and strabismus, amblyopia should be treated first as the end point of both types of amblyopia is freely alternating fixation with equal vision. If surgery is performed prior to amblyopia therapy, this end point cannot be gauged accurately; also patients will not attend for follow-up once good cosmetic result has been obtained after surgery. Principle of strabismus surgery should be: “Vision Before Surgery”.

*Consultant Oculoplastic Surgeon & Strabismologist, Mughal Eye Trust Hospital, Lahore Pakistan

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Acknowledgement: Ophthalmology Update is highly gratified to Ms. Diana Spencer, Editorial Coordinator, Eye News, UK, for permitting us to republish the excerpts of this article already published in Eye News with reference: No: 6 Vol: 19 April-May/2013, in view of giving wider readership to the benefit of our Ophthalmologists.
Risk factors for developing amblyopia are a positive family history, delayed development, prematurity; the visual development in these children should be closely monitored. There is a great need to increase awareness among parents, opticians and general ophthalmologists that this silent threat to vision is treatable at any age according to the recent studies. “Does full-time occlusion therapy correct Amblyopia irrespective of a patient’s age”

The largest study in this respect to date was conducted by the Pediatric Eye Disease Investigator Group (PEDIG) in USA, and it reported that three-fourths of children with previously untreated amblyopia responded to treatment with only two or more lines of improvement up to 18 years of age. The optimal therapy is considered to be in the range of 9 to 10 years. Recent studies regarding neuroplasticity have replaced the formerly-held view that the brain is a physiologically static organ but it changes throughout life. Many proofs of neuroplasticity have been revealed in adults. According to Levi and Plato, significant improvement of Vernier acuity in adult amblyopes occurred. The mean improvement in distance and near acuity in amblyopic eyes by 12 months was 3.3 and 1.9 lines log MAR respectively. Following study was conducted to find answers to all the myths regarding amblyopia and particularly to see how much visual recovery is possible even in severe amblyopia.

MATERIALS AND METHODS

This was a prospective clinical trial of 102 cases with unilateral, severe amblyopia conducted from Jan’10-Sep’12, ages ranging more than 3 years with visual acuity in the amblyopic eye from 6/60 to counting fingers only in the other eye, inter eye acuity difference of 3 or more lines with a history of an amblyogenic factor that met study-specified criteria for strabismus and/or anisometropia. Complete ophthalmic examination was performed by only one ophthalmologist. That included fixation pattern of eyes, presence or absence of a phoria/tropia by a cover-uncover test, fundus examination and color vision. Any case with an organic cause for visual loss was excluded from the study. Assessment of visual acuity of either eye for both near and distance (Snellen’s), refraction and Best Corrected Visual Acuity (BCVA) was performed by a trained optician.

The cases were divided into 3 age groups as shown in Figure 1: Group A: age 3-7 years = 38 cases (37.25%), Group B: 8-12 years = 41 cases (40.20%), Group C: 13-35 years = 23 cases (22.55%). The gender distribution in all three groups is shown in Fig 2. All patients had some degree of anisometropia; 2 children had stimulus deprivation amblyopia due to traumatic cataract (age=5 and 7 years), 76 patients presented with strabismus. All cases were prescribed an optimal refractive correction for a month and then full-time occlusion therapy along with near visual activities for 3-4 hours/day which included coloring, drawing, reading large prints initially shifting to smaller prints, playing video games on the personal computers.

They were closely followed-up at regular intervals of 1 day/year age. Children were instructed to come wearing the occlusive patch; first the vision of the occluded eye was checked and then that of the unoccluded eye and they were instructed to wear the patch immediately thereafter and each follow-up visit. Any change in fixation pattern of the two eyes was also noted after removing the patch.

The criteria for a successful therapy was regarded as a maximum visual recovery, achieving (6/6 Snellen’s); occlusion therapy was continued till this was achieved in all age groups. Then it was gradually weaned over the next 7 weeks and stopped. The weaning protocol adopted was 1 day off in the first week, 2 days off the second week, 3 days off the third week and so on till occlusion therapy was discontinued in 7 weeks. Cases in the 3-7 year age group were followed-up weekly and any drop in visual acuity during weaning was monitored. Cases more than 7 years of age were followed-up after every 2 weeks till occlusion therapy was successfully finished in seven weeks. Patients were followed-up at 2 weeks, 1 month, 2 months and then every 3 months for the next 18 months after stopping full-time occlusion.

RESULTS

Success was defined as equalization of visual acuity in both eyes i.e. 6/6 (Snellen’s). Improvement in visual acuity noted with full-time occlusion therapy was 6/6 Snellen’s in 38 / 38 (100% success) in Group A (3 – 7 year). In Group B, (8 – 12 years), 38 cases out of 41

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Specific Characteristics</td>
<td></td>
</tr>
<tr>
<td>Total Patient Number</td>
<td>102</td>
</tr>
<tr>
<td>Age: 3-7 years</td>
<td>38</td>
</tr>
<tr>
<td>Age: 8-12 years</td>
<td>41</td>
</tr>
<tr>
<td>Age: 13-35 years</td>
<td>23</td>
</tr>
<tr>
<td>Gender, Female (%)</td>
<td>50</td>
</tr>
<tr>
<td>Gender, Male (%)</td>
<td>52</td>
</tr>
<tr>
<td>Traumatic cataract</td>
<td>02</td>
</tr>
<tr>
<td>Strabismus</td>
<td>76</td>
</tr>
</tbody>
</table>
achieved 6/6 vision (92.68% success). In Group C, (13 – 35 years), 22 cases out of 23 achieved 6/6 (95.65%) success (Table II). The average time duration for successful amblyopia therapy in group A was 8 +/- 1 week, in group B was 9 +/- 2 weeks and in group C 16 +/- 2 weeks.

Visual acuity improved even in the "unsuccessful cases" (not achieving 6/6) was 6/60 to 6/12 in three cases in group B and one case in group C due to eccentric fixation. Hence an improvement of 5 lines did occur even with eccentric fixation. Patient's compliance to therapy was found to be the mainstay of clinical improvement in vision in this study. Groups A and B were noted to be more compliant to therapy than group C in spite of regular counseling of both the parents and the patients (Fig: 4).

All cases, showed improvement in near vision prior to the distance vision. Color vision in all cases was found to be normal. There was an increase in stereopsis after a successful amblyopia therapy. A more interesting outcome of the study noted was that out of the 102 amblyopic cases included in our study, 76 (74.50%) presented with strabismus. 56 cases (73.68%) became orthophoric once their amblyopia was fully corrected while only 20 cases (26.31%) needed surgery for strabismus correction once their vision was restored in the amblyopic eye (Table III).

Reversal of amblyopia was noted in 2 cases in Group A: 1 stopped wearing glasses after two months of stopping the weaning and VA dropped to two lines

**TABLE II: Amblyopia therapy success in different age groups**

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>PATIENTS ACHIEVING 6/6</th>
<th>PATIENTS NOT ACHIEVING 6/6</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-7 Years</td>
<td>38/38 100%</td>
<td>0/30</td>
</tr>
<tr>
<td>8-12 Years</td>
<td>38/41 92.68%</td>
<td>3/41 = 7.32%</td>
</tr>
<tr>
<td>18-35 Years</td>
<td>22/23 95.65%</td>
<td>1/23 = 4.35%</td>
</tr>
</tbody>
</table>

**FIGURE 4: Level of compliance to amblyopia therapy in different groups**

**Graph Key:**

- 6/60
- 6/36
- 6/24
- 6/18
- 6/12
- 6/9
- 6/6

0.1 0.166667 0.25 0.33333 0.5 0.6666671

**Table III: Impact of Amblyopia therapy on Strabismus**

<table>
<thead>
<tr>
<th>Group</th>
<th>Amblyopia cases presenting with Strabismus</th>
<th>Strabismus correction with amblyopia therapy</th>
<th>Cases requiring surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (38)</td>
<td>33 (32.35%)</td>
<td>28</td>
<td>5</td>
</tr>
<tr>
<td>B (41)</td>
<td>25 (24.50%)</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>C (23)</td>
<td>18 (17.65%)</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Total (102)</td>
<td>76 (74.50%)</td>
<td>56 (73.68%)</td>
<td>20 (26.32%)</td>
</tr>
</tbody>
</table>

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when she came for follow-up. She was started again on full-time patching and the visual acuity returned to 6/6. The second case stopped patching abruptly while it was being weaned. On follow-up, the visual acuity had dropped by two lines. It was controlled by resuming the full-time patching again. One patient in group C behaved similarly and reversal of amblyopia was controlled by resuming full-time patching and continuous spectacle wear. Patch related mild contact dermatitis was noted in 60% children, which was managed by steroid skin cream.

**CONCLUSION**
Visual improvement is possible in almost every patient with severe amblyopia irrespective of his/her age. Full-time occlusion therapy is the standard treatment for any severity of amblyopia. Occlusion amblyopia does not occur if the therapy is closely monitored. Reversal of amblyopia does not occur if occlusion therapy is gradually weaned. The mainstay of a successful amblyopia therapy is patients' compliance. Full visual recovery is only possible by highly motivated and inspired patients and their parents, hence strong counseling is mandatory prior to institution of therapy.

**REFERENCES:**

**Stellate Cataract**
**Claus Zehetner, M.D., & Nikolaos Bechrakis, M.D.**

A 55-year-old man was referred by his general practitioner because of a progressive unilateral decrease of visual acuity over the previous 6 months. The patient reported having blunt ocular trauma from a fist punch 9 months earlier. On examination, he was noted to have a stellate-shaped axial opacification of the lens. Traumatic cataracts are caused by blunt or penetrating ocular trauma. The proposed mechanism for indirect injury is shock waves progressing through the eye along the line of concussion. Opacification of the lens may occur in the cortex or capsule and can result in the formation of a stellate-shaped or rosette-shaped cataract. If such injuries disrupt the visual axis, cataract surgery may be required. This patient regained full visual acuity after successful phacoemulsification and intraocular-lens implantation.

(Curtesy: N Engl J Med 2013);
Knowledge, Attitude, Practice (KAP) regarding Diabetes & Diabetic Retinopathy (DR): A Study of Gaddap Town in Karachi.

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Prof. Muhammad Saleh Memon., DO, FRCS (Edin)

ABSTRACT

Purpose of the Study: The purpose of the study was to determine the diabetes related level of Knowledge, Attitude and Practices (KAP) in Gaddap Town, Karachi.

Methodology: The study is based on the cross sectional method of data collection. The period of data collection was June and July 2012. Total sample size of the study was 527 patients. The questionnaire was a mix of qualitative and quantitative method in which qualitative inquiry was included to get in-depth information about the attitudes and behaviors of patients about diabetes.

Results: The mean age of the study participants was 32 years with 21.8% illiterate population and 78.30% illiterate with different levels of education. The sample comprised of 54.5% males and 45.5% females. Out of these 33.8% were housewives, 33% were students and 33.2% were workers or agriculturists. The overall KAP score percentage of the study population was 34.40%. The KAP score percentages for knowledge, attitude and practice regarding diabetes were 35.23%, 24.72% and 35.80% respectively. The level of knowledge and practices varied greatly with reference to educational level. Students had better level of education regarding diabetes than housewives and workers.

