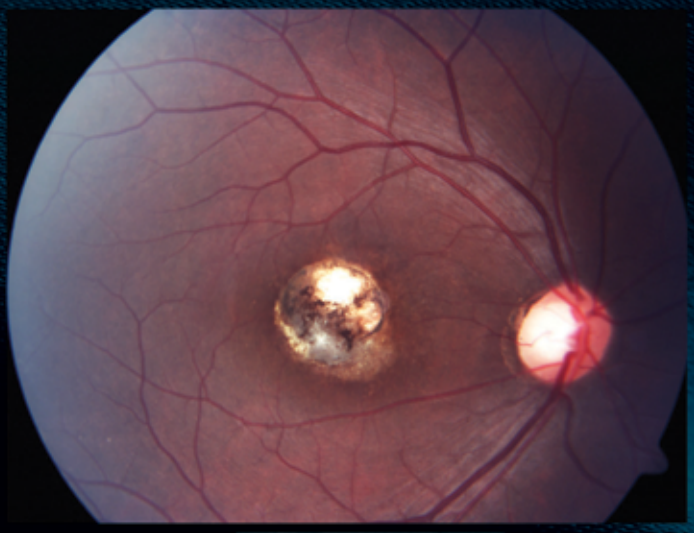
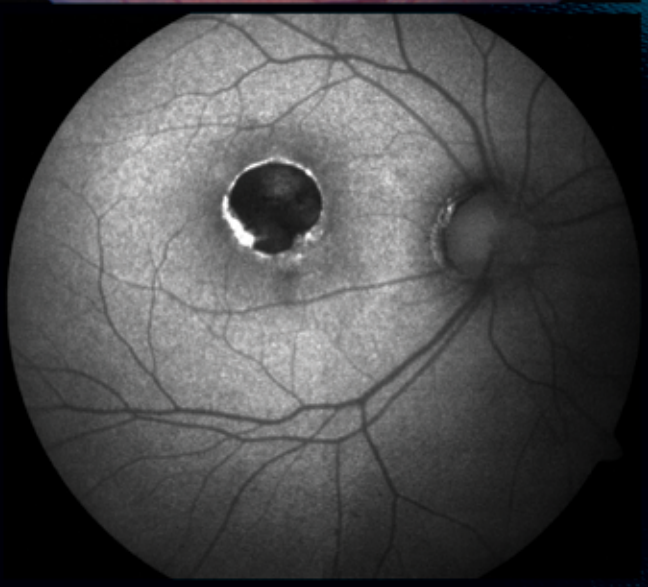
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Kerala Journal of Ophthalmology





HIGHLIGHTS

Cataract Surgery in Uveitis

Muscle Pulleys- The Birth of a New Concept in Strabismus

Epiretinal Membrane- Management and Recent Advances

Diagnostic and Therapeutic Challenges- Glaucoma

Also

Practical Tips for the Comprehensive Ophthalmologist

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Fundus Photo and Autofluorescence Images of a Macular Toxoplasma Retinochoroiditis Scar

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Dear Friends,

Bonjour and welcome back with this year's monsoon edition of KJO. As we feel the plentiful showers of rain and blessings around us, it is also raining great articles in this edition of KJO. This time we have Majumder et. al. from Sankara Nethralaya , Chennai with a major review on Cataract Surgery in Uveitis, a very practical and useful topic for every ophthalmologist. There are other very interesting articles from authors across the state which I am sure will make enjoyable reading.

Yet another generation of would-be ophthalmologists have stepped into their future careers with the new admissions this season. Post graduate education, a very important part of academic life, has come miles from where it was before. Gone are those days when a student had to spend hours in a college library rummaging through voluminous books searching for information and when examinations were faced for the first time at the end of the course period. Information has got a different face with the internet revolution. With the information explosion, knowledge is available at will to those who care to access it. Hospitals and associations are also coming forward with post-graduate training programmes, mock exams and more, which is quite heartening. Theoretical knowledge and academics is one side of the coin, but on the other side, are the students getting enough practical experience? In the best interest of patients, this calls for further co-operative and collaborative efforts. Students should be encouraged to go on short periods of observation to reputed institutes so that the overall exposure to various subspecialties is adequate. Surgical exposure is a separate issue altogether and it is practically difficult to expect uniformity across teaching institutes. However, we should also keep in mind that the specialty of ophthalmology has progressed so much, that even a small mistake from a post-graduate student is unaffordable. In such a situation, simulators, wet labs and customized training through fellowships have a major role in shaping future surgeons in the present era.

Times are changing and so are the methods in training. Still, the fact that India is one of the leading countries in the field of ophthalmology is a testimony to the teaching programme prevalent in our country.

Jai KSOS!

Dr. Ashok Nataraj
Editor, KJO

Dr .K.Nataraja Iyer M.D

Pathogenesis of Ocular Tuberculosis -An Enigma?

Tuberculosis(T.B) is a communicable disease caused by Mycobacterium Tuberculosis. It spreads through air and inhalation of the infectious organism is the major cause of disease. The most common site the organism comes in contact with our body is the lungs. The defense mechanism in our body is such that it tries to localize the organism at the point of contact.However,in a susceptible host the disease overcomes these barriers overwhelms the alveolar macrophages with attendant release of inflammatory mediators and formation of casseating granuloma.

There are three mechanisms by which T.B can affect the eye. Primary infection by T.B bacilli causes bacteremia .If bacteremia is severe there is extensive dissemination of the organism throughout the body including the eyes. In a milder bacteremia when the resistance is good, the organism can get deposited in various parts of the body which can remain dormant for a long time. When favorable condition develops for the organism to thrive these lesions can become active and may present as bone and joint T.B,ocular T.B etc.

It is obvious from these statements that involvement of eyes may occur as a part of primary T.B or delayed post primary T.B.In addition to the two forms mentioned above hypersensitivity manifestation to T.B protein can affect the eye. A classical example of hypersensitivity in eye is phlyctenular keratoconjunctivitis.The significance of phlycten is that it coincides with mantoux conversion an indication of recent infection. In such a situation it maybe worthwhile to look for the source of infection(screening of contacts etc).

The reaction of the body to T.B infection varies depending on whether it is primary or post primary. When a person is infected with T.B bacillus he develops a hypersensitivity status in 6-8 weeks. This is called mantoux conversion. In a mantoux negative individual T.B bacilli can freely move around and cause military T.B ,meningeal T.B etc.But by becoming mantoux positive the body acquires the power to prevent dissemination by limiting the infection to the site of entry. The primary T.B has the classical features of non bacillary lesions,absence of fibrosis,casseation,cavitation etc.Under exceptional circumstances if a person gets infected after becoming mantoux positive and if the infectious load is heavy the body may not be able to restrict the infection to the site of entry.In other words the body responds differently to infection by T.B bacilli in a mantoux positive and mantoux negative person.The features of post primary T.B infection is fibrosis ,casseation, cavitation and restriction of the disease to the area of infection. In such a situation it maybe possible to demonstrate T.B bacilli from the lesion.It may not be so in the case of extrapulmonary T.B. Ocular T.B as a manifestation of post primary T.B is non-bacillary and it is usually difficult to confirm T.B by demonstrating AFB.Mostly the lesions are granulomatous and histopathological exam might often be required to clinch the diagnosis. Many a time a differential diagnosis of sarcoidosis may pose a dilemma.

In short ocular T.B is a diagnostic challenge and we may have to depend on circumstantial evidence to proceed with management.

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Major Review

Cataract Surgery in Uveitis

Dr. Parthopratim Dutta Majumder MS

Cataract is a frequent complication of uveitis, being caused either by the inflammation or by the steroids used to treat it. Some forms of uveitis, such as Fuchs heterochromic cyclitis or uveitis associated with juvenile idiopathic arthritis, commonly feature cataractas part of the disease process, whereas others result from topical, periocular, or systemic corticosteroids used to treat uveitis.Unique intraoperative conditions and the uncertainty of the postoperative coursepresent challenges to the surgeon, which must be considered in all phases of the procedure from preoperative patient selection through postoperative management.

Lens changes in uveitic eyes

Cataract formation in uveitis is thought to be the result of prolonged breakdown of the blood-ocular barriers caused by intraocular inflammation. The entry of plasma phospholipids into the eye is thought to increase lens epithelial permeability. Increased Phospholipase A activity during inflammation and reduction in metabolic activity of the lenshas also been implicated in aetiopathogenesis of cataract in uveitis. Complications of uveitis, such as posterior synechiae and secondary glaucoma, are also important risk factors for cataract formation. Posterior synechiae can cause localized lentalopacities in the anterior epithelium which is pathologically characterized by localized areas of cellular necrosis surrounded by a zone of hyperplastic lens epithelium.[1] Finally, treatment for uveitis itself can increase the risk of cataract. Corticosteroids, applied topically or systemically, are known to cause cataract.

Posterior subcapsular opacification is the most common type of clinically detectable cataract associated with uveitic entities.Usually lens changes secondary to inflammation are seen initially in the anterior sub-capsular epithelium, equatorial zone, or in the posterior subcapsular region.[1]However, chronic cyclitic membranes associated with posterior synechiae and anterior subcapsular opacities arealso common.

Specific uveitic conditions associated with increased incidence of complicated cataract

- HLA-B27–associated anterior uveitis
- Fuchs' heterochromic cyclitis
- Juvenile idiopathic arthritis–associated uveitis
- Pars planitis
- Sarcoid–associated uveitis
- Behcet' s disease

Preoperative assessment

Need and time of surgical intervention in uveitic cataract varies from cases to cases and the decision for operating such a cataract should be taken judiciously. Foster et al[2] have suggested few indications for surgical interventions in uveitic cataract : lens induced uveitis, visually significant cataract in uveitic cataract with great potential of post-operative visual recovery,cataract hindering the view of fundus with probable posterior segment involvement and as a part of posterior segment surgery where cataract extraction aid in visualization of fundus.Also unlike senile cataract extraction, successful visual rehabilitation.

It is of paramount importance to achieve and maintain complete control of intraocular inflammation for 3 months prior to any surgical intervention. Many a times it requires effective but judicious use of corticosteroid &immunosuppressive agents. Care must be taken in prescribing these medications to patients with various systemic ailments like diabetes, hypertension,psychiatric illness or depression, liver disease etc.Periocular steroid can be used in patients without glaucoma with no history of steroid responsive ocular hypertension but intolerant to corticosteroid or immunosuppressives. We usually start topical and oral corticosteroid (40mg/day or 0.5mg/kg/day) one week prior to cataract surgery and gradually taper the steroid depending on the post-operative inflammation. Patients already receiving systemic steroids and/or immunosuppressives usually need to increase the dose of oral steroid prior to surgery. Systemic steroid prophylaxis may not be required for cataract surgery in patients with

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Fuch's uveitis unless there is posterior segment involvement. Judicial use of topical steroid, proper control of preoperative anterior segment inflammation or periocular steroid can be used in such cases.

Infectious etiology of uveitis should be identified and treated adequately before planning cataract surgery. Proper antimicrobial prophylaxis should be considered along with or without corticosteroid while planning surgery in these patients. In a case series,one-third of patients with a history of ocular toxoplasmosis had reactivation within 4 months of cataract surgery.[3] Many surgeon use acyclovir 400 mg three times a day 1 week prior to surgery prior to surgical intervention in complicated cataract associated with recurrent viral uveitis or double strength trimethoprim-sulfaethoxasole three time weekly in ocular toxoplasmosis.[4]

Phacoemulsification is the preferred method approach for removal of uveitic cataract as small size wound and reduced iris manipulation reduces the chances of postoperative inflammations. A clear corneal approach is also favoured in patients with secondary glaucoma as preservation of conjunctiva for subsequent filtration surgery is ensured. Pars plana vitrectomy with lensectomy through posterior approach can be decided in case of vitreous haemorrhage,severe vitritis or other posterior segment disorders. Topical anaesthesia, though not contraindicatedin uveitic cataract surgery may unnecessarily complicate or risk the procedure.

Iris management

Though **intracameral mydriatics** provide rapid mydriasis comparable to topical mydriatics in most of the cases of non-dilating pupils in cataract surgery, most of the time they don't work in uveitic cases because of permanent iridolenticular adhesions or synechiae formations.

We use adrenaline diluted in balanced salt solution (1: 1000, 0.5 mL adrenaline in 500mL) in uveitic cataract without posterior synechia. Preservative free intracameral lignocaine is another good alternative in such uveitic cataract without synechia. Different concentrations of epinephrine and phenylephrine are used in these Intracameral mydriatic solution and addition of lidocaine helps to increase mydriatic effects and reduces ocular pain and discomfort. Result of a phase III trial of intracameral ketorolac combined with phenylephrine,primarily aimed to maintain mydriasis and decrease postoperative pain, is encouragingand may serve as a useful adjunct.

Visodissection between the iris and lens surface may be helpful in breaking weak posterior synechiae. High viscosity Ophthalmic Viscosurgical Devices (OVDs)like Healon GV® (Abbott Medical Optics) are often helpful. Viscomydriasis helps us to deepen anterior chamber, stabilize iris tissue in visco-filled environment and achieve pupillary dilatation.

Most important part of the iris management in uveitic cataract is separation of the adherent iris from the anterior lens capsule which can be accomplished by swiping a spatula between these adhesions. Peripheral anterior synechiae can be released in the same way. One has be very careful while separating these synechiae avoiding damage to descemet's membrane or lens capsule.

In case of a very dense pupillary fibrotic membrane, one may have to make a nick with 26 gauge needle and expandthe opening or in difficultcases peripheral iridectomy may be required, if access cannot be obtained at the pupillary area. Large pupillary membranes can be incised with microvitrectmy scissor (like Grieshaber scissor) and can be stripped from pupillary margin using forceps.

Pupil stretching is one of the popular method of attaining optimum pupillary dilatation in uveitic cataract surgery and can be achieved with bimanual or single handed techniques. Bimanual pupil stretching is achieved with the help of two Kuglein hooks, which are engaged in two opposite points on the pupillary margin and are pushed away from each other gently in opposite directions. Similar stretching maneuver is usually repeated in a direction perpendicular to the initial stretch to achieve maximum possible dilation of the pupil. The stretching should be carried out gently and slowly which reduces the severity of iris tears.(figure 2)Single handed pupil stretching can be done using Beehler pupil dilator (Ambler Surgical Corp, USA), which can stretch the pupil in four asymmetrical quadrants with three micro-fingers and a hook.These techniques are extremely helpful in small pupil with uveitic cataract of moderate density. These techniques create micro-iris tears and rarely can cause intraoperative bleeding. However in Intraoperative floppy iris syndrome (IFIS), pupillary stretching techniques may not be helpful. After stretching, the pupil is expanded with viscoelastic, a cohesive viscoelastic such as Healon GV®, is preferred. This gives a pupil of adequate size for subsequent cataract surgery. The smaller the pupil, the better the effect of pupil stretching.

Iris retractors or hooks are very helpful in management of uveitis cataract. They can be used to enlarge and maintain the pupil size throughout the surgical procedure.Several nylon self-retaining iris retractors, including Grieshaber



Fig 1: Uveitic Cataract

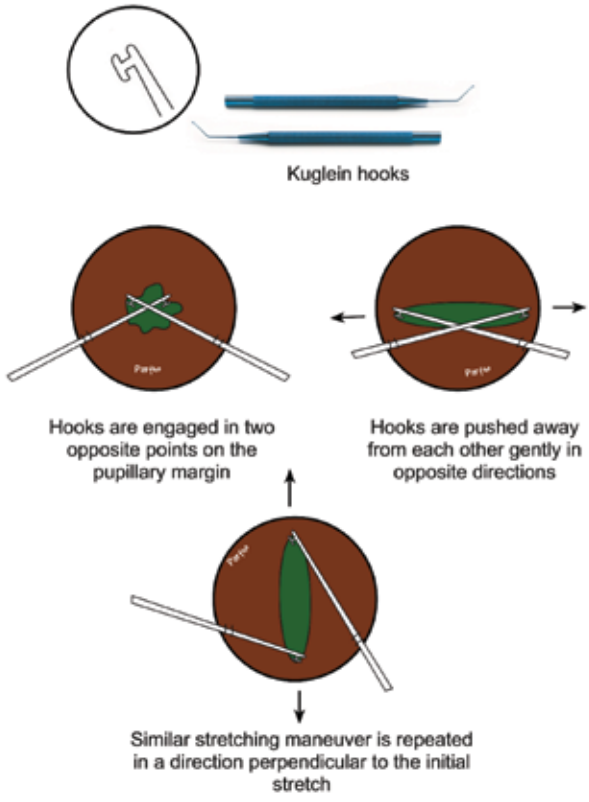


Figure 2

(Kennesaw, GA, USA), Howard Instruments (Tuscaloosa, AL, USA) are available commercially. These hooks are usually made up of polypropylene with hook at one end and an adjustable silicone sleeve at the other end. These hooksare inserted through self-sealing paracenteses (usually with a 26 gauge needle), made perpendicularly at the limbs, in a diamond or square pattern.Care should be taken to avoid placing these hooks anteriorly in cornea as it may lead to tenting forward of iris, which may impede the insertion of phaco probe or chopper or damage to iris while entering

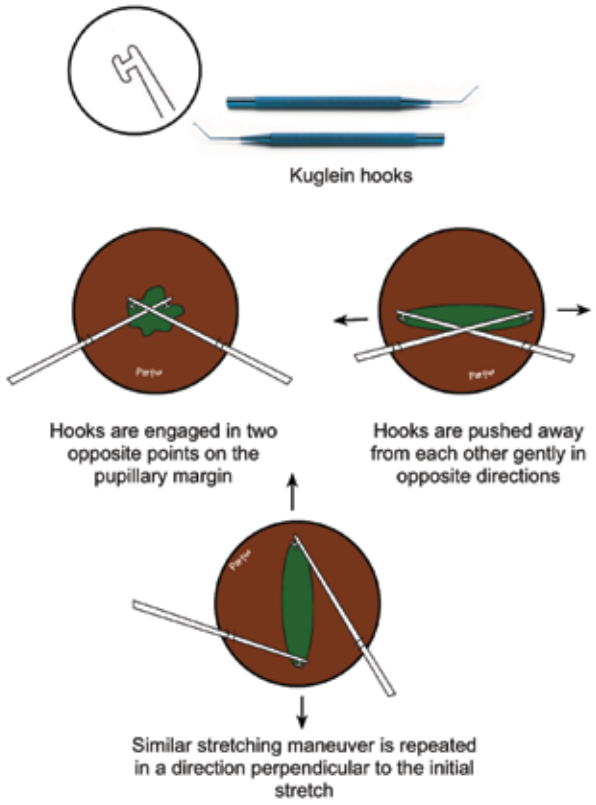


Figure 3

these instruments. (Figure 3)

Capsulorrhexis

It is important to attain a sufficient sized capsulorrhexis in cataract surgery of uveitis in patients with small pupil. A small rhexis may lead to post-operative synechiae with anterior lens capsule or rhexis margin and capsular phimosis.Using a controlled but sufficient centripetal forces, one can keep the advancing capsulorrhexis flap just beneath the pupil edge and in close proximity to the pupillary margin and try to attain a relatively larger capsulorrhexis.

Managementof Nucleus

It is important to achieve a complete hydro dissection. Uveitic cataract with soft nucleus can dealt with low phaco power or sometimes can be managed with irrigation and aspiration only. Hard nucleus is dealt with nucleotomy and nuclear emulsification and in marginally dilated pupils, vertical chop technique is safer because emulsification is mostly done in the endolenticular space at the center of the rhexis rather than the lens equator.

Meticulous attempt should be made to remove all the cortex as the protein contained within the crystalline lens are highly antigenic and a potential instigator of post-operative inflammation. The use of bimanual irrigation-aspiration can



Fig 4 Post operative Inflammation after Cataract surgery

helpful. It is also important to check under the iris for small fragments of nucleus in eyes with small pupil which may lodge in posterior chamber during phacoemulsification.

Intraocular lens implantation (IOL) in Uveitis

Proper selection of IOL material is very important for successful outcome of cataract surgery in patients with uveitis though we lack properly designed clinical trials which can help us to take an evidence based decision to select appropriate IOL materials in such patients.

The most important factor is biocompatibility of lens material with ocular tissue and it is desirable to select a material with high biocompatibility to decrease the postoperative inflammation. Various authors have studied the effect of IOL materials on outcome of cataract surgery. Alio et al[5] in their prospective study, found lowest postoperative inflammations with acrylic IOLs (either hydrophilic or hydrophobic). Acrylic IOLs have been proven to show better results with respect to visual acuity, posterior capsule opacification, postoperative inflammation and cystoid macular oedema. Hydrophilic acrylic IOLs have good uveal but lower capsular biocompatibility whereas hydrophobic acrylic IOLs have lower uveal but higher capsular biocompatibility. Recently a Cochrane review of clinical trial evidence reported decreased risk of development of posterior synechiae with hydrophobic acrylic IOLs.[6]

It is of paramount importance to place the IOL in capsular bag and one should always ensure that both the haptics are within the bag especially in eyes with small pupil. The implantation of the IOL within the capsular bag helps to decrease the physical contact of the IOL with surrounding uveal structures, stabilizing the blood-aqueous barrier. One should perform a surgicaliridectomy in cases with extensive peripheral anterior synechiae. Injection of subconjunctival betamethasone at the end of the surgery can help in reduction of postoperative anterior chamber inflammation.

Post-operative management

Various studies have shown a reduced incidence of inflammation and surgery related complications in uveitic eyes by phacoemulsification with posterior chamber intraocular lens implantation when compared with extracapsular cataract extraction techniques.Posterior synechiae, capsular opacification, cystoid macular oedema(CME), and post-operative inflammationare common after cataract surgery in uveitic patients.

Oral and topical corticosteroids should be tapered based on clinical response postoperatively. One should not taper these anti-inflammatory medications too quickly following surgery.In absence of glaucoma or history of steroid-responsive ocular hypertension, periocular corticosteroidcan be injected in patients with labile diabetes

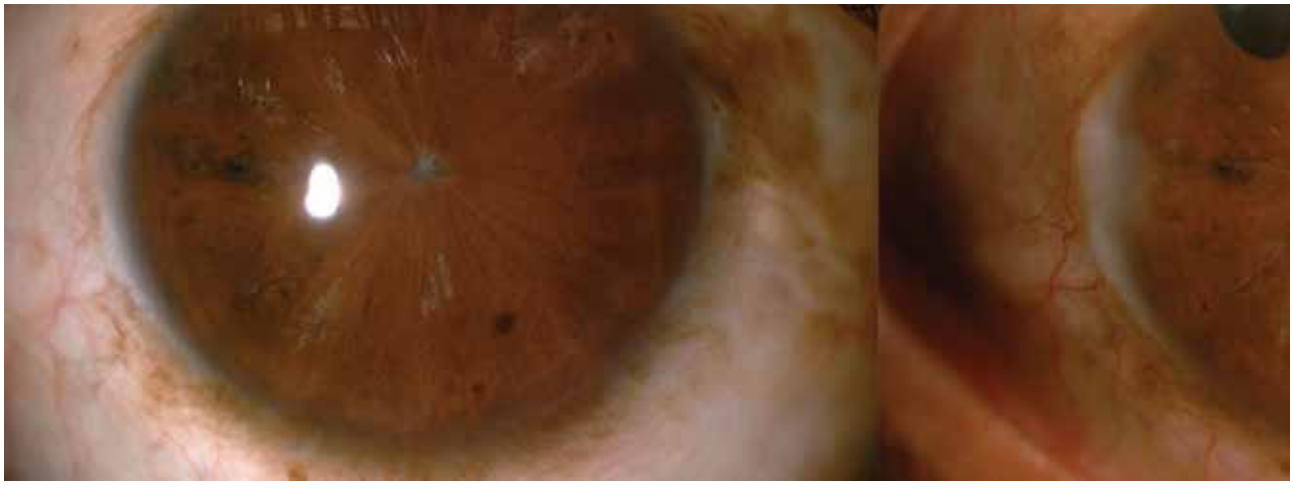


Figure 5: Preoperative & post operative pictures of a case of uveitic cataract

or hypertension, history of psychiatric disease etc.Topical nonsteroidal anti-inflammatory agents is usually a useful adjunct for prophylaxis against cystoid macular edema, though proper evidence in uveitis patients are lacking.Bélair et al[7] found that the use of oral corticosteroids seemed to reduce the incidence of postoperative CME at 1 month when compared with eyes of patients with uveitis who did not receive oral corticosteroids.

Successful visual rehabilitation through cataract surgery of the uveitic cataract warrants thorough diagnostic evaluation,effective perioperative inflammation control and meticulous surgical management. Corticosteroids and immunosuppressives add to the Surgeon's armamentarium to effectively control pre and postoperative control of inflammation, minimizing the incidence of CME due to cataract surgery and irreversible damage of ocular structures.

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Major Review

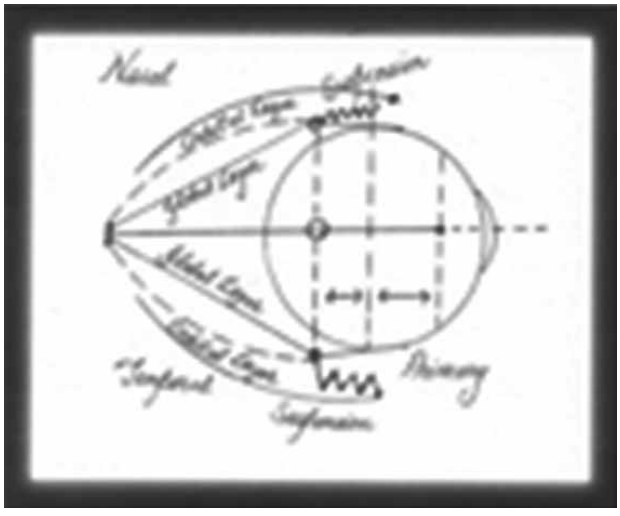
Muscle Pulleys –The Birth of a New Concept in Strabismus

Dr Elizabeth Joseph M S

Hitherto, the surgical management of strabismus depended entirely on the surgical manipulations of extra ocular muscles to modify their actions. Now, because of the recent works by Dr Joseph Demer et al and because of the availability of high resolution imaging, we are aware that orbital connective tissue and extraocular muscle (EOM) sleeves have a lot to play in the etiopathogenisis of strabismus.The orbital connective tissue are pivotal in control of ocular kinematics a role not controlled by neural circuits. Modification of these orbital connective tissues namely mucle pulleys have become a new surgical modality in strabismus.

Muscle pulleys are structures of connective tissue and smooth muscle that connect the EOM to the orbital wall, located near the equator.Tendons and muscles travel through pulleys by sliding inside thin collagenous sheaths that telescope within pulley sleeves.The pulleys act as a secondary origin of the rectus muscle. During ocular movements only the part of the muscle anterior to the pulley move and posterior part of the muscle is relatively immobile

Extra ocular muscles are composed of an orbital layer and a global layer.



Diagrammatic representation of EOM divided into (orbital and global layer inserts into orbital wall while global layer inserts onto selera

Pathology of pulleys and associated connective tissue is associated with binocular misalignments or strabismus. Three types of pulley pathology are now identified. – Pulley heterotopy, Pulley instability and Pulley Hindrance

Pulley Heterotopy.

Many cases of incomitant cyclovertical strabismus are associated with heterotopy of one or more rectus EOMpulleys .Pullley heterotopy could be the cause of "A" or "V" pattern. In a "V" pattern, for example,there is relatively more esotropia in infraduction than supraduction, and one or both LR pulleys are typically located inferior to the MR pulley . The superior rectus (SR) is often temporal to the inferior rectus (IR)pulley in one or both orbits. The converse is true in "A"pattern, and the SR may also be nasal to the IR as well Pulley displacements cause Abnormal direction of rectus muscle pull results in misalignments typically diagnosed as Pattern Strabismus.

These clinical findings mimic features of what has been hither to regarded as "oblique" EOM dysfunction, and suggest that clinical nosology be significantly revised to avoid implications of oblique EOM over- or under-contraction.

Extreme pulley heterotopy is associated with esotropia and hypotropia in axial high myopia, and presumably represents the effect of connective tissue degeneration in the pulley suspensions.

Acquired pulley heterotopy may be the common consequence of simple aging. The horizontal rectus pulleys of normal older people sag inferiorly in a symmetric manner probably related to reduction in the range of supraduction. Asymmetric rectus pulley sag would be expected to produce incomitant vertical strabismus that could easily be mistaken for a neurological sign. These connective tissue changes might be expected to compromise EOM kinetics.

- **Pulley Instability:** While normal pulleys shift minimally with gaze changes, one or several pulleys may become unstable and shift markedly with gaze to alter EOM action. This shift may occur in one gaze position only.

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Inferior LR pulley shift in adduction may be acquired, and can mimic the restrictive hypotropia in adduction traditionally attributed to superior oblique (SO) tendon sheath pathology (Brown syndrome), or "X" pattern exotropia. This pathology has been termed "gaze-related pulley shift" (GROPS).An exaggeration of the physiologic excyclo-rotation of the rectus pulley array in convergence may produce a marked "Y"pattern exotropia,one present only in elevated gaze.

- Pulley displacements cause Abnormal direction of rectus muscle pull
- Results in misalignments typically diagnosed as Pattern Strabismus.
- A pattern- L R pulley is superior to MR pulley
- V pattern- MR pulley is higher than LR pulley

Pulley instability can be diagnosed only by orbital imaging in multiple gaze positions.

Pulley Hindrance. Abnormally anterior pulley location,or failure of a pulley to move posteriorly during EOM contraction, results strabismus.

Pulley Surgery. Central to the initial recognition of pulleys was the stability of rectus EOM paths following large surgical transpositions of the scleral insertions. Only slight shifts of pulleys are observed by MRI after insertional transposition. Posterior suturing of the transposed EOMs increases the desirable pulley shift,markedly increasing the effectiveness of transposition in treatment of paralytic strabismus.