Conclusion: The lower KAP scores call for need of an effective, mass diabetic education program. This could not only lower the financial burden of managing the diabetes by reducing the diabetes related morbidity and mortality but also halt the current epidemic of diabetes in the region.

Key words: Knowledge, Attitude, Practice

INTRODUCTION

Diabetes Mellitus has become a major public health challenge in last few decades. Its prevalence is rising around the world as 366 million people were diabetic patients in 2011 that will increase to 552 million by 2030. It has been estimated that the prevalence of diabetes will be high in developing and Least Developed Countries (LDCs) as eight out of ten countries will be from developing countries or LDCs by 2025. Notably, China, India and Pakistan will be among those few countries that are expected to have the highest increase in the prevalence of diabetes by 2025. Ironically, Pakistan is expected to have 11.4 million people with diabetes by 2030. Some well-known risk factors of diabetes outlined in the literature are obesity, decreased physical activity and changes in dietary habits. Diabetes considered as silent killer as morbidity and mortality associated with diabetes is mainly due to the complications associated with the disease.

Diabetic retinopathy (DR) is an important cause of blindness in diabetic patients. It is commonly believed that after 15 years of diabetes, approximately 2 percent of people have developed complete blindness and about 10 percent developed severe visual impairment. Diabetes is one of the leading causes of visual impairment and blindness in developed countries.

Knowledge plays an important role in changing attitude and practices of the community and can also enhance the knowledge of diabetic patients to change their attitude toward the disease. It can be argued that promotion of knowledge and attitude of diabetes and its related diseases at community level seems to be critical to encounter the rising epidemic of diabetes and related complications. Education and awareness
program can change the attitude of people regarding diabetes. Collecting information about the level of awareness about diabetes in a population is the first step in formulating a prevention program for diabetes. This study was conducted to assess knowledge, attitude and practice of people in Gadap Town Karachi about diabetes and diabetic retinopathy.

**METHODOLOGY OF THE STUDY:**
A cross-sectional study was designed to assess the knowledge, attitude and practice of the people in Gadap Town, Karachi, regarding diabetes and DR. The permission from ethical committee of Al-Ibrahim Eye Hospital was sought before initiation of the study. A questionnaire was developed that includes both qualitative and quantitative aspects of knowledge, attitude and practice of population for diabetes and diabetes related complications including DR.

**Key Demographic Indicators of Study Area:** According to 1998 census, the Gadap Town has population of 0.3 million people. The sample population was drawn from lower medium income groups stratified in different ethnic groups. Out of eight union councils of Gadap Town, four Union Councils (UCs) were randomly selected namely Memon Goth, Kathore, Manghopir and Gadap city. Sample strata were randomly selected in four UCs and households were selected randomly from the selected clusters in the UCs. A cross-sectional study was designed to assess the knowledge, attitude and practice of the people in Gadap Town Karachi about diabetes and diabetic retinopathy.

**Questionnaire Design and Analysis:** The questionnaire was designed to capture five important aspects of KAP among the population in the sample area. This includes respondents’ attitude, knowledge about diabetes and related complications, risk factors, treatment of diabetes, monitoring of diabetes and usual practices in daily life.

To measure the levels of various aspects of KAP, scalar-scoring method was used. Each item of the knowledge, attitude and practice questionnaire was awarded one point for correct response and zero point for wrong or uncertain response. Overall, the 22 questions in the questionnaire were awarded seven scoring points to a person who answers all questions correct. It means 73 score of KAP is the highest score a respondent could achieve. The total 73 points were divided into three sections in which 42 points (58%) attributed to knowledge section, 6 points (8%) to attitude and 25 points (34%) to practices section.

For the purpose of analysis, this total KAP score is used to scale the levels of knowledge, attitude and practice. The KAP score above 50 was considered as maximum level, the scores between 25 and 50 were considered as medium level and score below 25 was considered as minimum level. Analysis of variance (ANOVA) was used for comparison of more than two groups. Kruskal-Wallis test was used where only two groups were being compared.

**RESULTS:**
Total sample size of the study was 527 respondents. The mean age of the respondents was 32 ± 129.11 that ranged from 17 years to 80 years. The study shows considerable level of literacy with different level of education among respondents as 78.3 percent were literate while 21.8 percent were illiterate. In literate respondents, 8.2 percent has completed primary level of education (5th grade), 30.6 had middle level (9th grade), 34.2 were graduates and 5.3 were postgraduates. Out of 527 respondents, 54.5 percent were males and 45.5 percent were females. The sample size was also divided into three groups in which the survey respondents were 33.8 percent housewives, 33.0 percent were students and 33.0 percent were labors or farm workers.

The overall KAP score of surveyed respondents was 34.4 percent that means only 34.4 percent of respondents have considerable level of knowledge about diabetes, have rational behavior (attitude) towards disease of diabetes and take appropriate measures to control and prevent diabetic related complications. The mean KAP score for knowledge, attitude and practice were 15.50 (SD±8.24), 1.73 (SD±0.9) and 7.88 (SD±2.58) and respective percentages were 35.23%, 24.72% and 35.80% respectively.

**Table-1 KAP reference values and overall scores with percent.**

In terms of different levels of KAP score in study population, 44.0 percent achieved low or minimum level of KAP score, while 40.8 percent achieved middle or medium level of KAP score. Only 15.2 percent achieved high level of KAP score.

**Table-2 shows description of different levels of Knowledge, attitude and practices of male and female respondents.**

The data shows no significant statistical difference among three target groups about the knowledge of diabetes and diabetic retinopathy.

**Table-3 shows KAP scores in percentage by profession, gender, education level and diabetic status.**

Apparently, significant statistical difference was found between sample population with and without diabetes as 41 percent of sample population with diabetes had knowledge of diabetes and DR in comparison with 35 percent of sample population without diabetes.

Regarding knowledge of diabetes, most of the respondents have knowledge of at least one symptom of diabetes; while 7.6 percent did not have knowledge about any symptom. The question of risk factor for diabetes has also received different responses as 47.1
percent respondents viewed *overeating* as major risk factor while 22.2 percent considered *obesity* as a risk factor. A very small percentage of sample population (2.8 percent) believed that *heredity* is a major risk factor of diabetes. Only 9.5 percent of respondents were unaware of any risk factor.

It is important to note that only 7.4% respondents (2.8 percent) believed that *heredity* is a major risk factor have knowledge that blindness is a complication of diabetes.

### Table 1: KAP reference values and overall scores with percent

<table>
<thead>
<tr>
<th>Description</th>
<th>Knowledge</th>
<th>Attitude</th>
<th>Practices</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Score</td>
<td>Percent</td>
<td>Score</td>
<td>Percent</td>
</tr>
<tr>
<td>Case Total Score</td>
<td>44 60%</td>
<td>7 10%</td>
<td>22 30%</td>
<td>73</td>
</tr>
<tr>
<td>Total Score</td>
<td>23188 60%</td>
<td>3689 10%</td>
<td>11594 30%</td>
<td>38471</td>
</tr>
<tr>
<td>Obtained Scores</td>
<td>8170 62%</td>
<td>912 7%</td>
<td>4151 31%</td>
<td>13233</td>
</tr>
<tr>
<td>Means</td>
<td>15.50</td>
<td>1.73</td>
<td>7.88</td>
<td>25.11</td>
</tr>
<tr>
<td>Percentages</td>
<td>35.23</td>
<td>24.72</td>
<td>35.80</td>
<td>34.40</td>
</tr>
<tr>
<td>St. Deviation</td>
<td>8.24</td>
<td>0.9</td>
<td></td>
<td>2.588</td>
</tr>
</tbody>
</table>

### Table 2: KAP scores among genders

<table>
<thead>
<tr>
<th>Description</th>
<th>Knowledge High (&gt;50%)</th>
<th>Knowledge Middle (31-50%)</th>
<th>Knowledge Low (&lt;=30%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>58 (11.01%)</td>
<td>95 (18.03%)</td>
<td>134 (25.43%)</td>
<td>0.5394</td>
</tr>
<tr>
<td>Female</td>
<td>37 (7.02%)</td>
<td>104 (19.73%)</td>
<td>99 (18.79%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Attitude Male</th>
<th>Attitude Female</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0(0%)</td>
<td>55 (10.44%)</td>
<td>0.0098</td>
</tr>
<tr>
<td>Female</td>
<td>0(0%)</td>
<td>48 (9.11%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Practices Male</th>
<th>Practices Female</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26 (4.93%)</td>
<td>120 (22.77%)</td>
<td>0.2495</td>
</tr>
<tr>
<td>Female</td>
<td>24 (4.55%)</td>
<td>100 (18.98%)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: KAP scores in % by profession, gender, education and diabetes status

<table>
<thead>
<tr>
<th>Description</th>
<th>N</th>
<th>Knowledge Percent</th>
<th>Attitude Percent</th>
<th>Practice Percent</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profession</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.27</td>
</tr>
<tr>
<td>Students</td>
<td>174</td>
<td>36%</td>
<td>25%</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>Housewives</td>
<td>178</td>
<td>35%</td>
<td>24%</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>Workers</td>
<td>174</td>
<td>35%</td>
<td>25%</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>526</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value</td>
<td>0.9015</td>
<td></td>
<td>0.2831</td>
<td>0.0674</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.3452</td>
</tr>
<tr>
<td>Male</td>
<td>287</td>
<td>35%</td>
<td>26%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>240</td>
<td>35%</td>
<td>24%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>526</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value</td>
<td>0.0219</td>
<td></td>
<td>0.0001</td>
<td>0.1765</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0447</td>
</tr>
<tr>
<td>Educated</td>
<td>412</td>
<td>36%</td>
<td>26%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Uneducated</td>
<td>115</td>
<td>31%</td>
<td>22%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>526</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value</td>
<td>0.0219</td>
<td></td>
<td>0.0001</td>
<td>0.1765</td>
<td></td>
</tr>
<tr>
<td>Diabetes Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0654</td>
</tr>
<tr>
<td>Diabetic</td>
<td>21</td>
<td>41%</td>
<td>29%</td>
<td>42%</td>
<td></td>
</tr>
<tr>
<td>Non-Diabetic</td>
<td>506</td>
<td>35%</td>
<td>25%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>526</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value</td>
<td>0.7876</td>
<td></td>
<td>0.38</td>
<td>0.0067</td>
<td></td>
</tr>
</tbody>
</table>
diabetes. Only 2.3 percent respondents regarded diabetes as major cause of blindness. Diabetes was considered as one of the causes of decreased vision by 17.5 percent of respondents; whereas diabetic retinopathy as cause of blindness was considered by 7.4 percent respondents. It is interesting to note that 56.9 percent respondents considered cataract as cause of diabetes. Cataract is a treatable disease and there are slim chances of blindness even in chronic cases. On the contrary, the respondents have extremely low level of knowledge about DR and diabetic complications leading to blindness. Only 35.8 percent of the respondents’ were involved in healthy practices. Housewives and workers have better practices than students as 37 percent housewives and 37 percent workers of the total sample made efforts to prevent and control diabetes. It is interesting to note that although 18.0 percent of respondents achieved a high level of knowledge score, but their practices do not correspond to their level of knowledge.