Before recognition of pulleys, posterior fixation of rectus tendons to the underlying sclera ("fadenoperation" in German) very far posteriorly was performed to reduce ocular rotation specifically in the field of a particular extraocular muscle.This was thought to be by reducing the EOM's contraction. This was believed to be effective because of a reduction in the EOM's scleral arc of contact .Now it is thought that posterior fixation suture produce pulley tightening , restricing ocular rotation in that direction.Based on this information we can now replace fadenoperation with pulley posterior fixation as this is a much easier and safer surgery.Sutures are placed in a much more anterior and convenient location in pulley fixation compared to faden suture.In fact sutures need not be passed though the sclera at all.

Indications For Pulley Posterior Fixation

- A V Pattern without oblique over action
- Convergence excess esotropia
- Partially accomodative ET
- Augment maximal recessions - Distance – near disparity

In surgical correction of convergence excess esotropia there is frequent over correction for distance / under correction for near It is often difficult to decide the correct surgical Dose of M R recession. Pulley posterior fixation will produce a mechanical restriction of M R which will weaken M R in its direction of action so that Distance – near disparity is corrected

Surgical Procedure of MR Recession with Pulley Fixation

M R Recession is done in the standard manner. Identify the pulley- usually 12 mm from insertion . Pulley identified by its pale colour and resistance to movement.Pulley brought forward . Non absorbable suture passed between pulley and muscle . Repeat for the other pole of the muscle. Success confirmed by assessing limitation of the range of adduction on forced duction

- Pulley posterior fixation sutures reduce distance- near in comitance and Reduce the need for bifocals. Works similar to FADEN suture or posterior. Fixation suture but is far more safer and easier. Pulley posterior fixation sutures reduce distance- near in comitance.



partially acoomodative ET with distance – near disparity.

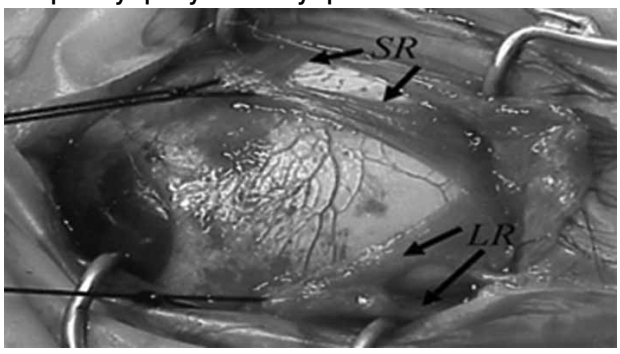


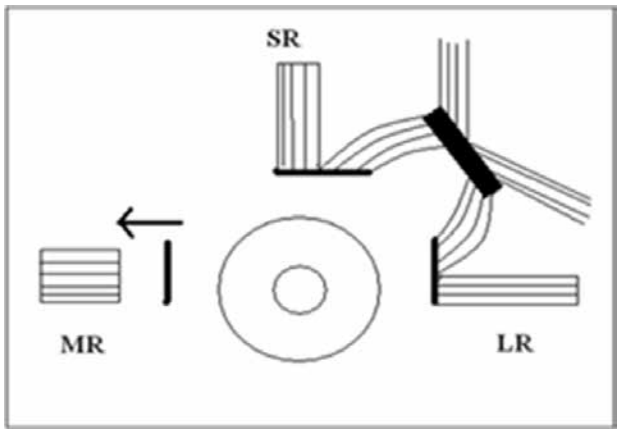
Treated with MR recession with pulley fixation

Pulley Heterotopy

Extreme pulley heterotopy due to degeneration of pulley suspension is associated with esotropia and hypotropia in high axial myopia It can be treated surgically by reinforcinng the pulleys and muscle trans positions

Loop Myopexy in Myopic Strabismus Fixus





However theoretically optimal, direct pulley surgery is currently in the earliest stages of clinical development, and will probably require the test of time

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Major Review

Epiretinal Membrane:Management and Recent Advances

Dr Bindu Rajesh MS, Dr Jay Seth MS

Introduction

Epiretinal membrane (ERM) can be defined as an avascular fibrocellular proliferative tissue over the inner surface of internal limiting membrane (ILM). It is primarily caused by abnormal proliferation of cellular structures interspersed with extracellular matrix proteins.[1] Since the ERM principally involves the macular region, its proliferation and subsequent contraction leads to variable grades of distortion of retinal architecture and subsequent visual disturbances.[1] These visual symptoms primarily include blurring of vision and metamorphopsia. Iwanoff was the first to describe the clinical entity of ERM in 1865.[2] Subsequently, it has been extensively studied by various authors over the past 150 years and labelled this condition by several names such as cellophane maculopathy, macular pucker, surface wrinkling retinopathy, epiretinal fibrosis / gliosis, preretinal macular fibrosis and internal limiting membrane contraction. Majority of these ERM's are idiopathic in nature with a prevalence of less than 4% below 60 years of age and approximately 25% over the age of 75 years, suggesting a uniform and vital association with advancing age.[3,4,5,6]

Etiopathogenesis

Epiretinal membranes may be either idiopathic in nature (iERM) or may arise secondary to ocular pathologies such as trauma, uveitis and retinal vascular disorders including retinal vein occlusions and diabetic retinopathy, and also following retinal surgeries, lasers and cryotherapy.[3,8] Amongst them, iERM is the more common variety encountered in daily practice.[8]

Foos in the year 1977 proposed a hypothesis for development of iERM. He postulated that posterior vitreous detachment (PVD), which occurs as a normal ageing phenomenon, causes microscopic ILM defects.[9] Through these minuscular defects, the retinal glial cells including Müller cells and astrocytes migrate and proliferate over the inner retinal surface. Although plausible, this hypothesis does not validate all iERM formations as immunohistochemical staining has failed to demonstrate ILM defects in all cases.[10] To surmount these weaknesses, Sebag proposed an alternate hypothesis in which he suggested that after formation of anomalous PVD, hyalocytes from the cortical vitreous remain onto the ILM which subsequently proliferate and form the iERM.[11]

The common factor in both the hypothesis remains proliferation of cellular components. These can be either the retinal glial cells (Müller cells and astrocytes) or hyalocytes, which have been detected most commonly by histochemical markers.[12, 13] Other cellular components identified include the macrophages, retinal pigment epithelial cells (RPE), fibroblasts and myofibroblasts.[12, 13, 14] Of these, the RPE cells have been detected more frequently in ERM's secondary to retinal breaks, trauma and retinal detachment surgeries.[15]

ERM being a fibrocellular membrane, necessitates presence of extracellular matrix (ECM) component consisting of collagen in addition to the above mentioned cellular component. The signalling pathway for cellular migration and proliferation of ERM arises from various growth factors such as basic fibroblast growth factor, transforming growth factor ß (TGF-ß) and vascular endothelial growth factor (VEGF) which act in a paracrine fashion.[21, 22, 23] Secretion of these growth factors is triggered by anomalous PVD which induces mechanical traction on the retina.[11]

Ensuing initial formation of ERM, contraction of the membrane starts developing. This leads to progressive wrinkling of the underlying ILM initially followed by inner retinal layer and subsequently entire retinal thickness distortion.

Classification and clinical features

In the year 1997, Gass proposed a clinical classification for defining various stages of epiretinal membrane (ERM).[24] Grade 0, also known as cellophane maculopathy, is the earliest stage, with normal visual acuity and an aymptomatic patient, characterized by presence of a thin membrane with glistening sheen over the retina in the absence of

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retinal distortion. Progressive contraction of this membrane leads to irregular distortion of inner retinal layers which is also known as crinkled cellophane maculopathy or Grade 1 ERM wherein fine superficial radiating folds are visible with tortuosity of retinal vasculature. The patient may have symptoms such as metamorphopsia, photopsia and even macropsia. Development of macropsia can be hypothesised due to coming together of the foveal cones secondary to the contracting membrane. Subsequently, the membrane advances in its proliferative and contractile nature acquiring opaqueness and leading to full-thickness retinal distortion causing macular pucker or preretinal macula fibrosis or Grade 2 ERM. The opaqueness is presumed to be due to axoplasmic stasis and may be associated with cotton-wool spots and occasional haemorrhage and hard exudates. Patients usually present with considerable metamorphopsia and deterioration of visual acuity which may necessitate active surgical intervention.

Management and recent advances:

Investigations:

Diagnosis of ERM is primarily clinical. Careful examination is required to rule out secondary causes of ERM such as vascular disorders, uveitis, trauma, retinal breaks and previous ocular intervention including lasers, cryotherapy or ocular surgeries.[8] Optical coherence tomography (figure 1) is universally used to evaluate ERM in terms of: Amount of retinal distortion, central macular thickness, presence / absence of intra-retinal edema, visualization of cleavage planes, differentiating pseudoholes from true macular holes associated with ERM and to assess the integrity of photoreceptor layers especially ellipsoid layer for prognostication.[25, 26, 27]

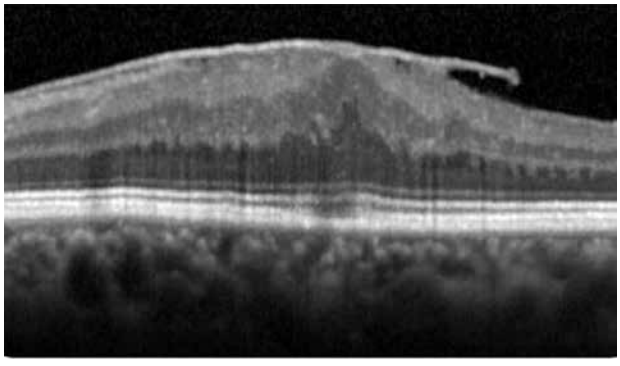


Figure 1: Optical coherence tomography scan of a patient depicting a thickened epiretinal membrane causing retinal elevation with loss of foveal contour. Preservation of the outer retinal layers can be made out.

Fluorescein angiography is rarely required in patients with opaque media in order to visualize distortion of retinal vasculature suggestive of contractile membrane and associated leakage indicating cystoids edema.[28] Application of the revolutionary fundus autofluorescence (FAF) imaging has been rendered to visualize the retinal vasculature distortion and has been correlated to the proportion of retinal microstructural damage and metamorphopsia.[29] Multifocal electroretinography and preferential hyperacuity perimetry are also lately being employed to evaluate the macular functionality in ERM.[30, 31]

Observation:

Most asymptomatic patients with early ERM can be managed with observation. Topical NSAIDs may help reduce associated inflammation. Active intervention with surgical approach is considered in patients with significant visual deterioration with or without associated metamorphopsia.

Vitrectomy

Macular surgery for ERM per se has not changed much since it was initially introduced, though advances in instrumentation have improved the surgical success rates and made surgeries less cumbersome. Surgical management consists mainly of vitrectomy with epiretinal membrane removal using either the conventional pars plana vitrectomy or 23 or 25 gauze sutureless vitrectomy. A parsplana vitrectomy is done initially followed by PVD (posterior vitreous detachment) induction.

Advances in PVD induction include adjuvant use of plasmin and microplasmin which have the advantage of both PVD induction as well as liquefaction. Enzymes causing liquefaction alone are not preferred as they carry the risk of tractional retinal breaks.[30-32]

Vital stains:

After vitrectomy various vital stains like trypan blue which stains ERM or ICG which stains ILM and thereby helps in identifying ERM by "negative staining" can be utilized for complete removal or ERM. Triamcinolone acetonide also stains ERM and posterior hyaloid without the side effects of vital dyes and is used widely for this purpose. Membrane blue dual(0.15%) is another dye which is FDA approved for the purpose of staining the ILM as well as the ERM. It has the additional advantage of staining the vitreous and allowing clear visualization of the posterior hyaloid. Brilliant blue green(BBG) has also been reported for use in ERM removal by double staining of both the ERM as well as the ILM and thus facilitates better removal of ERMs.[33]

Techniques of ERM peeling

Once the ERM is stained , then depending on the visibility of the edge it may be peeled from "outside to inside" or from "inside to outside" by creating a slit in the thickest part of

the membrane if a clear edge is not visible. Occasionally a Tano scratcher or a MVR blade may be used to drag the membrane by the "drag and snag" technique. In eyes where membranes cannot be elevated, using intraocular forceps, the membrane can be "pinched" .Alternately a soft tip extrusion needle can be used to aspirate the membrane. In very thick membranes, scissors may be used for delamination and segmenting of the same. Another development is the use of fluidic internal limiting membrane separation (FILMS) cannula .The FILMS cannula is a microcanula which is inserted under the ILM in the peripheral macula .Sterile viscoelastic solution is slowly injected resulting in a cleavage plane between the ILM and the remaining neurosensory retina. This technique has the advantage of causing gentle tamponade of the retina as the cleavage occurs. There is better separation of the ILM-ERM complex and less trauma to the retina resulting in a more complete removal of the membranes.

Peeling of the membrane by whichever technique must be done gently in tangential manner to prevent iatrogenic trauma to the retina and breaks. Membrane is usually adherent in areas of cotton wool spots , hence care should be taken to avoid starting dissection in these areas. At the end of the procedure, thorough examination and treatment of peripheral retinal breaks if present should also be carried out.

Combined ERM-ILM removal

Outcomes following ERM removal have reported improvement in vision in up to 90% and a low recurrence rate of 5% to 7%.[34-37] Some surgeons attribute the recurrence of macular pucker to proliferation of cellular remnants of the ERM on a scaffold of ILM scaffold[38,39] and hence they suggest removal of the ILM along with ERM i.e "double peeling". This is aided by the staining techniques like " double staining" as well as use of intraoperative OCT which enables better surgical success.

Membranectomy without vitrectomy

Membranectomy without vitrectomy was initially reported using 20 -gauge vitrectomy .The main advantage noted was reduced risk of cataract formation which according to many surgeons compromised the results of ERM surgery. The procedure includes making a 20 or 23 G sclerotomy through which light pipe and microhook needle were introduced and peeling was done. No infusion was used. The peeled membrane was either left in the vitreous or removed through the sclerotomy site. The sclerotomy site was closed after cutting the prolapsed vitreous.[40] The surgeon either left the membrane floating in the vitreous or pulled it out through the sclerotomy site. The prolapsed vitreous was cut, and the surgeon closed the sclerotomy sites. Long-term follow-up showed no progression of cataract above the baseline rate. However, the ERM recurrence rate was higher than normal (33%)41 and complaints of persistent disturbing floaters were more with this method. The small sample size , short follow up and need for proper case selection were the limitations of these studies. With the advent of 27-gauge vitrectomy, nonvitrectomized membranectomies are being attempted again, with the advantage of self sealing sclerotomies.42 From the limited reports in the literature, there does not appear to be a higher risk of complications other than recurrent ERM. Probably with further development of iOCT, OCT-guided ILM peel in a nonvitrectomized eye may also be possible in future.

Post Operative Outcomes

Although improvement in acuity usually ≥ 2 Snellen lines is achieved in most cases,further visual recovery occurs gradually over a period of 6 months to 12 years. However it may not be possible to completely eliminate metamorphopsia especially in eyes with very good visual acuity. Hence proper patient selection as well as counseling is necessary prior to the procedure and especially in patients with good visual acuity. Some residual visual loss can be attributed to the changes in retinal microstructure but at what stage this conversion from reversible to irreversible stage occurs is still unknown.

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Original Article

Prevalence of Macular Comorbidities in Cataract Surgical Patients and Visual Outcome in Presence of Macular Diseases.

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Abstract

Aim: To find the proportion of macular comorbidities in patients undergoing cataract surgery and the impact of associated macular disease on visual outcome after surgery.
Materials and Methods: A prospective study was conducted on patients planned for cataract surgery during the period of June 2012 to May 2013. A detailed history and ocular examination was done in all patients included in study. Detailed retinal examination, optical coherence tomography (OCT) and fundus fluorescein angiography (FFA) were done when indicated. All patients were followed post operatively at day one, one week, one month and two months.

Results: Overall prevalence of ocular comorbidity was 33.8% and 15.3% eyes had macular disorders. Diabetic maculopathy and age related macular degeneration was seen in 15 eyes, epiretinal membrane in 3 eyes, and macular hole in 1 eye and pseudophakic cystoid macular edema in 2 eyes. Average preoperative visual acuity in eyes with macular disorder was 0.90 LogMAR (±0.51) which improved significantly to 0.47 LogMAR (±0.47) postoperatively at 2 months (P= 0.000), though this was lower compared to normal eyes.

Conclusion: The study highlights that macular diseases will affect the visual outcome postoperatively. A detailed preoperative screening helps to identify macular diseases and postoperative visual outcome can be explained to the patient prior to surgery. Once diagnosed, treatment of the condition is possible before or after surgery.

Key Words: Ocular comorbidities, macular comorbidities, cataract surgery, visual outcome.

Introduction

Cataract is one of the leading causes of preventable blindness worldwide with excellent postoperative outcome after surgery. Excellent surgical outcome may not be achieved if patient has associated ocular comorbidities especially macular diseases[1]. Macular comorbidities include diabetic retinopathy and maculopathy, age related macular degenerations, retinal vein occlusion, retinal artery occlusion, retinal detachment, macular dystrophy, macular hole, vitreous hemorrhage, epiretinal membranes and vitreomacular traction. It is possible to assess the anterior and posterior segment of the eye thoroughly preoperatively using modern examination and investigative techniques even in the presence of grade three to four cataracts.

Preoperatively diseases like diabetic retinopathy, wet age related macular degeneration (AMD) and vascular occlusions, if detected can be treated by laser photocoagulation or intravitreal injections. Other conditions like vitreous haemorrhage, epiretinal membranes (ERM) and macular holes can be operated upon along with cataract or as a secondary procedure after cataract extraction[2].

The present study was planned to find the prevalence of macular comorbidities in cataract patients and assess the visual outcome.

Materials and Methods

A prospective study was conducted at our centre, for a period of one year, from June 2012 to May 2013 among patients undergoing cataract surgery. An approval was obtained from the ethics committee and an informed consent was taken from all the patients included in the study. All patients with cataract of any grade, posted for surgery were included (LOC III classification system[3]). Both eyes of the same patient were included in the study if the second eye also was operated during the one year period of the study. Patients with congenital and post traumatic cataract, those who had intra-operative surgical complications, patients with history of previous ocular surgery other than cataract and patients with previous history of an eye surgery performed elsewhere were excluded.

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A detailed ocular and medical history was taken by single examiner including the presence of systemic comorbidities like diabetes, hypertension, dyslipidemia, coronary artery disease (CAD), arthritis, thyroid disorder and asthma. History of any systemic medications being taken by the patient was also noted. Visual acuity assessment was performed under standard illumination using the logarithmic minimum angle of resolution (Log MAR) scale at a distance of 3 meters. In case of illiterate patients Log MAR 'E' chart was used. Near vision was measured at a distance of 33 cm with Snellen's near vision chart. Hand movement vision and perception of light were assumed to be equivalent to LogMAR 2.0[4].

Anterior segment assessment with slit lamp biomicroscopy was done along with grading of cataract by the Lens Opacities Classification System III (LOCS III). Intraocular pressure (IOP) was measured by Goldmann applanation tonometer. Retinal examination was done after dilatation, with slit lamp biomicroscopy using +90 D lens. Direct and indirect ophthalmoscopy was performed in all cases. In patients with retinal disease or suspicion further detailed evaluation was performed. B scan was performed on eyes with opaque media.

Potential acuity measurement was done using the Retinal Acuity Meter[5,6,7] (AMA Optics, Miami Beach, Fla.) in patients who could read English alphabets (20/300 to 20/20). The Heine LAMBDA Retinometer was used in illiterate patients to measure potential acuity by projecting a coarse fringe pattern recording the potential acuity from 20/300 to 20/25.

Preoperative keratometric measurement was done using IOL master 500 (Carl Zeiss, Germany) and biometry with Zeiss IOL master or the immersion technique, with Axis Nano (Quantel Medical, France) for mature cataract.

Patients with retinal pathology or suspects were subjected to OCT / FFA and fundus photographs were taken for documentation and explaining the disease condition to patient.

Surgical Technique:

Surgery was performed by a two experienced surgeons using the best practice patterns for surgery. All surgeries were performed under local anaesthesia, using the Alcon OZIL Infinity system for phacoemulsification and placement of IOL within the bag. Small incision cataract surgery was done in cases with grade 5 to 6 cataract. Combined surgery was performed in glaucoma patients at two different sites. Three port, 23 G pars plana vitrectomy was performed in patients requiring vitreo retinal procedure using the Alcon Accurus surgical system either following the cataract surgery on the same sitting or after a 3 week interval.

Postoperatively all subjects were reviewed by the same surgical team 4 hours after surgery or the next day then at one week postoperatively, at the end of one month and two months. They were examined for best corrected visual acuity, IOP, slit lamp biomicroscopy, detailed fundus examination and related investigations where indicated.

Statistical analysis:

Statistical analysis was performed using statistical software package (SPSS for Windows). The data were presented as mean and standard deviations. Chi-square tests were used to compare proportions. Confidence intervals (CI) were presented. Odds ratios (OR) were calculated to examine the association between the prevalence of cataract surgery, ocular and general parameters. All 'p' values were two sided and considered statistically significant when the values were less than 0.05[8]. The statistical tests used for analysis were Wilcoxon Signed Ranks Test and Mann Whitney Test.

Observations, Results and Analysis

A total 216 eyes of 197 patients were included in the study. One eye of 178 patients and both eyes of 19 patients (38 eyes) were included. There were 69 males (35%) and 128 females (65%). The age ranged from 35 to 89 years , with mean age of 67 ±10.14 years. One hundred and six (49%) patients were operated on right eye and one hundred ten (51%) on left eye.

There were 148 (75%) patients with systemic comorbidities and 49 (25%) without any associated systemic comorbidity. Hypertension was seen in 47.7% patients, diabetes mellitus in 44.2%, dyslipidemia in 23.4%, asthma in 10.7%, coronary artery disease (CAD) in 10.7%, thyroid disorder in 3.6%, nephropathy in 2%, arthrities in 1%, homocystinuria in 0.5% and liver disorder in 0.5% patients.

Mean preoperative BCVA in all the eyes included in study was 0.89 ±0.55 LogMAR units (Snellens 6/48). Preoperatively 51 eyes (23.6%) had BCVA less than 1 LogMAR units (Snellen's 6/60), 133 eyes (61.6%) had BCVA between LogMAR 1 to 0.5 (6/60 to 6/18) and 32 eyes (14.8%) had BCVA less than 0.5 LogMAR units (6/18 to 6/6). Cataracts were classified into 6 grades depending on the nuclear opalescence irrespective of the grade of cortical and posterior subcapsular cataract. Mean preoperative and at two months postoperative IOP was 15 ± 3.14 mm of Hg and 14 ± 2.48 mm of Hg respectively. Mean axial length was 23.05 ±1.07 mm, (range 20.19 to 29.93 mm). Mean

IOL power implanted was +21.5 ±1.78 Diopter (range 14.5 to 25.5 D).

Phacoemulsification was performed in 191 eyes (88.4%). Small incision cataract surgery (SICS) was done in 21 eyes (9.7%), combined surgery in 2 eyes (0.9%), phacoemulsification and vitrectomy in 1 eye (0.4%) and phacoemulsification and pterygium exicision in 1 eye (0.4%). Postoperatively 151 (70%) eyes had BCVA of 0 Log MAR (Snellen's 6/6), 47 (21.7%) eyes had BCVA of 0.1 to 0.5 Log MAR (Snellen's 6/7.5 to 6/19), 15 eyes (6.9%) had BCVA between 0.5 to 1 LogMAR (6/18 to 6/60) and only 3 eyes (1.4%) had BCVA worse than 1 LogMAR. (Snellen's < 6/60). Table 1 shows the distribution of postoperative visual acuity in 216 eyes included in the study at end of two months follow up.

BCVA in LogMAR at 2 months	Equivalent Snellen BCVA	Number of eyes(216)	Percentage
0	6/6	151	69.9%
0.1	6/7.5	25	11.5%
0.2	6/9.5	8	3.7%
0.3	6/12	11	5.1%
0.4	6/15	3	1.4%
0.5	6/19	8	3.7%
0.6	6/24	4	1.8%
0.8	6/38	3	1.4%
1.47	2/60	1	0.5%
1.77	1/60	1	0.5%
2	PL + ve	1	0.5%

BCVA- Best corrected visual acuity, PL + ve - Perception of light

Table 1 : Distribution of postoperative visual acuity at two months

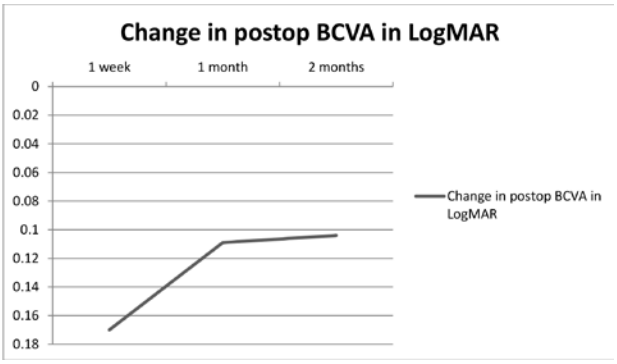
Mean postoperative BCVA at 1 week was 0.17 LogMAR (Snellens 6/9.5) which improved to 0.109 LogMAR (Snellens 6/7.5) at 1 month and 0.104 LogMAR (Snellens6/7.5) at 2 months postoperatively. The overall visual outcome in eyes at two months postoperatively, significantly improved when compared to preoperative values (P = 0.000). Figure 1 shows the improvement in postoperative BCVA in all the eyes from one week to one month and two months. The change in BCVA from postoperatively 1 week to postoperatively 1 month was significant (Wilcoxon Signed Ranks Test Z =6.77; P=0.000) however there was no significant difference in BCVA between the one month and two month follow up period (Wilcoxon Signed Ranks Test Z =1.045; P=0.296).

Overall 33.8% (73/216 eyes) had any ocular comorbidity, of these 15.3% (33/216 eyes) had macular comorrbidity of any type (Table2). The BCVA in eyes with macular involvement was 0.90 ± 0.51LogMAR (Snellens 6/48) and it improved significantly to 0.47 ±0.47 LogMAR (Snellens 6/19) postperatively at 2 months (Wilcoxon Signed Ranks Test Z= 4.516; P= 0.000). Preoperative BCVA in 40 eyes with ocular comorbidities other than macular disease was 0.73 Log MAR which improved to 0.09 Log MAR . Macular comorbidities were associated with a lower visual outcome as compared to eyes with other ocular disorders.

Ocular Comorbidity	Number of eyes	Percentage
Macular Comorbidity		
Diabetic Retinopathy	23	10.6%
AMD	15	6.9%
ERM	3	1.4%
Macular Hole	1	0.5%
Pseudophakic Cystoid Macular Oedema	2	0.9%
Other Comorbidities		
Glaucoma	18	8.3%
Dry eyes	4	1.8%
Uveitis	2	0.9%
Pterygium	2	0.9%
Optic Neuritis	2	0.9%
Posterior Staphyloma	1	0.5%
Ptosis	1	0.5%
Scleritis	1	0.5%
Endothelial Dystrophy	1	0.5%
Squint	1	0.5%

AMD – Age related macular degeneration, ERM – Epiretinal membrane

Table 2 : Distribution of various ocular comorbidities



BCVA- Best corrected visual acuity

Figure 1: Comparision of average postoperative BCVA at 1 week, 1 month and 2 months in LogMAR

Among the patients with diabetic retinopathy both non proliferative and proliferative (NPDR and PDR) 23 (10.6%) eyes had a mean preoperative BCVA of 0.87 +0.49 LogMAR (Snellens 6/48) which improved significantly to 0.43 (+0.47)

LogMAR (Snellens 6/15); (Wilcoxon Signed Ranks Test Z = 5.21; P = 0.000). Table 3 shows the distribution of severity of diabetic retinopathy. Calculating the mean preoperative BCVA in eyes with NPDR and PDR separately we found that the BCVA in eyes with NPDR was 0.72 LogMAR units (Snellens 6/30) and in PDR eyes it was 1.03 LogMAR units (Snellens 6/60). Postoperatively at two months this improved to 0.22 LogMAR units (Snellens 6/9.5) and 0.64 LogMAR units (Snellens 6/24) respectively (Table3). Clinically significant macular oedema was detected in 12 (5.5%) eyes. The preoperative BCVA was 0.96 LogMAR units (Snellens 6/60) which improved to 0.54 LogMAR units (Snellens 6/19) postoperatively(p=0.003).

Mean preoperative BCVA in 13 eyes (6%) with dry AMD was 0.6 LogMAR (Snellens 6/24), and it significantly improved to 0.15 LogMAR (Snellens 6/9.5) postoperatively (Wilcoxon Signed Ranks Test Z = 3.31; P = 0.001). However mean preoperative BCVA in two eyes (0.9%) with wet AMD was 1.2 LogMAR (Snellens 4/60) and there was no change in the postoperative visual acuity (BCVA 1.1 LogMAR). One patient was a given course of intravitreal injection avastin (Bevacizumab, Roche Diagnostics GmbH, Germany).

In two eyes (0.9%) with vitreous haemorrhage mean preoperative BCVA was 1.23 LogMAR which improved significantly to 0.4 LogMAR units (Snellens 6/15) postoperatively and three eyes (1.3%) with vitreomacular traction had preoperative BCVA 0.76 LogMAR (Snellens 6/38) which improved to 0.5 LogMAR (Snellens 6/19) postoperatively. Eyes with VMT, macular hole and Epiretinal membrane the visual outcome was not statistically significant.

Preop BCVA in 2 eyes (0.9%) with pseudophakic cystoid macular edema (CME) was 1.4 (±0.85) LogMAR (Snellens 2/60) and did not improve significantly following cataract surgery (0.5 ± 0.14); (Wilcoxon Signed Ranks Test Z =1.34; P=0.18).