Only 24.7 percent of respondents have positive attitude in terms of understanding of diabetes, methods of prevention and controlling it and willingness to implement the knowledge. Only 11 percent of respondents showed dis-satisfaction with their dietary pattern while 89 percent respondents were satisfied with their eating habits and quality of food. For the changes in lifestyle question, 32.8 percent of respondents believed that they have higher chances of developing diabetes in future. Interestingly 19.9 percent respondents attributed development of diabetes with their life style, while 73.4 percent of respondents believed that eating habits/patterns to be a major cause of diabetes.

**DISCUSSION**

The level of knowledge varied significantly among sample population from lack of understanding of "diabetes" in term to participants describing different options for prevention and control of diabetes. The overall knowledge of the sample population was 35.2 percent that is extremely inadequate. This is similar with the earlier studies conducted at national and regional level that reported same level of knowledge in people. Studies have also reported a generally lower knowledge of the common people regarding diabetes. In Pakistan, earlier studies show marginally better level of knowledge than the current research. The difference in level of knowledge may be probably due to the sample selection and inclusion of non-diabetic population.

The difference in the level of knowledge between educated (36 %) and uneducated (31%) respondents was significant. Earlier studies found a positive correlation between level of education and knowledge of diabetes that means literacy has positive impact on level of diabetic knowledge. The study also shows that there was no difference in knowledge regarding diabetes between females and males. This is in contradiction from the study conducted in Oman.

One of the major findings of the study is the assessment of knowledge about diabetic retinopathy. The analysis revealed that respondents have low level of knowledge about diabetic retinopathy as only 7.4 percent respondents have knowledge that diabetes causes retinopathy and blindness. This calls for the role of the general physicians in imparting diabetic education including knowledge regarding diabetic retinopathy.

Although the knowledge of educated people regarding diabetes was better than un-educated but in contrast the practices of uneducated people were better than the educated people. This could be due to the increasing tendency of urbanization among educated people i.e. increased physical inactivity and use of fast foods etc. Also people residing in the rural areas, usually uneducated, still prefer fresh vegetables and fruits in their diet and are physically more active.

The practices of non-diabetics were found to be slightly inadequate than diabetics respondents (practice score of diabetics 42 percent, practice score of non-diabetics 36 percent). The possible explanations for this result could be that the diabetics are taking precautions in order to avoid and control diabetes. This study not only assessed the individual's knowledge about diabetes thus identifying their educational needs but also their willingness to learn. The willingness to adopt healthy eating habits if/when suggested is very encouraging and increases chances of success of a diabetic education program in the community.

**CONCLUSION:**

The study shows that the knowledge about impact of diabetes on eyes was generally very poor in the sample population of Gaddap Town. Although many respondents thought that diabetes can result in impaired vision; great majority considered it due to cataract. Very few respondents were aware of Diabetic Retinopathy and that it can cause Blindness. There was lack of understanding about importance of the diet and life style. Considering lack of knowledge about diabetes and DR, it is important to consider all the aspects of this KAP study while developing behavioral change communication/information, education,
Knowledge, Attitude, Practice (KAP) regarding Diabetes & Diabetic Retinopathy (DR): A Study of Gaddap Town in Karachi.

REFERENCES:

Knowledge, attitude and practice regarding eye complications and care among Omani persons with diabetes - A cross sectional study, Oman Journal of Ophthalmology, 3(2).

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Quarterly

Ophthalmology Update

Approved & indexed by PMDC, PakMedinet & H.E.C
INTRODUCTION:

Evisceration (evisceration bulbi) is one of the causative surgical procedure where by intraocular structure along with the cornea is excised leaving behind the sclera and surrounding structure intact. Finally to cover the corneal defect, sclera, tenon's capsule and the conjunctiva is closed in two different layers. Among the destructive surgery, evisceration is the most commonly performed surgery with or without the ocular implant throughout the world especially in developing countries where eye care infrastructure are inaccessible to the general population.

The first recorded evisceration was performed by James Bear in 1817, which was accidentally performed iridectomy for a patient of acute Glaucoma and that made him to remove the content of the globe. The first routine evisceration was performed by Noyes in 1874 and published a review of the evisceration procedure that he used in cases of severe ocular infection. Later in 1884, Mules developed a unique technique for evisceration where he used a hollow glass ball into the scleral cavity after removal of content of globe and cornea. The World Health Organization (WHO) program for prevention of blindness estimates that 55 million eye injuries occur globally each year. Of these, 75000 require hospitalization and approximately 200000 are open globe injuries. The prevalence of blindness (< 3/60) as a result of injury is about 1.6 million and there are 19 million with visual impairment. The economic cost for treating the patients with trauma is tremendous accounting for US$ 5 million and a loss of 60 work – years according to a study conducted in emergency department(USA) for a period of six month. Ocular trauma is a global health problem leading to one of the major cause of mortality, morbidity and disability of human life. Although ocular trauma is preventable unfortunately greater effort and resources are being invested in the clinical and surgical management of trauma than its prevention. Ocular trauma had significant impact for blinding eyes diseases if not treated in time. Superficial corneal trauma sustained specially in agricultural countries such as Pakistan often leads to rapid progression of corneal ulceration and visual loss. The objectives of our study were to determine the demographic characteristics and clinical indications for evisceration.
and the orbital implant trends in our set up.

**MATERIALS AND METHODS**

This is a hospital based retrospective study of patients presenting at tertiary Eye Care Centre, in the department of ophthalmology Hayatabad Medical Complex, Peshawar over a period of two years (Nov 2010 to Nov 2012). 160 patients had been eviscerated. All patients were admitted and proper detail ocular and systemic history was taken. Ocular and systemic examination was performed. X-ray orbit and skull, C-T Scan Orbit to know about intraocular or intra-orbital foreign body (IOFB) type, site, and size of the IOFB and B-Scan ultrasonography. The rest of investigation like HCV, HBS, FBC, Blood sugar, urea, Creatinin, X-ray chest, ECG in old age patients for local and general anesthesia fitness. Orbital implant was done for empty socket in 149 patients and dermofat graft in 11 patients. Age ranged from 1 year to 80 years. There were 95 (59.37%) male whereas 65 (40.62%) were female. Demographic data, site and type of trauma, duration of trauma, cause for operation, operated eye, and types of anesthesia used were entered into a computer program SPSS 11.6.

Painful blind eye because of glaucoma and its treatment were categorized under glaucoma and its sequel. Painful blind eye with unknown cause B – Scan ultrasonography were performed to look for intraocular tumors. Non traumatic corneal ulcer that underwent evisceration either due to perforation or extension of the disease into the eye, were classified as corneal ulcer related. Surgeries were further classified as either evisceration, evisceration with implant or dermofat graft. Operated eyes were recorded as either right, left. Similarly anesthesia was noted as either under local anesthesia that include either peribulbar or as general anesthesia. For the eviscerations, a 360° peritomy was performed and the sclera was incised just posterior to the surgical limbus. An evisceration spoon or periosteal elevator was used to separate the uvea from the sclera and to deliver the intraocular contents. The interior of the scleral shell was scraped or cleaned with gauze to remove all visible remnants of uveal tissue. In addition, the surgeon routinely used dehydrated (absolute) alcohol to remove residual pigment from the scleral wall. Anterior relaxing incisions that measured approximately 1 cm were made medially and laterally, avoiding the medial and lateral rectus muscles. The posterior sclera was also opened around the optic nerve with a combination of sharp and blunt dissection. A porous implant that was infiltrated with antibiotic solution was placed in the scleral shell, and this was closed in layers with 5-0 Ethidand sutures.

Out of 160 cases 102 cases of trauma and its subsequent sequel accounting for 63.75% was a leading cause for evisceration with orbital implant and dermofat graft were performed. Among all majorities of the patients had war (bomb blast) or while fighting related trauma followed by road traffic accident, house hold and sports related trauma (cricket ball, disposable syringes). While 3.125 % of cases of had history of agricultural related trauma. Most vulnerable age group in patients who underwent evisceration because of trauma and its sequel was 1 - 20 years 47 patients followed by age group 21 – 40 years in which the number of patients were 41, and 40 patients in 41 – 60 years of age group. Trauma is significantly high in numbers of male population. Overall, out of 160 patients, 118 (73.75%) patients had evisceration under local anesthesia, and 42 (26.25%) patients, surgery had been performed under general anesthesia. 149 (93.125%) of patients had silicon orbital implant were used while only 11 (6.875%) of patients had evisceration with dermofat graft. Left eye was involved in 97 (60.625%) of cases. Most of the patients come to tertiary care hospital from outside, from periphery federally administered tribal area (FATA) and also from Afghanistan. Post-operative endophthalmitis is the second most common indication for evisceration in our setup because of tertiary care hospital all are the complicated post surgical cases are referred to teaching and training institute.

**Table I Causes of Evisceration with Orbital implant (N=160)**

<table>
<thead>
<tr>
<th>Causes</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocular trauma</td>
<td>102 (63.75%)</td>
</tr>
<tr>
<td>Post; operative endophthalmitis</td>
<td>21 (13.125%)</td>
</tr>
<tr>
<td>Corneal ulcer related</td>
<td>18 (11.125%)</td>
</tr>
<tr>
<td>Glaucoma and its sequel</td>
<td>14 (08.75%)</td>
</tr>
<tr>
<td>Endogenous endophthalmitis</td>
<td>05 (3.125%)</td>
</tr>
<tr>
<td>Total</td>
<td>160 (100%)</td>
</tr>
</tbody>
</table>
Pakistan. Ocular trauma and its subsequent monocular blinding effect have been largely mentioned in different countries around the world4-20. But unfortunately none of the study focused upon the irreversible blindness that occurs with trauma, at the same time previous studies have compared the traumatic blindness with that of cataract blindness which is totally arguable. Global concern on blinding ocular injuries is demanded. Our study result revealed most common cause of trauma were war related, house hold, sports and agricultural led. Prevalence of ocular trauma that needs evisceration, increases with increasing age most common being young adults and majority are male 16 this explains that trauma mainly affects a large number of active and energetic peoples of nation which can be easily prevented by public awareness. In contrast to our result, one study showed equal risk factor for both sex in trauma patients who needed evisceration and the other study showed children at greater risk and decreasing risk for the young adult for trauma. Indication for evisceration have been reported from 10.7% – 28% in previous literatures10, 13, 14, 18. But in our study, there was high percentage (63.75%) of ocular trauma and its sequel that have resulted into evisceration because of war zone. On the other hand possibilities may include poverty, poor literacy, lack of knowledge, remote areas in the country without eye care facility, cultural and traditional beliefs together with unsafe working environment in our community might have result a positive influence for high percentage of cases.

The cause for evisceration remains one of the crucial questions as we know that once the surgery like evisceration is done, the hope for the vision to recover is obviously absent. Out of these curiosities we did this project and we found that ocular trauma is one of the leading causes for evisceration in our 102 cases out of 160 cases of evisceration. Early treatment seeking behavior of the patients should be motivated and traditional belief and treatment should be discouraged. At the same time it is important that surgeon should realize that the evisceration leads to not only visual loss to the patients but it can also significantly add economical burden. Moreover surgeon should also consider about the social and psychological factors and subsequently counsel patients and their family members before surgery.