Type of DR	Number of eyes	Percentage
Mild NPDR	5	2.3%
Moderate NPD	4	1.8%
Severe NPDR	3	1.4%
Early NPDR	7	3.2%
High Risk PDR	4	1.8%

DR- Diabetic retinopathy, NPDR- Non proliferative diabetic retinopathy, PDR- proliferative diabetic retinopathy

Table 3: Distribution of Diabetic Retinopathy

Discussion

Incidence of ocular diseases like age related macular degeneration, glaucoma and diabetes is rising in populations around world including in countries like India and China[8]. Increasing number of patients who require cataract surgery are presenting with associated complex problems. Epidemiological studies report an overall 34% to 36% incidence of ocular comorbidities in cataract patients[2,8,12,13].

Decision to perform cataract surgery in patients with pre existing retinal disease is a challenge because visual outcome in these cases is guarded. However two studies namely Early Treatment of Diabetic Retinopathy[9] study and Age Related Eye Disease study[10] have shown that visual acuity does improve after cataract surgery in patients with diabetic retinopathy and age related macular degenerations[11].

The present study conducted at our centre included patients from Kerala. The mean age of population in our study was 67 years which is similar to a study by Al-Orainy et al[12]. However, the average age reported in other studies[12,13,14] is much higher (75 years). Al-Orainy et al have proposed that the reason for presentation at a younger age could be attributed to greater exposure to UV rays due to hot and sunny climate, resulting in development of cataract at an earlier age.

Awareness amongst the general public about early reporting to the hospital for cataract treatment would be a reason for early presentation of patients in our study. Kerala has a high literacy rate and a higher educational level and socioeconomic status. A higher prevalence of diabetes in our population would be another attributing factor[12]. Menon et al[15] reported prevalence of diabetes mellitus in Kerala as 19.5%.

There was a significant female preponderance in the patients included in our study (65.4%). West and Valmadrid[16] reported that women were at higher risk for developing cataract. A population based eye survey conducted in Tirunelvelli district of South India reported that females are at higher risk for developing cataract[17].

The worldwide reported prevalence of ocular comorbidities ranges from 26% to 49% [2,8,13,14]. Overall prevalence of ocular comorbidity in our study was 37.5%. Auckland Cataract

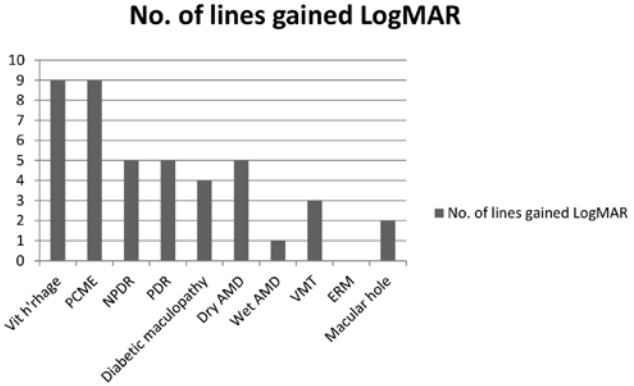
Study[14] reported a prevalence of ocular comorbidities in 26% and the SCOUTS study[2] in 34%. In our study ocular comorbidities were seen in 73 eyes (33.8%). The postoperative visual gain in these eyes was 2 lines less when compared to normal eyes. This difference was statstically significant (p = 0.000).

World Health Organization (WHO) categorized visual outcome following cataract surgery as excellent (>6/18), good (6/18 to 6/60) and poor (<6/60)18. If we classify the visual gain in our patients with ocular comorbidity according to WHO classification, 86.3% eyes had excellent visual outcome.

In eyes with any macular disorder there was mean gain of 4 lines in visual acuity which indicates good visual recovery according to the WHO classification. Only two eyes had poor visual outcome because of advanced diabetic retinopathy with maculopathy and one eye had advanced AMD. Figure 2 shows the improvement in postoperative visual acuity in various macular comorbidities.

Several studies[9,19,20] have reported improved visual outcome in eyes with diabetic retinopathy of any level present preoperatively. Cataract surgery helps to improve vision in these patients as compared to their preoperative visual acuity and also allows for better treatment of diabetic retinopathy due to better visualization. Squrell et al[19] found that progression of retinopathy was not related to the direct effect of surgery but it was the natural disease progression. We also found a similar outcome in our study.

There were 23 eyes with diabetic retinopathy in our study. At 2 months postoperative and after a follow up period of 6 months the mean gain of 6 lines was seen in 11 eyes



Vit h'rhage - Vitreous Haemorrhage, PCME – Pseudophakic cystiod macuar edema, NPDR – Non proliferative diabetic retinopathy, PDR – proliferative diabetic retinopathy, AMD – Age related macular degeneration, ERM – Epi retinal membrane, VMT – Vitreomacular traction,
Figure 2: The number of lines improved postoperatively in various comorbidities

(5.1%) with NPDR which was excellent visual outcome and 6 lines in 8 eyes (3.7%) with PDR which was good visual outcome according to WHO classification. In rest of the 4 eyes vision remained unchanged. Fourteen of these eyes had undergone laser photocoagulation preoperatively. One eye received intravitreal injection avastin preoperatively and three eyes were given intravitreal injection avastin and one eye injection triamcinolone for macular oedema postoperatively.

Out of the 12 eyes (5.5%) with clinically significant macular oedema 4 had NPDR and 8 had PDR. Eight eyes showed an average gain of 6 lines, three eyes remained unchanged and one showed worsening by one line. If we go by WHO guidelines[18] overall visual outcome was excellent in NPDR with CSME and good in eyes with PDR with CSME. Thus in our study the visual outcome in diabetic retinopathy patients was significantly improved though it was worse when compared to normal eyes.

At the end of 6 months follow up postoperatively a mean gain of 8 lines was seen in eyes with vitreous haemorrhage as the vitreous haemorrhage cleared spontaneously which indicates an excellent visual prognosis and 2 eyes with vitreomacular traction also showed improvement in BCVA by 4 lines which was good visual prognosis.

At the end of 6 months follow up eyes with dry AMD showed 5 lines of improvement in distance vision and 5 lines for near vision (P = 0.001). According to WHO classification this was excellent visual outcome. This On the contrary eyes with wet AMD, macular hole and ERM did not show significant visual improvement for distance or near vision.
The older studies[21,22] have reported an increased risk of AMD progression following cataract surgery. This could be because of the surgery with older technique was associated with more intraocular trauma and and postoperative inflammations. However The Age Related Eye Disease Study[22] did not show any such corelation.

Two patients with uveitis showed improvement in BCVA by 8 lines on LogMAR chart. Results of our study were similar to study done by Hazari et al[23] who reported that cataract extraction and PCIOL implantation is safe procedure ineyes with uveities, if it is well controlled for at least three months before surgery.

We performed the surgery using the recomended standerdised procedure for both phacoemulsification and manual small incision cataract surgery. This has helped in reducing the postoperative inflammation and therefore

the risk of worsening of pre existing ocular disease is significantly lower.

Conclusions

In our study we found out that the prevalence of ocular comorbidities is significantly high therefore, screening the patients prior to surgery is important. After surgery though the visual outcome in eyes with ocular comorbidities was not as good as normal eyes, overall visual acuity significantly improved in eyes with dry AMD, NPDR without CSME and vitreous haemorrhage. However it did not show significant improvement in eyes with advanced AMD, vitreomacular traction, epiretinal membrane, cystoid macular oedema.

With the available technology, majority of ocular comorbidities can be diagnosed preoperatively. We found out that potential visual acuity assessment was a useful test to predict postoperative visual acuity and to inform the patient regarding the visual prognosis. In our study preoperatively treatment was initiated as fundus examination was possible in 90.7% eyes. Delaying cataract surgery in patients with comorbidities is not advisable as harder and dense cataract prolonged surgical time leading to greater inflammation and more risk of postoperative complications.

Limitations:

Analysing data of a larger sample size is required for more generalisations of results. Quality of life assessments was not done in our study.

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Original Article

The Role of Perioperative Factors and Corneal Astigmatism as Contributing Factors for Achieving Better Uncorrected Visual Acuity after Phacoemulsification. A Pilot Study to Identify a Possible Hidden Factor

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ABSTRACT

AIM: 1. To analyse the correlation between postoperative corneal astigmatism and final subjective acceptance of astigmatic correction in patients undergoing uncomplicated phacoemulsification.
2. The role of incision size, type of intraocular lens (IOL) and type of astigmatism in final uncorrected visual acuity.

MATERIALS AND METHODS: This single centre prospective observational study included consecutive patients who underwent uncomplicated phacoemulsification by a single surgeon with temporal unsutured clear corneal tunnel incision and implantation of foldable intraocular lens. Preoperative and 3rd week postoperative detailed slit lamp examination, keratometric readings, uncorrected and best corrected visual acuities were measured.

RESULTS: The pilot study on 59 patients showed concordance between postoperative corneal astigmatism and final subjective acceptance of its correction in only 25.5% of patients. The required postoperative cylinder corrections were more than thekeratometric difference in 27%, less in 22%, and 25.5% did not accept any cylindrical correction. The correlation between keratometric difference and the accepting cylinder was weak. There were no significant differences in post operative uncorrected visual acuity with incision sizes (2.3mm and 2.8mm),and types of IOL use (p=0.72). Patients with astigmatism "with the rule" post operatively had a non significant trend toward better visual acuity compared to other types.

CONCLUSION: In the absence of definite correlation there may be a hidden factor like posterior corneal curvature influencing corneal astigmatism. The estimation of posterior corneal curvature during calculation for toric IOLs / astigmatic keratotomy, besides anterior curvature, may help achieve uncorrected emmetropia post phacoemulsification, for which a larger study is required.

INTRODUCTION

Residual refractive astigmatism has a deleterious effect on visual outcomes following phacoemulsification, often disappointing patients' expectations. This is especially important in multifocal intraocular lens (IOL) implantation where as little as 0.50 diopter of postoperative astigmatism may be the difference between subjective success and failure. Often, despite meticulous attention to calculation of the measured corneal cylindrical power and axis and subsequent placement of the correction (relaxing incision or toric IOL), both the surgeon and the patient are frequently confronted with unexpected and unexplained postoperative residual astigmatism affecting vision. Many obvious factors have been postulated to contribute to this shortfall, including inaccurate keratometry and/or wrong axis placement of correcting toric IOLs or incisions. There is an obvious need for further research in this area to delineate the hidden factors affecting final visual outcome.

AIMS AND OBJECTIVES

1.To analyse the correlation between postoperative corneal astigmatism and final subjective acceptance of astigmatic correction in patients undergoing uncomplicated phacoemulsification.
2. The role of incision size, type of IOL and type of astigmatism in final uncorrected visual acuity.

MATERIALS AND METHODS

This study was designed as a single centre prospective observational study of consecutive patient with senile cataract who underwent uncomplicated phacoemulsification through a temporal unsutured clear corneal incision(CCI)

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with foldable in-the-bag IOL implantation by a single surgeon.

Exclusion Criteria

1. Previous ocular surgery/ diseases affecting corneal refraction
2. Ocular trauma
3. Patients with other comorbid conditions which affect the visual acuity, including vitreoretinal pathology.

All patients underwent a comprehensive ophthalmologic examination preoperatively. Evaluation of best-corrected visual acuity (BCVA), slit-lamp examination,intraocular pressure (IOP) measurement, and fundus examination were performed on the preoperative day and at 3weeks postoperative follow up.

Statistical analysis was done with commercially available software SPSS v. 19 for WINDOWS. Descriptive statistics, Chi- Square test and Fisher's exact test were used. A p value less than 0.05 was considered for statistical significance.

RESULTS:

59 consecutive patients who underwent phacoemulsification and fulfilled the inclusion criteria constituted the study cohort. There was a female preponderance (35 patients – 59%). The mean age of the study cohort was 70 years (range of58 – 82rs).

The corneal incision was taken in the temporal cornea uniformly in all patients. The incision sizes were either 2.8mm (in 46 patients) or 2.3mm,according to the IOL implanted which was selected by the patients; 54% chose nonaspheric IOL while the rest went for aspheric lenses.

Postoperative astigmatism was "with the rule" in one third of the patients (20) and "against the rule" in another third (20) while oblique astigmatism was seen in 18 patients.

Analysis of postoperative astigmatism showed concordance between the keratometric astigmatism and subjective acceptance in only 25.5% of the entire cohort (table 1). The trend was similar across the varying types of postoperative astigmatism. 9 of 15 patients who did not requirecylinder spectacle correction had astigmatism "with the rule".

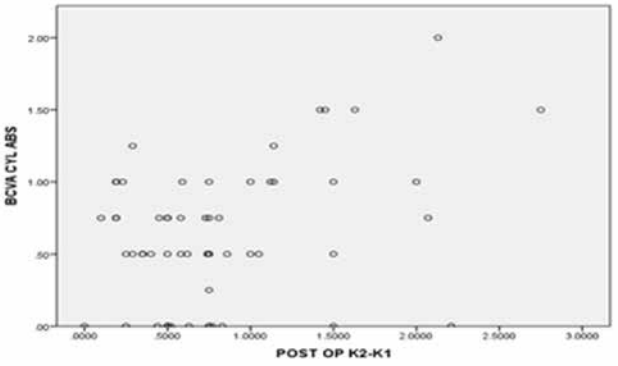


Fig 1:Scatter diagram showing correlation between keratometric difference and the accepting cylinder.

The more commonlychosen incision size was 2.8 mm. However, there were no significant differences in post operative uncorrected visual acuity with incision sizes (2.3mm and 2.8mm) (p= 0.48).

Visual acuity	2.3mm incision	2.8mm incision	Non aspheric	Aspheric	Total
6/9 or better	9	36	25	20	45
6/12	4	10	7	7	14
Total	13	46	32	27	59

Table 2

Surgically induced astigmatism (SIA)was comparable with incision size of 2.3 mm (0.46 ± 0.37) and 2.8 mm (0.59 ± 0.67) (p = 0.368 Not Significant).

Post-operative uncorrected visual acuity did not vary significantly withvarying categories of IOL, with non aspheric lenses faring as well as aspheric ones (p= 0.72) (Table 2). There was no significant difference in post operative uncorrected visual acuity with type of preoperative astigmatism (p = 0.536) (Table 3). The distribution of

Correlation between post operative corneal astigmatism and subjective acceptance	Frequency n (%)	With the rule n (%)	Against the rule n (%)	Oblique n (%)
Acceptance<keratometric astigmatism	13 (22)	2 (10)	5(25)	6(33)
Acceptance=keratometricastigmatism	15 (25.5)	3(15)	8(40)	4(23)
Acceptance>keratometricastigmatism	16 (27)	6(30)	4(20)	6(33)
Requiring no cylindrical correction	15 (25.5)	9(45)	3(15)	2(11)
Total	59 (100)	20(100)	20(100)	18(100)

Table 1: The correlation between keratometric difference and the accepting cylinder was weak.Correlation coefficient was 0.390589

preoperative astigmatism was relatively even among "with the rule", "against the rule" and oblique types. Post operative concordance with the category of astigmatism was seen in 69% of the patients (12/16 with the rule, 16/20 against the rule and 13/23 oblique). Patients with "with the rule" astigmatism post operatively had a non significant trend toward better visual acuity compared to other types ($p = 0.29$).

Visual acuity	With the rule	Against the rule	Oblique	Total
6/9 or better	13	12	20	45
6/12	3	8	3	14
Total	16	20	23	59

Table 3

DISCUSSION

With the advancement of small-incision cataract surgery and foldable IOLs, the surgeon's goal is an emmetropic eye postoperatively, and patients expect prompt and complete visual recovery. Postoperative uncorrected visual acuity is affected by postoperative astigmatism.Previously described factors affecting the severity of postoperative astigmatism in phacoemulsification include incision size, configuration and location of the surgical incision[1–3].

We could not identify any significant association between postoperative visual acuity and type of astigmatism, incision size or type of intraocular lens in our study.

Our choice of incision was clear corneal and temporal in all patients. Clear corneal incision (CCI) can be performed in a superior or temporal location, obliquely, or according to preoperative steep axis. Several studies have shown that temporal incisions result in with-the-rule (WTR) astigmatism, whereas superior incisions result in against-the-rule (ATR) astigmatism[4–7]. Since the astigmatism changes to ATR astigmatism with age, temporal incision seems superior to other locations in the cornea.

Incisions that are wider and closer to the central cornea and have a shorter tunnel length will induce more astigmatic flattening at the meridian of placement. If an eye has no pre-existing astigmatism, then the ideal corneal incision would be placed temporally, far from the visual axis, and would have a long tunnel length and a narrow width. This is a case in which moving from a standard phaco incision of 2.8 mm down to a microincision of approximately 2.2 mm or smaller would be preferred. The smaller the incision, the less SIA is induced[8]. Prior studies have shown that this hold true for wounds from 11mmto 3 mm[9].

Our study showed no significant difference in SIA with incision sizes of 2.3mm and 2.8mm. This is in contrast to another study which showed less SIA induced with 2.2 mm as compared to a 3 mm incision[10]. When the incision decreases from2.2 mm to 1.8 mm or even to 1.6 mm, no significant beneficialclinical effect of SIA has been noted.

Our study suggests that the impact of incision size on visual acuity is negligible with small incisions, 2.3 mm or 2.8 mm. Neither did the SIA vary significantly nor the postoperative visual acuity. Notably,studies have shown that the benefitsof small incisions less than 3.5 mm are significant only in the earlypostoperative period, with a decrease in difference over longer durations[11].

Keratometric difference did not have significant correlation with the subjective acceptance of astigmatism in our data. Traditionally, keratometers and Placido-disk corneal topographers have been used to measure the curvature of the anterior surfaceof the cornea and corneal power and astigmatism values have been calculated by assuming a fixed posterior:anterior curvature ratio. Since Jaffe and Claymanfirst analyzed the relationship between cataractsurgical technique and refractive results in individualpatients in 1975, ophthalmic surgeons have calculated surgically induced refractive change in an attempt to minimize postoperative corneal and ocular astigmatism. Several studies suggest that current methodology is inadequate for achieving optimum astigmatic outcomes.

Not measuring the posterior corneal astigmatism could result in incorrect estimation of total corneal astigmatism, hindering toric IOL selection through overcorrection in with-the-rule astigmatism and undercorrection in against-the-rule astigmatism. The magnitude of posterior corneal astigmatism cannot be predicted based on the amount of anterior corneal astigmatism. Patients who have anterior with-the-rule astigmatism—in other words, the cornea is steep at 90 degrees anteriorly—tend to have, on average, 0.5 diopter (D) of steepness vertically along the posterior cornea, and because the posterior cornea is a minus lens, steepness vertically translates into power horizontally or against-the-rule effect refractive power at 180. So you might measure a patient who has 2 D on the anterior cornea and when all is said and done, that patient may only have 1.3 or 1.4 D on the total corneal power because the posterior cornea throws in about 0.5 or 0.6 D in the other direction[12].

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CONCLUSIONS

The incision size, type of IOL and type of pre operative corneal astigmatism had no significant effect on the

final uncorrected visual acuity. In the absence of definite correlation between the final subjective acceptance and the corneal astigmatism there may be a hidden factor like posterior corneal curvature influencing corneal astigmatism. The estimation of posterior corneal curvature during calculation for toric IOLs / astigmatic keratotomy, besides anterior curvature, may help achieve uncorrected emmetropia post phacoemulsification.

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Original Article

Macular Changes Following Cataract Surgery Over A Six Month Period

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ABSTRACT

AIM: To study the macular changes following cataract surgery over a 6 month follow-up period using optical coherence tomography(OCT)

METHODOLOGY: Central macular thickness (CMT) was measured for 100 patients (mean age 66.3±8.6 years) who underwent small incision cataract surgery over 2 years from December 2012 to November 2014. Data was collected 1 day preoperatively, 1 week, 6 weeks and if needed 6 months after surgery.

RESULTS: • Qualitative changes: subtle cystoid abnormalities (28%), diffuse spongy thickening (13%) and frank cystoid macular edema (1%).

• Quantitative changes: A significant increase in CMT was seen on comparing first week with preoperative values (22.7μ) and fourth week with preoperative values (26.1μ). A significant decrease was seen on comparing fourth week with first week values (25.9μ).

• Topographical changes: A significant increase noted in all quadrants except inner nasal and inner superior.

• No correlation of CMT was found with posterior capsule rent, postoperative uveitis, duration of surgery or axial length.

CONCLUSION: Routine OCT done in the early postoperative period can pick up macular changes like subtle cystoid alterations and diffuse spongy edema in addition to CME. Study of such OCT patterns may contribute to identification of OCTchanges predictive of CME development. This in turn can help clinicians tailor post op NSAID regimen in individual patients.

KEYWORDS: CATARACT SURGERY; OPTICAL COHERENCE TOMOGRAPHY; CYSTOID MACULAR EDEMA ; CENTRAL MACULAR THICKNESS

INTRODUCTION

Though clinically significant CME with decreased visual acuity is seen in only 0.2-1.4% of eyes(1)(2), angiographic evidence of CME occurs in approximately 10-20% of uncomplicated phacoemulsification cases(3)(4). Clinically significant CME is associated with a decrease in visual acuity of 20/40 or worse(5)and usually occurs within 3–12 weeks postoperatively.

OCT is a non-invasive tool for objectively monitoring retinal thickness with a high degree of reproducibility and repeatability. Before the development of postoperative CME, theremay be a phase of subclinical increase in central macular thickness. This study aimed to evaluate:-

1. The incidence of CME and other macular changes after small incision cataract surgery using OCT
2. The effect of cataract surgery on central macular thickness at 1 week, 1month and if needed 6 months after surgery
3. To determine the relation of central macular thickness changes with surgical and biometric parameters

MATERIALS AND METHODS

This is a descriptive study. The study group comprisedof 100 patients who presented to the outpatient department of Ophthalmology, Amala Institute of Medical Sciences during the study period, which was from December 2012 to November 2014.

Inclusion criteria:

All prospective cataract surgery patients attending ophthalmology outpatient department during the study period

Exclusion criteria :

1. Patients with pre existing macular disease
2. Patients with pre existing inflammatory conditions like

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uveitis
3. Patients with dense cataracts whose preoperative OCT scan could not be obtained due to media haze

Procedure :

After obtaining informed consent, the following were measured:-

- Best corrected visual acuity (BCVA) – measured using Snellen's chart
- Slit lamp examination and biomicroscopy using 90D lens
- A scan biometry
- Spectral domain OCT images were obtained through dilated pupils using CIRRUS HD-OCT (Carl Zeiss) to determine central macular thickness

All patients were started on topical antibiotics and anti-inflammatory eye drops pre-operatively. Surgery was carried out under peribulbar anaesthesia after dilating the pupil with tropicamide and phenylephrine eye drops. A standard surgical technique was followed(small incision cataract surgery). The baseline postoperative regimen included oral levofloxacin, topical antibiotics sixth hourly, topical anti-inflammatory eighth hourly and prednisolone eye drops fourth hourly.

BCVA, fundus evaluation and OCT scans were repeated during follow up after 1 week,1 month and if required after 6 months of surgery. The retinal thickness maps were divided into central macular thickness and 2 peripheral ring area with diameters of 3 mm and 6 mm each. The quantitative increase in thickness and topographical distribution was noted in each of these quadrants. In addition to, qualitative pattern recognition scans were attempted in order to describe retinal response in the immediate postoperative period.

RESULTS

Hundred patients were included in this study with a minimum age of 45 years and a maximum age of 82 years (Fig 1). Mean age of the patients was 66.3 ± 8.6 years.52% were female and 48% were male (Fig 2).

Quantitative macular changes: CMT at 1 week and 4 weeks were compared independently with preoperative CMT. On analysis using the paired t-test, there was a significant increase in CMT in first and fourth week values when compared to preoperative values. There was a statistically significant decline in CMT between first and fourth week. (Table 1, Fig 3)

Qualitative macular changes: The following qualitative macular changes were seen(Fig 4):-

- Subtle intraretinal cystoid abnormalities without substantial increase in retinal thickness or loss of foveal contour - most common – 28% (Fig 5)
- Diffuse retinal thickening with blunting of the foveal contour but no definite cystoid abnormalities – 13% (Fig 6)
- Frank cystoid abnormalities withinthe retina with distortion of the foveal contour - classically seen – 1% (Fig 7)

In the single patient in our study group who went onto develop CME, ILM wrinkling was the first change noted. (Fig 8)

Topographical comparison of macular thickness: The paired t-test was used for comparison of preoperative and postoperative retinal thickness in each quadrant separately. There was a statistically significant increase in fourth week retinal thickness when compared to corresponding preoperative values in all quadrants except inner superior and inner nasal quadrant($p<0.05$).

Correlation of postoperative CMT with surgical and biometric parameters:

A) PCR :

6% patients had a history of PCR and they showed anincrease in postoperative CMT when compared to those patients without PCR both at 1 week and 4 weeks after surgery, but it was not found to be statistically significant using independent t-test (Fig 9,10, Table 2).

B) Postoperative uveitis :

The increased postoperative CMT in 2% patients with uveitis (1week postoperative) was not found to be statistically significant when compared to patients without uveitis usng the independent t-test(Table 3).

C) Duration of surgery :

No statistically significant correlation was found between postoperative CMT and duration of surgery using the Karl Pearson correlation (Table 4).

D)Axial length :

No significant correlation was seen between postoperative CMT and axial length using Karl Pearson correlation (Table 5).

DISCUSSION

Quantitative macular changes:- Belair et al found the incidence of CME to be 4% at 1 month postoperatively and 0% at 3 months after surgery. The 2 eyes with CME had a mean increase in CMT of 304 μm compared to 9 μm increase for remaining eyes.(6)

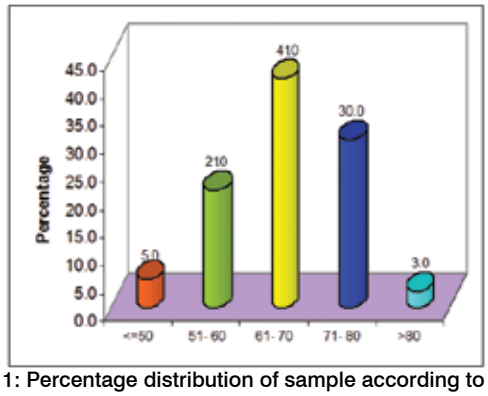


Fig 1: Percentage distribution of sample according to age

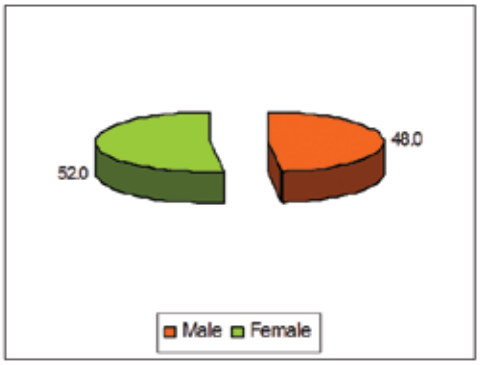


Fig 2: Percentage distribution of sample according to sex

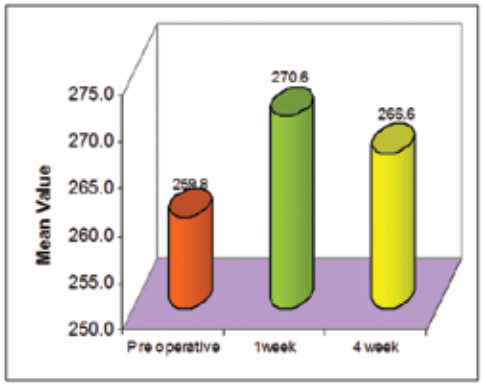


Fig 3: Comparison of CMT

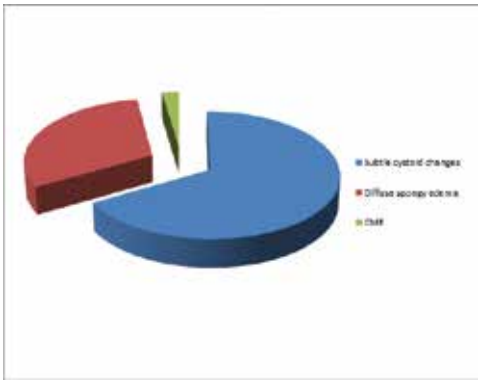


Fig 4: Qualitative distribution of macular changes

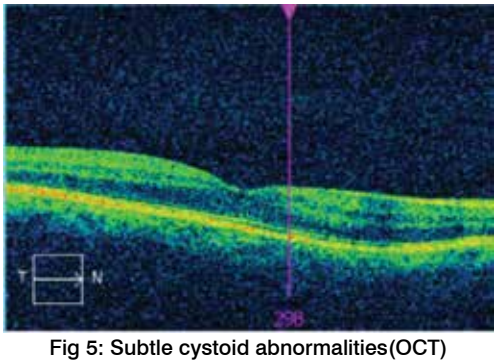


Fig 5: Subtle cystoid abnormalities(OCT)

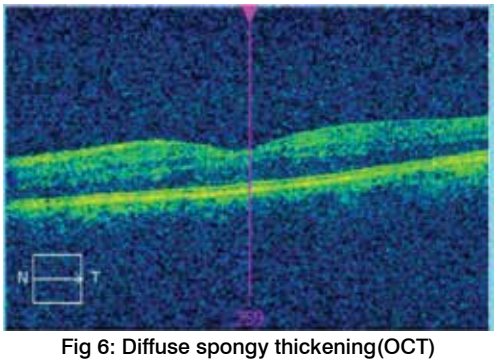


Fig 6: Diffuse spongy thickening(OCT)

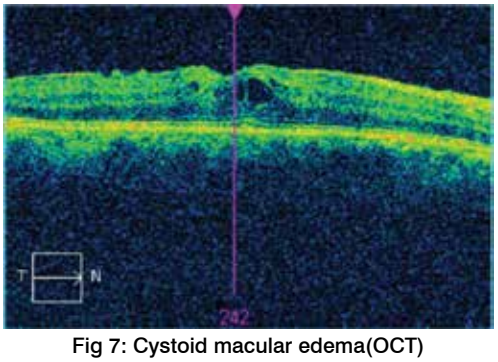


Fig 7: Cystoid macular edema(OCT)

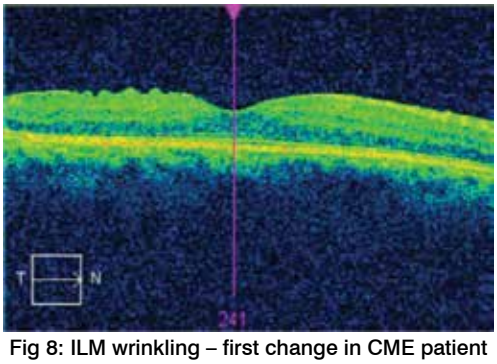


Fig 8: ILM wrinkling – first change in CME patient

Vukicevic et al found that macular thickness increased after surgery and central foveal thickness increased by 7% which returned to preoperative levels by 6 months.(7)

Our study found a significant increase in CMT in first and fourth week values when compared to preoperative values. There was a statistically significant decline in CMT between first and fourth week.