CONCLUSION

Prevention is better than cure, if we can make population aware about the trauma and its impact this will help reduce the blindness related to trauma. Moreover, changing behavior and adopting preventive measures often requires expanded community and

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 20 years</td>
<td>47</td>
</tr>
<tr>
<td>21 – 40 years</td>
<td>40</td>
</tr>
<tr>
<td>41 – 60 years</td>
<td>41</td>
</tr>
<tr>
<td>Above 60 years</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
</tr>
</tbody>
</table>

DISCUSSION

When medical and surgical treatment fails to save the eyes from ocular disease that discomfort or alarm human lifestyle or which disfigure the eyes then the role of destructive surgery is clearly indicated. In our study we have analyzed only the cases that have under gone evisceration with implant. Ocular trauma and its sequel (102 cases 63.75%) is the major cause for evisceration that we have found. Though ocular trauma is preventable, it remained a global challenge to struggle and decrease the blindness that is due to trauma even in 21st century especially in developing countries like Pakistan.
government involvement. The media, newspapers, radio and television are extremely important in creating awareness of the problem in community.

REFERENCES
ABSTRACT

Purpose: To assess the outcome and complications after median forehead rotational flap for lid reconstruction.

Methods: Retrospective case review of 23 patients. Patient record was reviewed on non-probability purposive basis from Oculoplasty clinic, Isra Postgraduate Institute of Ophthalmology, Karachi from January 2008 to December 2012. All the patients who underwent median forehead rotational flap for lid reconstruction were included. Patients with complex reconstruction from multiple sources were excluded. Outcome was recorded for final flap acceptance and cosmesis. Complications were also noted and recorded.

Results: 23 patients were included in this study. All patients had undergone median forehead rotational flap. Age of the patients ranged from 22 years to 84 years (mean of 62.04 years). 10(43.47%) patients were male while 13(56.52%) were female. 18(78.26%) patients underwent surgery for reconstruction after tumor excision. Out of these 13(2(2.22%) were proven to be Basal cell carcinomas, 03(16.66%) were squamous cell carcinomas and 2(11.11%) were melanomas. 13(72.22%) patients had tumors at the medial canthus while 5(27.77%) patients had tumors at the lower lid. 03(13.04%) patients underwent surgery for cicatrical ectropion of the lower lid due to acid burn. 01(4.34%) patient had cicatrical ectropion of the upper lid and medial canthal area secondary to acid burn. 01(4.34%) patient underwent surgery due to traumatic laceration and tissue loss. As far as complications are concerned 01 (4.34%) patient had forehead wound gapping which required re suturing. 02(8.69%) patient had wound dehiscence at the distal margin of the flap, which were dealt with re suturing after refreshing the margins.

Conclusion: Median forehead rotational flap is an effective procedure for lid reconstruction secondary to different causes of defects in the area of upper and lower eyelids and medial canthus. It is associated with fewer complications, which are easily manageable. It shows promising results with good cosmesis.

INTRODUCTION

Eyelids have highly specialized multifunctional characteristics. Considering their aesthetic and emotional qualities, lid reconstruction is always challenging for lid surgeons. Various procedures have been tried for reconstruction of different parts of the lids and canthi depending upon the location, size and thickness of the tumors or defect.

The ideal goal of reconstruction is to provide aesthetics and protection to the globe. To attain these goals; reconstruction should ideally replace the delicate, thin, pliable, well vascularized and innervated tissues of the eyelids with those of its kind. For defects that cannot be closed with direct closure, structures adjacent to the eyelids may act as reservoirs for tissue harvesting and flap or graft transfer.

The median forehead skin is one such good reservoir for lid and adenexal reconstruction. There are conditions of the medial canthus, upper lid and lower lid which merit reconstruction of a large area. Median forehead skin provides an easily accessible and harvestable flap material for such reconstruction.

Conventionally the periorbital region is divided into the following 4 zones:

Zone I – upper eyelid;
Zone II – lower eyelid;
Zone III - medial canthus;
Zone IV – lateral canthus

Usually median forehead flap is used in reconstruction of the medial canthal defects (zone III), however in our institute we performed this flap for the reconstruction of Zone I and Zone II anterior lamellar defects also. Zone IV lies at longer distance from the median forehead, so it demands different options. Various surgeons have also used forehead flap variations for reconstruction of medial-canthus, upper and lower lids. Median forehead flap proved to be feasible for reconstruction after tumor excision, traumatic tissue loss and cicatrical ectropion.

MATERIAL AND METHODS

Patients record and photographs were reviewed on non-probability purposive basis from Oculoplasty clinic, Isra Postgraduate institute of Ophthalmology from January 2008 to December 2012. Retrospective case review of 23 patients was done. All the patients...
who underwent median forehead rotational flap for lid reconstruction were included. Patients with complex reconstruction from multiple sources were excluded.

Preoperative and postoperative photographs of the patients were taken on every visit after informed consent. Median forehead flap was planned in patients having defects on the upper lid, lower lid or medial canthus which cannot be closed with direct closure or local advancement flaps.

Majority of cases were performed under local anesthesia (Xylocaine 2% with Adrenaline 1:1000) except for three cases, which required general anesthesia. The tumor site (in case of tumor excision) was marked with Gentian violet dye leaving 2-4 mm of apparently normal skin depending upon the clinical evaluation of the tumor. A similar, slightly larger area was marked on the forehead skin along with its pedicle, making sure that the supra trochlear or supraorbital vessels are included in the pedicle. The base of the pedicle was marked up to the medial side of the eyebrow. Tumor was excised up to the desired depth and hemostasis achieved either by cautery, ligation or both. Specimen was saved in formaldehyde and sent for histopathology. We did not have the facility of standard frozen section or Moh's micrography at our institute, so excision well beyond the visible tumor was ensured.

The median forehead flap was dissected with 11 No. blade and fashioned up to the thickness of subcutaneous tissue with scissors up to the base of the pedicle. After hemostasis the margins of the forehead wound were undermined by blunt dissection for direct closure. The forehead wound was closed by interrupted 4/0 polypropylene sutures.

The underside of the flap was shaved off all the fat and subcutaneous tissue and put in place. The flap was anchored at the recipient site with subcutaneous interrupted 6/0 polygalactin (vicryl) sutures. The skin was approximated by interrupted 5/0 polypropylene sutures. A bolster was placed over the flap to avoid hematoma and ensure approximation without tension on the wound margins. The pedicle was left free without suturing to ensure adequate blood supply. Sterile bandage with antibiotic ointment was applied for 24 hours. Prophylactic oral antibiotic and NSAIDs prescribed.

The dressing was removed on 1st post-operative day and after assuring wound stability patients were discharged with additional topical antibiotic ointment. On 1st post-operative week the forehead sutures were removed along with alternate sutures of the flap. The oral medicine were stopped usually depending upon the wound condition. On 2nd week follow up the remaining flap sutures were removed. The pedicle was dissected away from the flap after ensuring flap's acceptance and wound stabilization. The cut end of the flap-pedicile junction was sutured with 5/0 polypropylene. The base of the pedicle was also excised and wound closed by avoiding dog earing. The remaining sutures were removed after one week. Patients were followed up for 3-6 months depending upon the cause of reconstruction as post tumor excision cases were followed as per histopathology report recommendation.

RESULTS

23 patients were included in this study. All patients had undergone median forehead rotational flap. Age of the patients ranged from 22 years to 84 years (mean of 62.04 years). 10 (43.47%) patients were male while 13 (56.52%) were female. 18 (78.26%) patients underwent surgery for reconstruction after tumor excision (Table 1). Out of these 13 (2.22%) were proven to be Basal cell carcinomas, 03 (16.66%) were Squamous cell carcinomas and 2 (11.11%) were Melanomas (Table 2). 13 (72.22%) patients had tumors at the medial canthus while 5 (27.77%) patients had tumors at the lower lid. 03 (13.04%) patients underwent surgery for cicatricial ectropion of the lower lid due to acid burn. 01 (4.34%) patient had cicatricial ectropion of the upper lid and medial canthal area secondary to acid burn. 01 (4.34%) patient underwent surgery due to traumatic

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Cause</th>
<th>No. of patients</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>1</td>
<td>Tumors</td>
<td>18</td>
<td>78.26</td>
</tr>
<tr>
<td>2</td>
<td>Cicatricial ectropion upper lid</td>
<td>03</td>
<td>13.04</td>
</tr>
<tr>
<td>3</td>
<td>Cicatricial ectropion lower lid and medial canthus</td>
<td>01</td>
<td>4.34</td>
</tr>
<tr>
<td>4</td>
<td>Traumatic tissue loss</td>
<td>01</td>
<td>4.34</td>
</tr>
</tbody>
</table>

Table 2: distribution of types of lid tumors

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basal cell carcinoma</td>
<td>13</td>
<td>72.22</td>
</tr>
<tr>
<td>2</td>
<td>Squamous cell carcinoma</td>
<td>03</td>
<td>16.66</td>
</tr>
<tr>
<td>3</td>
<td>Melanoma</td>
<td>02</td>
<td>11.11</td>
</tr>
</tbody>
</table>

Table 3: Post-operative complications

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Complication</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wound gap at donor site</td>
<td>01</td>
<td>4.34</td>
</tr>
<tr>
<td>2</td>
<td>Wound Dehiscence at flap recipient junction</td>
<td>02</td>
<td>8.69</td>
</tr>
<tr>
<td>3</td>
<td>Flap rejection</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>
Median Forehead rotational Flap for Lid Reconstruction

laceration and tissue loss.

**Fig. 1:** 65 years old female with Right lower lid basal cell carcinoma involving 60% of the lid.

**Fig. 2:** same patient after one week of reconstruction by median forehead flap.

**Fig. 3:** same patient after three weeks. The flap is in place and pedicle excised.

As far as complications are concerned 01 (4.34%) patient had forehead wound gapping which required re-suturing. 02(8.69%) patient had wound dehiscence at the distal margin of the flap (Table 3), which were dealt with re-suturing after refreshing the margins. None of the records show any early or late flap rejection.

**DISCUSSION**

Large defects in various periorbital zones that cannot be covered by direct closure or local advancement flaps demand abundant tissue for reconstruction with adequate circulation to avoid failure or rejection. Median forehead flap is one easily approachable and harvestable option for a variety of defects in various periorbital zones. Traditionally it is indicated for reconstruction of post tumor excision defects in zone III i.e. the medial canthus; however we successfully tried this procedure in Zone I and Zone II anterior lamellar defects at our institute. Full thickness large defects of these zones do need separate procedures such as Cutler Beard\(^{17}\) and Hughe’s\(^{18}\) flaps. Total lid reconstructions have also been described by various surgeons using variations in forehead flap\(^{10,11,14}\).

The broadness of the forehead allows fashioning a graft as vast as required. The entire length of the eyelids and medial canthal area can be covered by a forehead flap without disturbing the anatomy and cosmesis of the donor area. The donor site can be easily closed by undermining the surrounding area. The normal midline furrow (more marked in elderly patients) helps in hiding the surgical scar.

The presence of arterial supply, mainly the supratrochlear artery\(^{19}\), within the pedicle of the midline flap renders it friendlier for acceptance at the recipient site. Once the flap is accepted and wound is healed the pedicle is cut off without any functional or cosmetic problem. On the other hand, especially in case of cicatricial ectropion, free skin grafts are usually required for larger areas of cictrization which cannot be alleviated with Z plasty. The chances of graft rejection and difference in skin colour are always there as the graft is devoid of any primitive vascular supply. This problem is adequately dealt with forehead flaps.

In our study the major portion of cases comprised of post tumor excisions. The breakup of the location of tumors showed that most of the tumors (56.52%) were located in zone III, followed by 21.77% in the zone II. This must not be confused by the normal epidemiology of lid tumors\(^{15}\) in which majority of tumors occur on the lower lids because in our study the sampling is not for all cases of lid tumors. It was focused on those cases which were treated by forehead flap which is usually reserved for medial canthal tumors. Within the cases done for tumor excisions the distribution of various types of tumors does reflect a normal or universal pattern i.e. 72.22% Basal cell carcinomas followed by 16.66% Squamous cell carcinomas and 11.11% Melanomas. Traumatic lacerations with tissue loss were also successfully bridged by forehead flaps without significant cosmetic disfigurement. The lesions of the zone IV i.e. the lateral canthus are beyond the scope of

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this procedure as the distance from the forehead is long, so usually temporal flaps are required for such defects.

As far as complications are concerned, the only group of complication we encountered was wound dehiscence. We noticed one case of wound gapping at the donor site i.e. the forehead. Wound was reshaped and sutured ensuring that there is no tension on the wound margins. There were 2 cases in which wound dehiscence was noted at the distal margin of the flap probably owing to post-operative wound contraction. These cases were also dealt with by re sutureting after reshaping of the margins. Forehead flaps have been used extensively and different modifications have been tried by various surgeons with promising results. These include scalping forehead flap, Galeal flap, expanded forehead flap, tunneled forehead flap and bucket handle flap. These techniques have been described by various surgeons to reconstruct the medial-canthus, upper and lower lid. All these studies showed promising result with similar minor complications as noticed in our study. The acceptance of forehead flap has been good in all the studies proving its efficacy for reconstruction.

CONCLUSION

Median forehead rotational flap is an effective procedure for lid reconstruction secondary to different causes of defects in the area of upper and lower eyelids and medial canthus. It is associated with fewer complications, which are easily manageable. It shows promising results with good cosmesis.

REFERENCES:

11. Yadrando D, Todd A, Jeffery S, Schock DDS. Reconstruction of the upper eyelid with a pedicled bucket handle brow flap. FACE vol.6, 165-167, 1999
ABSTRACT
Objective: Postoperative patient satisfaction and skin scarring after external dacrocystorhinostomy.
Study design: Retrospective study
Material and Method: This retrospective study was conducted in department of ophthalmology PGMI, Khyber institute of Ophthalmic medical sciences from January 2012 to January 2013. One hundred and forty seven patients with acquired nasolacrimal duct obstruction were included in this study. The surgeries were performed by three surgeons. Patients were examined postoperatively to evaluate the appearance of the skin scar at the site of incision used in external DCR at the time of 6 weeks and 6 months after surgery in two ways, patients subjectively evaluated their own incision and give their satisfaction in form of grading on performa and same perform is used by three blinded surgeons who graded the photographs taken from patients at 6th week and 6th month after surgery.
Results: The total one hundred and forty seven patients were admitted for external DCR surgery. All patients were followed for six weeks and six months after surgery. Surgeries were performed in seventy-eight with intubation and in sixty-nine patients without intubation. In total number of one hundred and forty seven, ninety-nine were female and forty eight were male. From the age group twenty-one to eighty years of age.
Conclusion: The skin incision in external dacrocystorhinostomy is satisfactory to most of the patients. Its appearance is improved with time; 90% of the incision was graded invisible or minimally visible by patients after six months of surgery.

INTRODUCTION
Dacrocystorhinostomy (DCR) is the treatment of choice and gold standard in most patients with acquired Nasolacrimal Duct (NLD) Obstruction. Surgical indication for DCR is recurrent dacrocystitis, chronic mucoid reflux, painful distention of lacrimal sac, and simply troublesome epiphora. Although there are many minor variations in surgical technique, all share the feature of creating an anastomosis between the lacrimal sac and the nasal cavity through a bony ostium. The most substantial distinction between techniques is whether one utilizes a more traditional external transcutaneous or an internal (intranasal) approach. External dacrocystorhinostomy has been established as the most efficient cure for epiphora from nasolacrimal duct stenosis or obstruction, with a success rate higher than 92% for cases with no canalicular disease. Although failure of surgery is rare, it is mainly attributed to common canalicular obstruction, “sump” syndrome, occlusion of the anastomosis medial to the canaliculi, and no entry into the nose. These factors are related to the underlying pathology, nasal anatomy, and mainly surgical technique. Although several modifications of the procedure have been introduced to address technical difficulties. The distal area of the common canalicular opening into the sac cavity remains the least investigated factor for lacrimal drainage obstruction and subsequent failure of a DCR procedure. A membranous condensation may functionally obstruct or anatomically block the common canalicular opening into the sac, and, if not correctly identified and excised, may affect the outcome of an external DCR. A visible skin incision is usually mentioned as one of the disadvantages associated with this procedure and is used as a reason to recommend endonasal or other non-incisional techniques. The purpose of our study was to look for skin scar and patient satisfaction after external dacrocystorhinostomy.

MATERIAL AND METHODS
This retrospective study was conducted in department of ophthalmology PGMI, Khyber Institute of Ophthalmic Medical Sciences from January 2012 to January 2013. One hundred and forty seven patients with acquired nasolacrimal duct obstruction were included in this study. Patients were excluded if they had congenital nasolacrimal duct obstruction, previous external DCR, contralateral DCR, localized trauma, or skin scar on the nose, or previous acute dacrocystitis with fistulaization or drainage, if they had undergone simultaneous bilateral external DCR or subsequent bilateral DCR within the previous 6 months or if they cannot be followed for 6 months.

Dacrocystorhinostomy was performed by an external incision 10 mm from medial canthus, which is extended 5 mm superiorly and 5 mm inferiorly with No. 15 Bard Parker blade. Blunt dissection was performed to the level of the periosteum. After the procedure was
finished, the skin was closed with 4-0 prolene subcutaneously. The periostium and the orbicularis were closed in separate layers. Eye was padded after application of antibiotic skin ointment. Pad was removed after 6 hours and suture was removed after 1 week.

Photographs were taken with a digital camera 8MP, 3264x2448 pixels. The frame included the brow and the nasal tip and was taken at a 45° angle, following the example of a standard photograph included in the design of the study. Illumination was provided by the camera’s built-in flash. Digital photographs were taken with a resolution of 3264x2448 pixels and saved in a JPG format with a compression of not more than 10% and were not modified or edited in any way. Photographs of each patient were taken from both sides before surgery, at the 6-week postoperative visit, and at the 6-month postoperative visit.

Images were processed with a “mirror” effect so that the observers would see them all as belonging to the right side. Photographs of each patient were randomly shown to 3 blinded observers on a 15-inch computer monitor with a screen resolution of 3264x2448. The observers were carefully instructed to look for the incision in its appropriate location. The observers were ophthalmologists.

### Patients survey to rate incision scar

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<tbody>
<tr>
<td>1</td>
<td>Can you see your incision site?</td>
</tr>
<tr>
<td>No</td>
<td>Grade 0</td>
</tr>
<tr>
<td>Yes, minimally visible</td>
<td>Grade 1</td>
</tr>
<tr>
<td>Yes, moderately visible</td>
<td>Grade 2</td>
</tr>
<tr>
<td>Yes, very visible</td>
<td>Grade 3</td>
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<tr>
<th>2</th>
<th>Are you overall satisfied with the scar?</th>
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<tbody>
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<td>Yes</td>
<td>No</td>
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<tr>
<th>3</th>
<th>Regarding scar, would you have this same operation done again?</th>
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<tbody>
<tr>
<td>Yes</td>
<td>No</td>
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<table>
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<tr>
<th>Are you overall satisfied with this surgical procedure?</th>
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<td>Yes</td>
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### RESULT

One hundred and forty seven consecutive patients were admitted to the study between January 2012 and January 2013 in Ophthalmology department of KIOMS Hayatabad Medical Complex Peshawar. Ninety nine patients were female and 48 were male. The ages ranged from 21 to 80 years. Age distribution is given below;

Photograph of a lady undergone External DCR at day one.

Six weeks after surgery, 37 of 147 patients could not see their incision site (25%), 53 of 147 graded it as minimally visible (36%), 41 of 147 (28%) thought it was moderately visible, and 16 of 147 patients (11%) graded their incision as very visible (grade 3).
Photographic evaluation of patients 6 weeks after surgery by the 3 observers is given below:

Out of 147 patients 129 (88%) said that they are satisfied with the overall surgery. Remaining 18 (12%) patients were not satisfied with overall surgery, out of which 3 (2%) patients are not satisfied due to scar formation and 15 (10%) patients are due to pain during surgery.

DISCUSSION

External DCR is the gold standard treatment for nasolacrimal duct obstruction because of patient acceptance, low cost, and high success rate. It can be performed safely under local anesthesia, on an outpatient basis, in elderly individuals. Endoscopic and other non-incisional techniques mention the lack of a skin incision as one of the advantages over external DCR. This retrospective study was designed to evaluate the skin incision in external DCR at 6 weeks and 6 months after surgery in 2 ways: by patient self-evaluation and by examination of standardized photographs by blinded observers.

At 6 weeks after surgery, 37 of 147 patients could not see their incision site (grade 0), 53 of 147 patients (36%). Therefore, almost two thirds of patients after 6 weeks could not see the incision or thought it was minimally visible. Sixteen patients of 147 (11%) thought that the incision was very noticeable. Photographic evaluation showed a higher incidence of visible incisions according to the observers, with incisions not visible in 20% of cases, minimally visible in 33%, moderately visible in 42% of cases, and very evident in 18% of cases.

At 6 months after surgery, 59 of 147 patients (40%) could not see their incision site (grade 0), 73 of 147 patients (50%) thought it was minimally visible, 12 of 147 patients (8%) graded their incision as moderately visible, and 3 of 147 patient (2%) found the incision very noticeable. At this point, 90% of patients thought their incision was invisible or minimally visible.
Photographic evaluation at 6 months after surgery also showed a higher incidence of visible incisions, with 34% of invisible incisions, 48% of minimally visible incisions, 13% of moderately visible incisions, and 5% of very visible incisions.

Photographic examination of the skin incision yielded a higher incidence of visible incisions than the patient’s own perception. This may be due in part to the high definition and magnification used at the examination: The 3264x2448 pixel photographs displayed on a 15-inch monitor have a ×3 magnification factor, showing the 10-mm incisions as measuring 30 mm on the screen.

The change in appearance of the incision between 6 weeks and 6 months after surgery was satisfactory. Patients were highly satisfied with the appearance of the incision: 131 of 147 at 6 weeks (89%) and at 6 months 144 of 147 (98%).