Qualitative macular changes:- Vukicevic et al found the

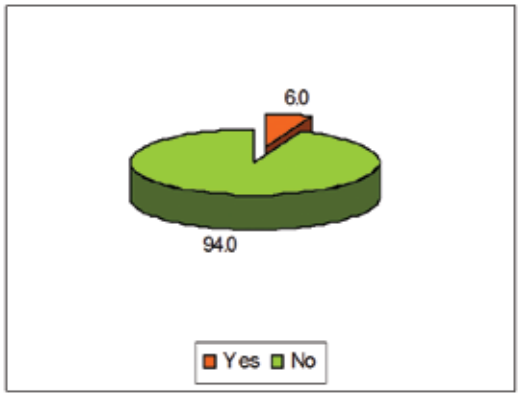


Fig 9: Percentage distribution of sample according to PCR

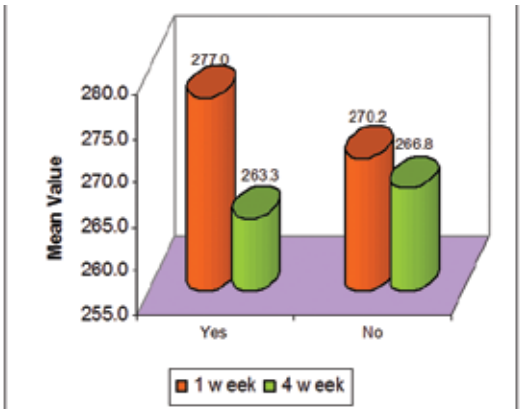


Fig 10: Comparison of postoperative CMT with PCR

Stage	Mean	SD	Group	mean difference	paired 't'	p
Pre	259.8	22.7	Pre Vs I wk post	10.8	7.82**	0.000
1 week	270.6	26.1	Pre Vs 4 wk post	6.8	4.61**	0.000
4 week	266.6	25.9	I wk post Vs 4 week post	4.0	2.48*	0.015

Table 1. Comparison of CMT.
**signficant at 0.01 level. *significant at 0.05 level

CMT	Posterior capsule rent	Mean	SD	N	t	p
1 week	Yes	277.0	24.3	6	0.62	0.537
	No	270.2	26.3	94		
4 week	Yes	263.3	21.4	6	0.31	0.755
	No	266.8	26.2	94		

TABLE 2: Comparison of postoperative CMT and PCR

Uveitis	N	CMT		t	p
		Mean	SD		
Y	2	272.00	11.31	0.078	0.938
N	98	270.54	26.37		

TABLE 3 : Comparison of postoperative CMT and uveitis

	R	p
1 week	-0.097	0.337
4 week	-0.153	0.130

TABLE4 : Correlation between postoperative CMT and duration of surgery

	R	p
1 week	-0.097	0.337
4 week	-0.153	0.130

TABLE 5: Correlation between postoperative CMT and axial length

incidence of CME to be 5%.(7) Henderson et al found the incidence of CME to be 2.35%.(8) von Jagow et al studied 33 patients and no cases of clinical CME was diagnosed in this study.(9)

The qualitative macular changes seen in our study included subtle intraretinal cystoid abnormalities (28%), diffuse spongy thickening (13%) and frank cystoid abnormalities with distortion of the foveal contour (1%).

Topographical analysis of macular changes:- Cagini et al found an asymptomatic increase in retinal thickness in the 3 mm and 6 mm areas at 12 weeks after surgery.(10)

Jurecka et al found the increase in retinal thickness in the inner macular ring and outer macular ring were statistically significant in first , second and third months after surgery. The increase in retinal thickness in the foveal area was statistically significant in first and second months post surgery.(11)

Gharbiya et al in a study of 40 patients found a significant increase in retinal thickness with a peak at 1 month for the 3 mm and 6 mm areas and a peak at 2 month for central macular thickness. At 6 months , the retinal thickness was still significantly increased only in the peripheral areas.(5)

Our study also found a statistically significant increase

in fourth week retinal thickness when compared to corresponding preoperative values in all quadrants except inner superior and inner nasal quadrant($p<0.05$).

Correlation of CMT with surgical and biometric parameters

A) Posterior capsule rent

Ackay et al in a retrospective study of 20 patients with PCR determined that 10% of theses eyes had clinically significant CME at 1 month follow up.(12)

Our study had 6 patients with PCR. Though there was an increase in postoperative CMT in these patients, this was not statistically significant which could be due to minimal or no associated vitreous loss in these cases.

B) Postoperative uveitis

Gulkilik et al found that CME was more in patients with postoperative anterior chamber inflammation of 2+ or more than in patients with less inflammation (43.2 vs 11.5%).(13)
This correlates with our study as most of the cases had mild to moderate uveitis and they showed an increase in CMT but there were no cases of CME.

C) Duration of surgery

Jurecka et al found a positive correlation between the duration of surgery and increase in retinal thickness in all areas one month after surgery.(11)
von Jagow et al found no correlation between time of surgery and macular thickness.(9)
This concurred with our study which found no significant correlation between CMT and duration of surgery.

D) Axial length

von Jagow et al found no correlation between axial length and macular thickness.(9)
Gharbiya et al found no significant correlation between axial length and macular thickness changes. (5)
This concurred with the results of our study.

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Original Article

Vitrectomy with Posterior Segment Intraocular Foreign body Removal : A Decade of Experience in Evaluating Prognostic Factors and Outcomes

Remya Mareen Paulose DNB, Thomas Cherian MS, Ashok Nataraj MS

Abstract

Background: The objectives of this study were to identify the predictive factors and to evaluate the visual and anatomical outcome in posterior segment intraocular foreign body patients managed by pars plana vitrectomy (PPV) with IOFB removal.

Methods: This is a retrospective study of 67 eyes with posterior segment intraocular foreign body (IOFB, who underwent pars plana vitrectomy with surgical removal of the foreign body between 2003-2013 (10 years). In addition to the epidemiological data such as age and gender of the patients, various data on the presentation and management of injury were collected which included time interval between injury and intraocular foreign body removal, examination findings at presentation, details of surgery, postoperative complications, postoperative visual and anatomical outcome and length of follow-up. All patients underwent IOFB removal via pars plana vitrectomy. Anatomical success was defined as no retinal detachment at last follow-up visit. Final best corrected visual acuity of 20/200 or better was considered as good visual outcome and below 20/200 was considered as poor outcome. The association between the variables was studied using the Chi- Square and Fischer exact tests.

Results: The interval between injury and IOFB removal was less than 7 days in 50eyes (60 %), between 7-14 days in 8eyes (12 %) and beyond that in 9 eyes (13.5 %). Timing < 7 day showed statistically marginally significant relation with poor anatomical outcome (P0.05). Preoperative retinal detachment was present in 11/67 (16.5%).After IOFB removal, the retina was detached in 22.3% (25/67 patients). After second vitrectomy performed in 6 patients, final anatomic success was 82%. Presence of preoperative vitreous haemorrhage and endophthalmitis were the statistically significant predictors for poor anatomical outcome. From the analysis, good visual outcome was correlated with visual acuity at initial presentation, size of foreign body, absence of endophthalmitis and early removal of foreign body. Conclusions-In conclusion, initial visual acuity, size of foreign body, days to foreign body removal and endophthalmitis were found to be the significant predictors of final visual outcome. For anatomical success only endophthalmitis and preoperative vitreous haemorrhage had statistical significance. With the advances in vitreoretinal surgical techniques none of the surgical techniques or presence of preoperative retinal detachment had any significant association with the outcomes after surgery. However the association between different clinical situations and and visual acuity are complex and hard to explain. This calls for the need for a prospective large sample size study to address all the above mentioned points.

Introduction

The presence of an intraocular foreign body (IOFB) is a common and serious problem accounting for approximately 17% to 41 % of penetrating ocular injury.[1]Among open globe injuries classified by Birmingham Eye Trauma Terminolgy[2], injury connected with sharp penetration had a better visual prognosis than that associated with blunt penetration, and intraocular foreign bodies were reported as having better visual outcome when compared with other mechanisms. Prognosis for vision in IOFBs was dependant on confluent predictive factors, as published by previous authors.[3-5] Predictive factors of visual outcomes could aid the clinician in choosing appropriate surgical and medical management of IOFB injuries and in counselling patients. This is particularly important since the current literature suggests that the prognosis of these patients have remained poor despite advances in surgical techniques.[7]

The objectives of this study were to identify the predictive factors and to evaluate the visual and anatomical outcome in posterior segment IOFB patients managed by pars plana vitrectomy (PPV) with IOFB removal.

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Patients and Methods

This is a retrospective study of 67 eyes with posterior segment IOFB, who underwent surgical removal of the foreign body at Little Flower Eye Hospital and research centre, a tertiary referral institute in south India. Patients included had experienced the injury between 2003-2013 (10 years). Those with anterior segment IOFBs, enucleation as the primary treatment, severely traumatized eyes, and central 5mm cornea involving injuries, follow-up period of < 1 month, ocular comordities like glaucoma or diabetic retinopathy and prior history of ocular trauma were excluded from the study.

In addition to the epidemiological data such as age and gender of the patients, various data on the presentation and management of injury were collected which included time interval between injury and IOFB removal, examination findings at presentation, details of surgery, postoperative complications, postoperative visual and anatomical outcome and length of follow-up.

The visual acuity was measured with a standard Snellen acuity chart and converted to a logarithm of minimal angle of resolution (LogMAR) units for statistical analysis. All patients with penetrating injury with a leaking wound underwent primary globe repair, performed by general ophthalmologists, before consultation with the retina unit for IOFB removal. Patients with a self sealing wound underwent parsplana vitrectomy as the initial intervention. A standard 3 ports, 20G or 23 vitrectomy techniques was performed. Pars plana lensectomy or small incision cataract extraction was also done in cases of traumatic cataract obscuring view during vitrectomy. Extraction of IOFBs was performed through a limbal or pars plana scleral incision. The areas of injured retina, including detached retina, were secured by endolaser photocoagulation, cryoretinopexy and intraocular tamponade by either gas or silicone silicone oil. At each follow up visit best corrected visual acuity, slit lamp biomicroscopic and fundus examination details were recorded. Anatomical success was defined as no retinal detachment at last follow-up visit. Final best corrected visual acuity of 20/200 or better was considered as good visual outcome and below 20/200 was considered as poor outcome.

Statistical Analysis

The association between the variables was studied using the Chi- Square and Fischer exact tests. A P value less than 0.05 was taken as the level of statistical significance.

Results

Sixty seven eyes of 67 patients who underwent pars plana vitrectomy for posterior segment foreign body removal was included in the study. All patients were males. Their ages ranged from 4 to 61 years with a mean age of 31.99 ±10.36 years. All patients had a minimum follow-up of at least 6 months (range- 6-42 months, mean- 10.85 ± 8 months).

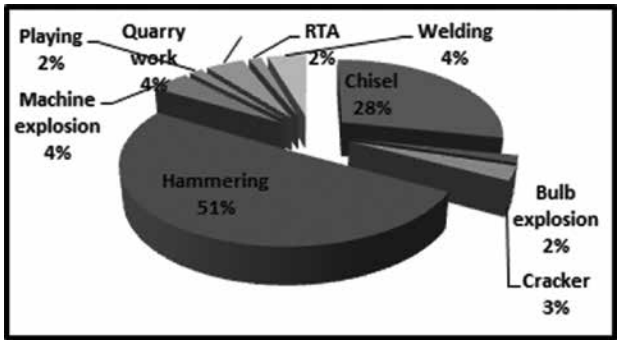


Fig 1. Mechanism of injury

The majority of foreign bodies were metal in nature (n=55, 82.1%).Other foreign bodies included stone (n=11, 16.4%) and glass (n=1, 1.5%). There is no statistical association between the nature of foreign body and the anatomical outcome (p =0.895).The most common activity involved was hammering (n=34, 50.7%).Other mechanisms of injury are summarized in figure 1.

Of the 67 eyes, 26 (39%) had an initial visual acuity of light perception or hand movements, in15 eyes (22.5%) visual acuity ranged between counting fingers and 20/200, between 20/200 and 20/40 in 14 eyes (21%) and in 11 eyes (16.5%) visual acuity was better than 20/40.

The initial and final visual acuities are summarized in table1.

Visual acuity	Initial no: (%)	Final no: (%)
No PL	1 (1.5%)	5(7.5%)
PL-HM	26 (39%)	8 (12%)
CF- <20/200	15(22%)	11(16.5%)
20/200- 20/40	14 (21%)	14 (21%)
≥20/40	11(16.5%)	29 (43.5%)

The interval between injury and IOFB removal was less than 7 days in 50eyes (60 %), between 7-14 days in 8eyes (12 %) and beyond that in 9 eyes (13.5 %). Timing < 7 day showed statistically marginally significant relation with poor anatomical outcome P0.05.The site of entry of foreign body in the eye was limited within cornea in 45 eyes (67.5%), within sclera in 17 (25.5%) and involving corneosclera in 5 eyes (7.5%). The entrance wound location and its correlation with the final anatomical outcome has been summarized in table 2.

Initial ocular examination revealed cataract in 49 patients

(73.1%), vitreous haemorrhage in 28 (42%), retinal detachment in 11 (16.5%) and endophthalmitis in 7 eyes (10.5%).All these patients underwent pars plana vitrectomy with foreign body removal. In 16 (23.9%) patients the foreign body removal was done with forceps, with magnet in 47 (70.1%) patients and in the rest 4 (6%) patients magnetic removal was assisted with forceps. Parsplana lensectomy was done in 23 patients and 26 patients underwent small incision cataract surgery. Primary intraocular lens was implanted in15 patients. Trans-scleral cryotherapy or endophotocoagulation wad used to treat retinal breaks. Prophylactic equatorial encircling 2.5mm band was used to support the vitreous base in7 patients (10.5%). Intraocular tamponade was performed at the end of surgery in 16 patients. Of these 5 were C3F8 and 13 silicone oil. The use of tamponading agents or prophylactic encircling band did not show statistical correlation for anatomic success (p =0.34, p=0.1 respectively).