These results are similar to those of another previously reported study[10] in which 97% of patients rated their incisions “good” to “excellent” and all patients stated that they would recommend the procedure to others.[2,10,11]

The skin incision in external DCR is satisfactory to the vast majority of adult patients at 6 weeks and 6 months after surgery. The incision site improves during this period, achieving 95% of invisible or moderately visible incisions according to observers and 98% according to patients.

In our study we also mention patient satisfaction regarding the incision site scar visibility as well as overall surgical procedure. One hundred and twenty nine (88%) patients said that they are overall satisfied with scar and also this surgical procedure and if they are given option they will again undergo the same procedure, while 18 (12%) patients said that they are not satisfied with incision site scar visibility as well as this surgical procedure. Out of these 18 (12%) patients 3 (2%) said that they are not satisfied with the scar formation at incision site[10] and 15 (10%) said they are not satisfied with this conventional surgical procedure because it is painful and they would prefer some alternative procedure.

CONCLUSION:

T he s k i n  i n c i s i o n  i n  e x t e r n a l dacryocystorhinostomy is satisfactory to most of the patients. Its appearance is improved with time; 90 % of the incision was graded invisible or minimally visible by patients after six months of surgery.

REFERENCES

Comparison of Mitomycine-C Alone & Mitomycine-C Combined With Conjunctival Autograft

Muhammad Rafiq, FCPS, Muhammad Imran, FCPS, Habibullah, Muhammad Akbar, Muhammad Sabir, Tajamul Khan, Naimatullah Kundi

ABSTRACT
Objective: To study the results of primary pterygium excision through mitomycin C (MMC) alone and MMC combined with conjunctival autograft.

Study design: Analytical study.

Setting and Duration: Eye A unit, Khyber Teaching Hospital, Peshawar from May, 2007 to April, 2009.

Methodology: One hundred patients with primary pterygium were selected from ophthalmology Department OPD at Khyber Teaching Hospital, Peshawar. Complete ocular examination was done after taking detailed history and those fulfilling inclusion criteria were included in the study. Topical proparacaine 0.5% and local infiltration of 2% lignocaine was used for anesthetising surgical site. In 50 of these patients, pterygium was excised through MMC application at the bare sclera while MMC with conjunctival autograft placement was used in the remaining. Patients were followed up till three months.

Results: In MMC alone group, recurrence rate was 16% (08 patients) while in MMC combined with conjunctival autograft group, it was 02% (01 patients). There was one case of conjunctival granuloma seen in MMC alone group.

Conclusion: Pterygium resection through MMC alone has high recurrence rate as compared to MMC combined with conjunctival autograft transplantation.

INTRODUCTION
Clinically, pterygium is a wing shaped fibrovascular growth arising from the bulbar conjunctiva onto the superficial cornea. Histopathologically, there is elastotic degeneration of the subconjunctival collagen causing pterygium formation. Nasal presentation is more frequent, but temporal and even bilateral (kissing) pterygia have been described. Exposure to wind, dust and dry climate have been implicated in the development of pterygia. One study suggests a fiberoptic type of transmission of ultraviolet light from the temporal side of the cornea, through the stroma and onto the nasal aspect of the eye, perhaps partially explaining why these lesions are more commonly found nasally.

Pterygium occurs in males twice as frequently as in females and usually occurs after the age of 20 years. The highest incidence has been reported in the age range of 20-40 years. Pterygium interferes with visual acuity by either involving visual axis or inducing astigmatism. It may also be a source of congestion and cosmetic problems.

Nonsurgical management of pterygium includes the liberal use of topical lubricating solutions, occasional use of mild anti-inflammatory agents for flare ups and use of sunglasses for protection against ultraviolet light.

Several techniques have been employed in surgical treatment of pterygium which are:
1. Simple bare sclera technique
2. Excision with adjunctive therapy like MMC
3. Conjunctival autografting

However, pterygium recurrence rate after bare sclera technique is very high ranging from 30-80%. Intraoperative application of MMC was used to bring down this high recurrence rate. Recurrence rate reported with MMC use ranged from 3-37.9%. The current regime of MMC is 0.02% applied to the bare sclera for 05 minutes. In 1985, Kenyon described conjunctival autografting which proved to be superior to Mitomycin C in terms of results and complications. When conjunctival autograft was combined with MMC application, it further improved the results. Limbal stem cells maintain corneal epithelial organization by undergoing continuous turnover throughout adult life.

MATERIALS AND METHODS:
One hundred patients with primary pterygium were selected from eye OPD at Khyber Teaching Hospital. Two groups were assigned by randomization process. In group A, we included the patients who underwent pterygium resection with Mitomycine C
alone. While in group B, patients were operated with conjunctival autograft along with MMC application.

Detailed history was taken enquiring the patients about their symptoms and duration, occupation, outdoor activity, exposure to sunlight glaucoma, diabetes mellitus and hypertension. They were thoroughly examined measuring visual acuity, extraocular movements assessment, slit lamp examination of the pterygium and ocular surface, fundoscopy and IOP measurement.

Inclusion Criteria:
- Age between 21-60 years
- Both sexes
- Primary pterygium encroaching 2mm or more over the cornea
- Pterygium causing decreased vision
- Pterygium with repeated episodes of congestion and grittiness

Exclusion Criteria:
- Diabetes Mellitus
- Collagen vascular disease
- Ocular surface disease like dry eye syndrome
- Uncontrolled glaucoma

Those fulfilling inclusion criteria were operated under microscope. Anesthesia used was topical proparacaine hydrochloride 0.5% and subconjunctival inj of lignocaine hydrochloride 2% in the pterygium bed.

Pterygium was peeled off its bed. Cornea was scraped with number 15 bard parker blade. In group A, MMC was applied at the denuded sclera for five minutes in a concentration of 0.02%. Ocular surface was irrigated with 100ml of ringer lactate solution. In group B, after MMC application and thorough irrigation of the ocular surface, an autograft was taken from the superotemporal bulbar conjunctiva of the same eye and transplanted at the denuded sclera in a way that the limbal side of the graft was oriented towards the limbus of the previously pterygium site. Conjunctiva was stitched with 10/0 nylon leaving the knot ends long so as not to cause irritation.

Antibiotic-steroid combination was given 4 times daily for one month postoperatively. Patients were re-examined at postoperative day 1,14,30,60 and 90. Recurrence was defined as fibrovascular growth encroaching over the cornea 1mm or more. Data were analysed using SPSS version 10.0.

RESULTS

Hundred patients were operated. Eighty two (82%) patients were male while eighteen (18%) were female. The patients' age range was 21-60 years with mean value of 45 years. Majority of the patients (50%) were in the age range of 31-40 years. There was a vast majority (85%) of outdoor workers with exposure to ultraviolet radiation. Most of these outdoor workers were drivers (40%), then labourers (20%) and farmers (15%).

Recurrence was noted in 08 patients (16%) in group A, while in group B, there was recurrence in 01 patient (02%).

Vascular anastomotic connections in the transplanted conjunctiva started towards the end of the 1st week. In two cases in group B, intense inflammatory response in the graft was seen with mild melting, but it was controlled with increasing the topical steroid dose and finally the graft was successful. No undesirable effect was seen at the bare donor conjunctival site. And during the follow up period, it was seen to be covered by the growth of the adjacent tissue. There was one case of conjunctival granuloma and one punctuate epithelial keratitis seen in group A. Punctate keratitis was treated medically while conjunctival granuloma was treated through minor surgical procedure.

DISCUSSION

Pterygium is frequently found in middle aged persons. Its geographical distribution is highly indicative of the effect of environmental factors like windy and dry climate. Coroneo, Solomon and Lee in 2007, documented the role of UV rays in the pathogenesis of pterygium. We in this study, have found the same type of trends. Pterygium has been treated using different surgical modalities. The unacceptably high rate of recurrence has been the main problem for the surgeons. Recurrence rates following
bare sclera resection range from 24% to 89%, following bare sclera resection with Mitomycin application between 3% to 37.5% and following pterygium resection with conjunctival graft placement between 2% and 39%.

By combining two of the most widely used surgical techniques, namely, free conjunctival autografting and the intraoperative use of MMC, we have found a considerable reduction in the recurrence rate and other postoperative complications.

MMC acts as an alkylating agent and causes irreversible damage to the DNA structure of the cells. Single intraoperative use of MMC is safer than postoperative topical daily application. Our study was predominated by males with a male to female ratio of 4.5 to 1. They were mostly outdoor workers like drivers, labourers and farmers indicating environmental factors to be the major culprits. The same was noted by Rasool in his study. We found recurrence rate of 16% in group A and 2% in group B. Narsani A. K. in his study on MMC, found it to be 16.3% (37) which was in accordance with our study. Chen et al reported 38% of recurrence rate with MMC (27) while Manning et al reported it to be 10.5%. There was one case of punctate epithelial keratitis and one conjunctival granuloma in group A. Punctate keratitis was treated medically with intensive topical lubricants while granuloma was treated by minor surgical procedure.

CONCLUSION

 Conjunctival autograft, when combined with intraoperative MMC application, has significantly reduced recurrence rate.

REFERENCES

Current Management of Vascular Retinopathy: Remaining & Arising Questions

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ABSTRACT
Retinal vein occlusion (RVO) as a cause of vascular retinopathy is a common retinal vascular disorder with the potential for significant vision-related morbidity. The disease entity has long been known, but until recently, there has been no effective treatment. Therapy by Vascular Endothelial Growth Factor Inhibitors (anti-VEGF) is a clear breakthrough, which has dramatically changed treatment and management of this sight-threatening retinal disease, but there are still many unanswered questions and new questions arisen. The purpose of this review is to highlight concerns related with anti-VEGF therapy in vascular retinopathy due to RVO.

Keywords: vascular retinopathy, retinal vein occlusion, vascular endothelial growth factor inhibitors, tachyphylaxis

INTRODUCTION
Retinal vein occlusion (RVO) is one of the most common causes of acquired retinal vascular abnormality in adults and a frequent cause of visual loss. In a recent analysis of pooled data from population studies worldwide, the overall RVO prevalence was 0.52% (0.44% branch retinal vein occlusion (BRVO), 0.08% central retinal vein occlusion (CRVO), translating to approximately 16 million individuals worldwide affected by RVO.

Despite being recognized at least as early as 1855 and its management is still controversial. Vascular retinopathy due to retinal vein occlusion causes retinal injury and loss of vision. The retina can also become "ischemic" resulting in the growth of new, inappropriate blood vessels that can cause further vision loss and more serious complications. Release of vascular endothelial growth factor (VEGF) contributes to increased vascular permeability in the eye and inappropriate new vessel growth. VEGF contributes to increased permeability across both the blood-retinal and blood-brain barriers.

In central retinal vein occlusion there is increased intraluminal and interstitial pressure throughout the retina drained by the obstructed vessels, resulting in reduced arterial perfusion, which is exacerbated by pre-existent arterial insufficiency, and in variable amounts of retinal ischemia. Retinal ischemia causes increased production of vascular endothelial growth factor, which causes vascular leakage and macular edema. High levels of VEGF also promote retinal hemorrhages and exacerbate capillary non-perfusion.

Human eyes with CRVO showed evidence of intra-retinal up-regulated expression of VEGF mRNA. Indeed, raised levels of VEGF have been reported in both the aqueous and vitreous fluid of patients with ischemic CRVO, and are responsible for the increase in vascular permeability that leads to macular edema (ME). Branch retinal vein occlusion also leads to retinal ischemia that induces the production of cytokines such as VEGF by retinal cells such as glial cells and vascular endothelial cells in the occluded region affected by anoxia. These cytokines interact with each other (cytokine network) and this results in impairment of the blood-retinal barrier and an increase of vascular permeability, considered important in the development of macular edema associated with BRVO. Lee et al. ischemic insult may play a central role in the development of BRVO-ME. Aqueous and vitreous levels of VEGF were significantly correlated with the severity of ME. The logical consequence was a therapeutic regimen specifically targeting VEGF.

DISCUSSION:
Therapy by Vascular Endothelial Growth Factor Inhibitors (anti-VEGF) is a clear break through, which has dramatically changed treatment and management of this sight-threatening retinal disease, but there are still many unanswered questions and new questions arisen. There are 4 anti-VEGF agents that are either approved or in common use in ophthalmology, namely ranibizumab (Lucentis, Novartis), bevacizumab (Avastin, Roche), pegaptanib (Macugen, Pfizer), and aflibercept or VEGF Trap-Eye (EYLEA, Bayer). The purpose of this review is to highlight concerns related with anti-VEGF therapy in vascular retinopathy due to retinal vein occlusion.
**Systemic Safety Concern**

While used intravitreally, the systemic absorption is minimal, however, a trend has been observed towards a higher risk of stroke among patients with a history of heart disease. Campbell et al. assessing the risk of systemic adverse events associated with intravitreal injections of vascular endothelial growth factor inhibiting drugs in the nested case-control study have found that intravitreal injections of bevacizumab and ranibizumab were not associated with significant risks of ischemic stroke, acute myocardial infarction, congestive heart failure, or venous thrombo-embolism. Clinical evaluation of ranibizumab (Lucentis, Novartis) based on two double-blind randomized trials comparing ranibizumab (0.3 mg or 0.5 mg) versus placebo in a total of 795 patients revealed that the incidence of heart failure and transient ischemic attacks was higher during the second year of ranibizumab therapy than during the first year of treatment. Patients should be informed of the potential adverse effects and uncertainties and be reminded that this condition improves spontaneously in about 50% of cases or almost in one quarter of affected eyes at 3 years, further controlled and prospective studies are necessary to compare treatment by Lucentis to the natural course with a longer follow-up.

There is some evidence that intravitreal anti-VEGF injections may result in systemic absorption, with the potential for injury in organs that are reliant on VEGF, such as the kidney. Pellé et al. reported the first case of a patient who developed an acute decrease in kidney function, non-immune micro-angiopathic hemolytic anemia with schistocytes, and thrombocytopenia after 4 intravitreal injections of ranibizumab. Light microscopy of a kidney biopsy specimen showed segmental duplications of glomerular basement membranes with endothelial swelling and several recanalized arteriolar thrombi. Because of the increasing use of intravitreal anti-VEGF agents, ophthalmologists and nephrologists should be aware of the associated risk of kidney disease. Early detection is crucial so that intravitreal injections can be stopped before severe kidney disease occurs. In Sorenson and Sheibani's opinion perhaps baseline and renal function during treatment (serum creatinine and urinary protein levels, blood pressure) should be carefully monitored to ensure that the improved visual acuity is not at the expense of renal function.

**Ocular Safety Concerns**

Intravitreal injections of various agents have been studied extensively. The overall risk of complications is low when the injection is administered by experienced ophthalmologists. Known risks of intravitreal injections can be vision threatening and require prompt diagnosis and treatment, possibly surgical intervention. The most serious but rarely occurring injection-related complications include acute-onset of endophthalmitis, pseudo-endophthalmitis, cataract development/progression, retinal detachment, and hemorrhage. In the latest study of endophthalmitis secondary to therapeutic intravitreal injections Englander et al. revealed that it is approximately equal probability of infection for each eye after receiving multiple, sequential injections and concluded that further studies are required to elucidate the best prophylactic and aseptic techniques to prevent this rare complication.

Additional infrequent complications include hypotony, angle closure, hemi-retinal vein occlusion, retinal pigment epithelial tears, iris/uveitis, optic disc atrophy, corneal epitheliopathy, maculopathy, central retinal artery occlusion, posterior vitreous detachment.

Recently Simunovic et al. revealed that endophthalmitis following intravitreal injection is associated with an increased incidence of Streptococcus spp. infection, earlier presentation and poorer visual outcomes when compared with endophthalmitis following cataract surgery. Irigoyen et al. concluded that the overall numbers of patients with endophthalmitis following intravitreal injections has risen dramatically over the past years. In contrast to earlier reports of multicentre studies, outcome of patients is relatively poor in the current treatment settings.

The preparation of the intravitreal injection site with topical povidone-iodine is the preferred prophylactic method to minimize the risk of endophthalmitis. There is no need for topical antibiotic use after intravitreal injection. Additional infrequent complication include anaphylactic reaction to the agent injected in the vitreous.

**A 2006 national survey in USA** Complications reported following complications rate associated with intravitreal injections: endophthalmitis-31%, increased IOP-26%, cataract-11%, other-16%. The most important adverse local effects related to anti-VEGF agents include uveitis, retinal detachment and cataracts.

The latest study on the rate of serious adverse effects in a series of bevacizumab and ranibizumab injections revealed that subjects who received bevacizumab were 12 times more likely to develop severe intraocular inflammation following each
injection than were those who received ranibizumab (OR = 11.71; 95% CI 1.5-93). The one case of acute intraocular inflammation following ranibizumab injection was mild and not associated with vision loss. No other serious ocular complications were noted. A trend was also noted toward an increased risk for arterial thromboembolic events in patients receiving bevacizumab, although the confidence interval was wide (OR = 4.26; 95% CI 0.44-41). In conclusion, authors stated that significant concern still exists regarding the safety of off-label use of intravitreal bevacizumab. The latest findings confirm this concern, since bevacizumab significantly reduces the level of VEGF in the blood plasma for up to one month in patients with diabetic ME as well as in those with age-related macular degeneration. No other serious ocular complications were noted. A trend was also noted toward an increased risk for arterial thromboembolic events in patients receiving bevacizumab, although the confidence interval was wide (OR = 4.26; 95% CI 0.44-41). In conclusion, authors stated that significant concern still exists regarding the safety of off-label use of intravitreal bevacizumab. The latest findings confirm this concern, since bevacizumab significantly reduces the level of VEGF in the blood plasma for up to one month in patients with diabetic ME as well as in those with age-related macular degeneration.

Patients receiving bevacizumab should be counseled regarding a possible increased risk for serious adverse events. Emerging clinical evidence suggests safety differences exist between ranibizumab and bevacizumab. Off-label drug use can be an important tool to provide patients with treatment in cases of unmet medical need. However, the use of an unlicensed medicinal product, when a suitable licensed alternative is available, puts prescribing physicians at risk of liability if safety issues arise.

Anti-VEGF therapy may therefore have adverse effects on ocular blood flow. Von Hanno et al. presented two cases of retinal artery occlusion after intravitreal injection of bevacizumab (Avastin) and ranibizumab (Lucentis) respectively and concluded that the therapeutic principle may be associated with an increased risk of retinal arterial occlusions. Leung et al. presented a series of three patients of the nearly 200 patients with CRVO who suffered apparent macular infarction within weeks of intravitreal administration of bevacizumab. The authors stated that this has not been described in the natural history of the disease and is associated with poor visual outcomes.

In Manousaridis and Talks opinion worsening of macular ischaemia in the long term cannot be definitely excluded, particularly in eyes with significant ischaemia at baseline and after repeated intraocular anti-VEGF injections. The decision to offer prolonged anti-VEGF treatment in cases of significant coexisting macular ischaemia should not be based only on measurements of macular thickness; instead repeat fluorescein angiograms should be performed.

Ischemic retinal injury may be an uncommon but severe adverse vascular reaction to intravitreal bevacizumab for CRVO. Although progression of retinal ischemia in CRVO could be observed shortly after intravitreal bevacizumab, whether this is a drug- or procedure-related effect or part of the natural history of the condition remains uncertain.

**Long-term efficacy concern**

**Tachyphylaxis/tolerance**

The worldwide use of intravitreal application of anti-vascular growth factor and the realisation that regular applications over long periods of time are necessary to maintain vision in these eyes, has revealed the problem of tolerance/tachyphylaxis. In 2008, two papers suggested for the first time possible tachyphylaxis/tolerance with chronic ranibizumab and bevacizumab treatment. Binder recommended different options to prevent tachyphylaxis/tolerance: (1) to increase the dosage or shorten treatment intervals if tolerance has developed; (2) to pause treatment if tachyphylaxis has occurred; (3) to combine drugs with different modes of action; or (4) to switch to a similar drug with different properties (bevacizumab and ranibizumab differ in molecular size, affinity and absorption).

**Economic and cost-effectiveness concerns**

Following the introduction of anti-VEGF treatment for RVO, there was a consequent rise in the number of these patients, potentially suitable for treatment as well as the number (frequency) of follow-up appointments. The associated increase in clinical workload has been substantial and there is concern that the introduction of anti-VEGF treatments for RVO could further exacerbate pressure on clinic capacity in the hospital eye service.

Brand evidenced that it is already possible to begin to consider a patient-centred approach based on an individual’s disease characteristics. It may be possible to use vision loss, visual acuity (VA) instability, or other signs of an active disease state as markers for requiring treatment, rather than using fixed dosing schedules. This type of approach should reduce the risks associated with over-treatment and undertreatment, thereby optimising the risk/benefit profile of the treatment and the efficient use of national health.
service resource.\textsuperscript{38}

In case of BRVO based on the latest systematic review by Mitry et al.\textsuperscript{39} the optimal timing of initial treatment with different anti-VEGF agents and subsequent re-treatment has not yet been determined. Individualized treatment allows the identification of patients who are most likely to benefit from the treatment. Tailoring treatment to the individual patient in this way should increase the chance of treatment success, while sparing patients from unnecessary drug exposure and risk of adverse events. Furthermore, avoiding unnecessary treatment also has the potential to improve the cost-effectiveness of treatment\textsuperscript{3} but further advances are needed in order to improve quality of life and reduce the burden to health care systems.\textsuperscript{40}

In Shapiro et al.\textsuperscript{41} opinion it is clear that anti-VEGF therapies may be only the beginning, since the therapeutic landscape for retinal disease is continually expanding with interesting developments in the near future. The findings of Quaggin\textsuperscript{42} also confirm that therapeutic approaches to blocking VEGF signaling in retinal diseases may have unexpected detrimental side effects and that the development of alternative strategies might be necessary.

CONCLUSION

Following the introduction of anti-VEGF treatment for retinal vein occlusion major concerns with this therapy include: repeat intravitreal injections; risk of cardiovascular complications; possible retinal and neural toxicity due to cumulative dosing; interference with physiologic functions of VEGF; and economic and cost-effectiveness concerns. Tailoring treatment to the individual patient should increase the chance of treatment success, while sparing patients from unnecessary drug exposure and risk of adverse events. Furthermore, avoiding unnecessary treatment also has the potential to improve the cost-effectiveness of treatment. Hopefully that findings from further studies will lead to better understanding of the pathophysiology of retinal vein occlusion and thus the development of new noninvasive and personalized treatment regimens.

REFERENCES:


INTRODUCTION:

Ocular trauma is one of the main cause of visual loss. The circumstances and driving forces implicated in such injuries are diverse. Injury sustained at a working place is a frequent scenario, but domestic and sports ocular injuries especially amongst women and children are of no exception; in fact such cases are mostly under-reported. A significant proportion of eye injuries are related to sports and recreation. Despite the fact that sports-related injuries account for only a small percentage of ophthalmic trauma, they are often more severe and visually devastating than other eye injuries. We are presenting two cases of eye injuries sustained in cricket with similar circumstances and resulted in comparable sequel. We comment on the need for appropriate protection. Early repair of the cornea may result in good visual recovery.

CASE 1:

A 15-year-old right-handed boy had his glasses smashed after being hit in the face by a bouncing cricket ball while batting. The impact was on the left side and resulted in left ocular trauma. He was immediately brought to the emergency room by his friends. Initial assessment showed a visual acuity of perception of light (PL) in the left eye. There was a corneal tear on the nasal side accompanied by an iris prolapse and ruptured anterior capsule with cataractous changes. A corneal repair and lens aspiration were performed. An intraocular lens was implanted after it was ascertained that the posterior capsule was intact and the fundal glow was positive. Six months later, he had a best-corrected visual acuity of 20/30 with -2.50D Sph/-3.0D Cyl@105°[Fig:1].

CASE 2:

Within few months, another cricketer, this time a 24-year-old male, who got hit in his glasses by a bouncer, was brought to us. As he was also right handed batsman the impact was on the left side and resulted in left ocular trauma. On examination he could detect only...
hand movement. There was a corneal tear on the temporal side which was associated with an iris prolapse. The cornea was repaired resulting in a best-corrected visual acuity of 20/30 with -1.50 D Sph/-2.00 D Cyl @ 75° [Fig: 2].

**DISCUSSION:**

The study of injury presents unparalleled opportunities for reducing morbidity and mortality. Eye injury suffered from sports, predominantly young men, and although most injuries are minor and achieve good visual recovery, the potential for severe visual loss is always present. Eye injuries from sports are less common than other ocular trauma as a study reported 12.5% ocular injuries from trauma.

- By carefully evaluating the mechanisms, patterns, and rates of injury in a given sport, it is possible to design and implement extremely effective prevention programs. Spectacles lead to many forms of unusual injuries in and around the eye. The impact on the spectacle can be directly transmitted to the bridge of the nose, causing lacerated bruises and bone fractures on the nose and possibly on the cheek bone, eyebrow, and retro-auricular area.
- In addition, if the glasses are broken, it can seriously injure the ocular structures because of penetration of broken glass pieces.
- Our patients underwent surgical procedure because of rupture of the ocular coats. This was the direct result of a cricket ball injury while wearing standard spectacle with glass lenses. To reduce such occurrences, polycarbonate prescription glasses are being prescribed more frequently, because these lenses have a higher tensile strength and are less likely to shatter.
- Vandana Jain presented the case report on spectacle induced ocular trauma highlighting the open globe injury in a young cricketer upheld despite the fact that wearing polycarbonate prescription glasses and caused by an unusual mechanism of spectacles torsion and therefore emphasized on the need for use of safety helmets while playing with ball-sports, irrespective of the material of the lens used.
- These injuries could probably have been prevented by the use of appropriate eye protection. Even many years ago a Canadian study has shown a significant reduction in reported eye injuries after the mandatory introduction of protective facemask for student players.
- Ophthalmologists have to play a role in protecting this young population at risk by actively encouraging the design and use of protective eyewear.

**CONCLUSION:**

There is a need for use of safety helmets while playing ball-sports. Ophthalmic injuries could probably be prevented by the use of appropriate eye protection. Ophthalmologists have to play a role in protecting this young population at risk by actively encouraging the design and use of protective eyewear.

**REFERENCES**

Congenital Fibrosis of Extraocular Muscles

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Consultant Oculoplastic Surgeon & Strabismologist
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This 4 year old boy was brought with both eyeballs fixed in abduction, the right also hypertropic. The parents were very worried about the child’s appearance as he had to start schooling soon. He was of good general health otherwise. There was no family history regarding strabismus in any other family member.

**Examination:** It showed a right head tilt and a face turn to the left. The child was using mainly the left eye to fixate while the right eye was fixed upwards and outwards. On attempted ductions and versions, no eyeball movement could be elicited in either eye. There was no ptosis of the upper lids. The remaining ophthalmological examination including the fundus was unremarkable. Since the child was mentally slow, his visual acuities could not be assessed.

**Management:**

1) *Cycloplegic refraction* was done; it showed Right: -1.50 DC x 180° and left: -2.00 DC x 180°. He was prescribed full correction.

2) Surgery was planned. Forced Duction Test (FDT) performed intra-operatively under general anesthesia showed very tight lateral recti bilaterally while medial recti were normal. Superior and inferior globe movement was also free. In the Right eye, large lateral rectus recession of 10 mm with hang loose technique and medial rectus resection 6 mm + inferior oblique myectomy was performed. In the Left eye, same amount of muscle surgery was performed but without operating on the inferior oblique muscle.

**Follow-up:** It is important to follow-up these cases regularly:

1) to prevent and treat amblyopia

2) To address complications of corneal exposure. Routine ophthalmologic care with visits every three to four months during the first years of life, and annual or biannual examinations in older affected individuals not at risk for amblyopia.

3) *Evaluation of relatives at risk:* Early clinical diagnosis can lead to early treatment and prevent secondary complications.

4) Genetic counseling is important as mostly this condition is autosomal dominant and only in a few cases, it has a sporadic occurrence as in this case.

**Comments:** Congenital fibrosis of extraocular muscles (CFEOM) refers to congenital non-progressive ophthalmoplegia, with or without ptosis, affecting part or all of the oculomotor nucleus and nerve and/or the trochlear nucleus and nerve. Hence it has a varied presentation and usually affects muscle groups. This case is unusual and interesting as only the lateral recti were involved bilaterally and inferior oblique only in the right eye.

These patients compensate for the ophthalmoplegia by maintaining abnormal head postures at rest; they move their heads rather than their eyes to track objects. They also may have associated intellectual disability, social disability, facial weakness, and/or a progressive axonal peripheral neuropathy. Individuals with Tukel syndrome also have postaxial oligodactyly or oligosyndactyly of the hands.
Fenugreek plant popularly known as 'Methi' in our part of the world and globally 'Greek hay' belongs to the genus Trigonella and is commonly found in the Middle East, Egypt, and Indo-Pakistan subcontinent. It has been used by humans since thousands of years in the form of vegetable, a flavoring agent (Kasuri Methi) and a food ingredient in beauty aids. It is also used in the form of seeds for the treatment of diabetes and high cholesterol. It raises good HDL-cholesterol and lowers unhealthy triglycerides. Due to its estrogen-like properties, fenugreek has been found to lessen the effect of hot flashes and mood fluctuations that are common symptoms of menopause and PMS. In Indo-Pakistan subcontinent and China it has also been used to treat arthritis, asthma, bronchitis, improve digestion, cure skin problems, treat sore throat and cure acid reflux. Fenugreek also has a long history of treating hormonal disorders. Recent studies have shown that Fenugreek helps in lowering blood glucose and may be an effective and adjunctive treatment for both type 1 and 2 diabetes.

Uses of Fenugreek:
Properties: antioxidant, carminative, demulcent, expectorant, laxative, and antidiabetic
Indicated for: Fevers, sore throats, wounds, swollen glands, skin irritations, ulcers, muscle aches and gout pain.

Home Remedy for Balancing Cholesterol: Studies have also found people who took 2 ounces (56g) of fenugreek seed each day had significantly (around 14 percent) lower cholesterol levels after 24 weeks, and had lowered their risk of heart attack by more than 25 percent. Therefore, a recommended remedy for lowering cholesterol is to take 2 ounces of seeds throughout the day. The seeds can be sprinkled onto prepared food, or they can be consumed with water if they are in capsule form.

Treating Diabetes and Lowering Blood Sugar Levels: Studies have shown that participants with type 2 diabetes had significantly lower blood sugar levels after eating fenugreek. Therefore, a recommended home remedy for treating Type 2 diabetes is to consume 500mg of fenugreek twice daily.

Herbal Cure for Skin Inflammation: Research has shown that Fenugreek is an effective topical treatment for skin problems such as abscesses, boils, burns, eczema, and gout. Therefore, a simple skin inflammation remedy is the following:
- Take a spoonful of fenugreek and grind it into a powder.
• Mix the ground powder with warm water.
• Take a simple piece of clean cloth and soak it into the mixture.
• Apply the soaked cloth directly onto the affected skin as a poultice.

**Natural Cure for Heartburn and Acid Reflux:**
Fenugreek seeds contain a lot of mucilage, which helps soothe gastrointestinal inflammation by coating the lining of the stomach and intestine. Therefore, for an effective remedy against heartburn or Acid Reflux, simply sprinkle 1 teaspoon of fenugreek seeds onto your food. Another option is to take one teaspoon of seeds and swallow them with water or juice before any meal.

**Home Remedy for Fever:** The Fenugreek herb has been known to help reduce fever when taken with lemon and honey, since it nourishes the body during an illness. Therefore, to treat a fever, simply consume one to two teaspoons of Fenugreek seeds three times a day along with an herbal tea (such as green tea) with a teaspoon of honey and lemon juice. Some health food stores also sell herbal Fenugreek teas, which can be used instead of the green tea.

**Remedy to aid Milk Production in Lactating Women:**
Fenugreek has been known to increase milk production in lactating women. Research has even shown that milk production can increase by over 500 percent within 24 to 72 hours after consuming this herb. Although it is not known why this happens, researchers speculate that the oil contained in fenugreek seeds plays a role. Therefore, a recommended remedy to increase milk flow is to consume one capsule of fenugreek seed (at least 500mg) three times a day.

**What are the Side Effects of Fenugreek?**
While Fenugreek is generally considered to be safe when used moderately, there have been reports of a few minor side-effects. Nausea is one common side effect, while other people have reported gastrointestinal discomfort (diarrhea and/or gas). If you are currently taking any oral medications, you should always use this herb at least 2 hours before or after these drugs. This is important since Fenugreek fiber has the potential to interfere with the absorption of oral medications due to its mucilaginous fiber (which gives it a moist and sticky texture).

**Where and How to Buy Fenugreek:**
Fenugreek is often available in capsules, seed, and powder form at many health food stores. The seeds can also often be found at Indian/Pakistani grocery stores. Therefore, to treat a fever, simply consume one to two teaspoons of Fenugreek seeds three times a day along with an herbal tea (such as green tea) with a teaspoon of honey and lemon juice. Some health food stores also sell herbal Fenugreek teas, which can be used instead of the green tea.

**References:**
2. Memorial Sloan-Kettering Cancer Center web site: "About Herbs: Fenugreek."
3. Natural Medicines Comprehensive Database web site: "Fenugreek."
4. NYU Langone Medical Center: "Fenugreek."