Table 2 The predictive variables studied and their frequency and significance

Predictive factors	Anatomic success n(%)	P-value (Fisher exact test)
Type of IOFB		
Metal	1/1(100%)	
Glass	45/55(91.6%)	0.895
Stone	10/12 (83.3%)	
Size of IOFB		
± 4mm	19/22(90.9%)	0.316
>4 mm	36/45(80%)	
Preoperative vitreous haemorrhage		
Present	37/39(94.8%)	0.005
Absent	19/28(67.8%)	
Entrance wound *		
Corneal	35/44 (75%)	0.721
Scleral	15/17 (88.2%)	
Corneoscleral	4/4 (80%)	
Preoperative RD		
Present	7/11(63.63%)	0.098
Absent	48/56(85.71%)	
Location of IOFB *		
Inferior retina	25/31(80.64%)	
Superior retina	10/11 (90.9%)	
Temporal retina	5/5(100%)	< 0.056
Nasal retina	4/8(50%)	
Inside vascular arcade	5/5(100%)	
Vitreous	6/7(85.71%)	
Endophthalmitis		
Present	2/7(28.5%)	0.0014
Absent	53/60(88.33%)	

*Chi-square test analysis

Preoperative retinal detachment (RD) was present in eleven (16.4%) eyes. Of these 7 (63.6%) eyes got reattached postoperatively, 4 (36.4%) had redetachment. Additionally retinal detachment occurred in 11 (19.64%), out of the 56 in the retina on group preoperatively. Out of these 15 patients, 6 underwent repeat vitrectomy and 3 retinas got reattached. Final anatomic success rate was 82% (55 of 67 patients).

Endophthalmitis occurred in 7 out of 67 patients (10.5%), all clinically evident at the time of presentation. All the patients had visual acuity < 6/60 out of which only 1 patient had good final visual outcome. 6/7 (85.7%) had poor visual outcome, of which 5 patients had less than 3/60 and 1 patient who presented initially with no PL did not show any improvement. There was statistically significant association between the presence of endophthalmitis and visual (p-0.007) and anatomical (P-0.00014) outcomes.

Table 3 Statistically significant predictors of good visual outcome

Predictive factors	Good visual outcome	P-value
Initial visual acuity		
< 20/200	20/41(48.7%)	0.001
≥ 20/200	23/26 (88.46%)	
Size of IOFB		
< 4 mm	20/22 (90.90%)	0.001
≥ 4mm	22/44 (50%)	
Days to IOFB removal		
< 7 days	28/50(56%)	0.019
≥ 7 days	15/17(88.23%)	
Endophthalmitis		
Present	1/7(14.2%)	0.007
Absent	42/60(70%)	

Of the 67 eyes, 29 (43.28%) achieved final visual acuity of ≥ 20/40. As shown in table the statistically significant predictors for good final visual outcome were good initial visual acuity (p-0.001), size of IOFB (p-0.001), ≥ 7 days for IOFB removal (p-0.019) and absence of endophthalmitis (p-0.007).

Discussion

Intraocular foreign bodies (IOFBs) present unique surgical challenges, particularly when the posterior segment is involved. Risk factors for IOFB after ocular injury include youth, male gender, work-related injury, metallurgy, and battlefield or blast injury. With the advent of microsurgical and vitreoretinal instrumentation and techniques, successful management of posterior segment injuries including IOFB reduced the rates of enucleation.[7] IOFB is a serious problem in young working age population. In accordance with previous reports[3,6,8] the mean age of the patients was 31.99 ±10.36 years. All the patients were males, reflecting the occupational background in this part of the country. This study found that metal foreign body associated with hammering was the most common type of IOFBs, which is similar to other studies.[9,10]

Despite surgical advances, RD remains a devastating complication after IOFB injuries. In our study, preoperative retinal detachment was present in eleven (16.4%) eyes; however it was not a significant predictor for the development

of postoperative retinal detachment. The incidence of retinal detachment was 22.3% (15 eyes) which falls within the reported range of 6-40% as published in similar studies [11].

Current literature on prognostic factors for the development of postoperative RD after IOFB removal has shown that larger IOFB size, endophthalmitis, vitreous haemorrhage, corneoscleral wound, preoperative RD and location of the IOFB are statistically significant. However as shown in table 2 our study found preoperative vitreous haemorrhage (P-0.005) and endophthalmitis (P-0.001) as the only statistically significant prognosticating factors for postoperative retinal detachment. In the presence of view compromising conditions like vitreous haemorrhage and endophthalmitis surgical manipulations to remove IOFB increases the risk of iatrogenic retinal breaks. After repeat vitrectomy, final anatomic success was achieved in 55 (82.08%) eyes.

Table 4. Analysis of surgical techniques and anatomical success

Predictive factors	Anatomic success n(%)	P-value (Fisher exact test)
Method of IOFB removal		
Forceps	15/16(93.75%)	
Magnet	36/47 (76.59%)	0.190
Forceps+magnet	4/4 (100%)	
Tamponade used		
None	37/44(84%)	
Silicone oil	13/18(72.2%)	0.300
C_3F_8	5/5(100%)	
Encircling band		
Yes	7/8(87.5%)	1.00
No	48/59(81.35%)	
Timing Of IOFB removal		
<7 days	38/50(76%)	0.05
≥ 7 days	17(100%)	

*chi-square test

Considerable debate exists regarding the timing of vitrectomy following posterior segment trauma.[11,12] Early IOFB removal can lessen the risk of complications directly related to the IOFB and might decrease the incidence of acute posttraumatic endophthalmitis.[13] We found no association between the timing of surgery and anatomical success. Additionally in our study timing < 7days had significant association with poor anatomical outcome (p-0.0004). In study conducted by Lit etal[14], it was found that delayed surgical intervention is favoured, due to the difficulty in removing the posterior hyaloid in these often young patients and the risk of intraoperative haemorrhage in an inflamed eye.

A wide range of final visual outcomes was reported in the literature, due to the variability of causes. Good final visual outcome (VA of 20/40 or better) was reported in 30 to 71% of patients.[6,14] In this study,43/67 (64.5 %) of the patients had good final visual outcome. In agreement with other observations[4,15,16] we found that IOFB size was an important prognostic factor for final visual acuity(P-0.001). A larger IOFB size usually indicates more severe eye injury, because the wound passage might involve more intraocular tissue. Similar to the study conducted by Greven etal[6], our study also found significant statistical correlation between initial visual acuity and final visual outcome (P-0.001). Poor final visual outcome was reported previously in 17- 50% of patients[9,11], while in this study it was found to be 35.5%.

Conclusions

In conclusion, initial visual acuity, size of foreign body, days to foreign body removal and endophthalmitis were found to be the significant predictors of final visual outcome. For anatomical success only endophthalmitis and preoperative vitreous haemorrhage had statistical significance. With the advances in vitreoretinal surgical techniques none of the surgical techniques or presence of preoperative retinal detachment had any significant association with the outcomes after surgery. However the association between different clinical situations and and visual acuity are complex and hard to explain. This calls for the need for a prospective large sample size study to address all the above mentioned points.

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Original Article

Intraocular Lens Power Calculation by Different Formulas in Short, Medium and Long Eyes using Partial Coherence Interferometry based Optical Biometry

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ABSTRACT

Aim: To evaluate the predictability of intra ocular lens (IOL) power calculations using Optical Biometry (Lenstar LS 900) and five different IOL power calculation formulas (SRK II, SRK/T, Haigis, Holladay & Hoffer Q) in eyes with different axial lengths (AL).

Methods: The present study was a retrospective comparative analysis of 75 patients who underwent uneventful phacoemulsification from April 2012 to March 2014. Patients were divided into three groups based on AL – Group 1 had 25 eyes with AL < 22 mm, Group 2 had 25 eyes with AL 22mm -25.5mm, Group 3 had 25 eyes with AL >25.5 mm. Pre-operative AL and Keratometer values were measured by Lenstar and power of implanted IOL and the predicted post-operative spherical equivalence were determined using SRK II, SRK/T, Haigis, Holladay and Hoffer Q formulas. Predictive accuracy of each formula was analysed by comparing the actual and predicted spherical equivalence (Median Absolute Error).

Results: Group 1 (Short Eyes) had a mean AL of 21.62. The Median Absolute Error (Med AE) generated was comparable in all formulas (0.47 in SRK II, 0.48 in all others).

Group 2 (Medium Eyes) had a mean AL of 23.51. The Med AE generated was comparable in SRK II, SRK/T, Haigis and Holladay (0.31) – all on which were lower than that of Hoffer Q (0.40).

Group 3 (Long Eyes) had a mean AL of 26.82. Lower Med AE were generate by SRK/T and Hoffer Q (0.93) when compared to Holladay (0.96) and Haigis and SRK II(0.97).

Conclusion

In short eyes all formulas yielded a comparable refractive result while in Medium eyes Hoffer Q was not upto the mark. In Long eyes SRK/T and Hoffer Q yielded a superior refractive result. SRK/T was the formula which gave consistent superior refractive results in the wide range of Axial lengths analysed.

Introduction

Today's cataract surgery occurs at an earlier age, and with implants for monofocal and multifocal corrections, patients now anticipate excellent uncorrected acuity, not just improved best corrected vision. This expectation places increased importance on accurate biometry and intraocular lens (IOL) calculations. Accuracy of the measurements has a consequence in patient satisfaction and depends on correct determination of eye length, IOL position, refractive power of the cornea, and selection of the proper IOL formula.

Aim of the study

To evaluate the predictability of IOL power calculations using Optical Biometry (Lenstar LS 900) and five different IOL power calculation formulas (SRK II, SRK/T, Haigis, Holladay & Hoffer Q) in Short, Medium & Long Eyes.

Materials & Methods

The present study was a retrospective comparative analysis of 75 patients who underwent uneventful phacoemulsification from April 2012 to March 2014 in our hospital. The exclusion criteria were combined procedures, capsule rupture, and failure to place the lens in the bag. All surgeries were performed by a single surgeon. 7 IOL types were used in the study (MA60AC, AR40E,Rayner, SA60AT, ZA9003,ZCB00, SN60WF).

Patients were divided into three groups based on AL – Group 1 had 25 eyes with AL < 22 mm, Group 2 had 25 eyes with AL 22mm -25.5mm, Group 3 had 25 eyes with AL >25.5 mm. Pre-operative AL and Keratometer values

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were measured by Lenstar and power of implanted IOL and the predicted post-operative spherical equivalence were determined using SRK II, SRK/T, Haigis, Holladay and Hoffer Q formulas. Spectacle refraction was done at 3 weeks postoperatively. The postoperative refraction was reduced to a spherical equivalent. Predictive accuracy of each formula was analysed by comparing the actual and predicted spherical equivalence. Statistical analysis was done and the Median Absolute Error (Med AE) was calculated in each group. A p value of $<0.05\%$ was taken as statistically significant.

Three components are involved in finding the best IOL power for any eye: accurate biometry, an optimised "surgeon factor" and a suitable IOL calculation formula. The greatest source of refractive surprise seems to be differences in measuring axial length, which are estimated to account for 54% of postoperative refractive error. As optical partial coherence interferometry (PCI) is gradually accepted as the preferred method for biometry, accurate and repeatable biometry is increasingly becoming a clinical reality. The accuracy of the optical partial coherence interferometry has been reported to be $\pm 20\ \mu$m, translating to a refractive error of ± 0.05 D due to the accuracy of axial length measurements. One advantage is that PCI is not subject to cross-contamination because it is a noncontact procedure, but visual acuity must be equal to or better than 20/200. An advantage of PCI is in its ease of use and speed of testing. PCI measures the optical axial length, that is, the cornea–fovea vertex distance(1).

There are two basic groups of formulas – theoretical formulas that use geometrical optics & empiric studies based on retrospective case studies & statistical analysis. SRK formula is one such empiric regression formula (IOL power = A constant -2.5AL -0.9K). Theoretical formulas are considered more reliable in predicting the correct IOL power.The first-generation formulas introduced by Fyodorov were dependent on a constant for ACD(4mm). A second generation formula introduced by Hoffer in 1983 – varied ACD using AL (Effective Lens Position (ELP) = 2.93X AL -2.92).Third generation formulas – Holladay 2,Hoffer Q & SRK/T – use AL & K values to predict ELP. Later- generation formulas – Holladay 2 uses 7 different variables to describe the ELP- AL,K,WTW corneal diameter, AC depth,age, lens thickness & preoperative refraction. Fourth generation formulas, like Haigis, take into account the preoperative anterior chamber depth (ACD) and use three constants (a0, a1, and a2), which are analogous to surgeon factor (SF), ACD and AL respectively(1).

Results

The Mean age group of whole group of patients studied was 65.16 (range 35 yrs – 84 yrs). Males constituted 41.3% and females 58.7%.

Group 1(Short Eyes) had a mean age of 67.88 yrs (range 51 yrs to 83 yrs). Males constituted 16% & Females 84%.Group 1 had a mean AL of 21.62. Med AE was comparable for all the 5 formulas (0.47 in SRK II, 0.48 in all others) (figure 1).

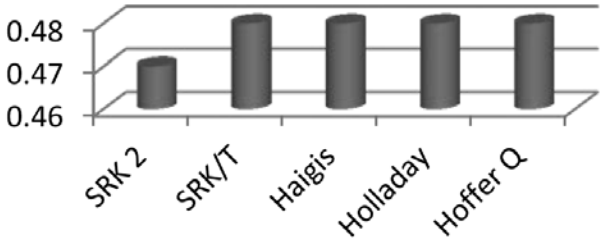


Figure 1 (Med AE of Group 1 – Short Eyes)

Group 2 (Medium Eyes) had a mean age group of 69.36yrs (range 59 yrs to 84 yrs). Males constituted 60 % of the group and females 40%. Group 2 had a mean Axial Length of 23.51. A lower Med AE was generated by SRK II, SRK/T, Haigis and Holladay (0.31) when compared to Hoffer Q (0.40) (figure 2).

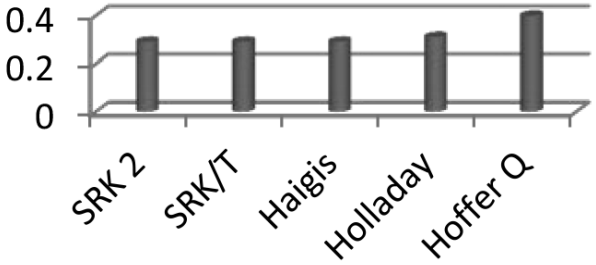


Figure 2 (Med AE in Group 2- Medium Eyes)

Group 3 had a mean age of 58.64 yrs (range 35yrs to 71 yrs). Males constituted 48% and females 52%. In group 3 mean AL was 26.82. Lower Med AE were generate by SRK/T and Hoffer Q (0.93) when compared to Holladay (0.96) and Haigis and SRK II(0.97). (Figure 3).

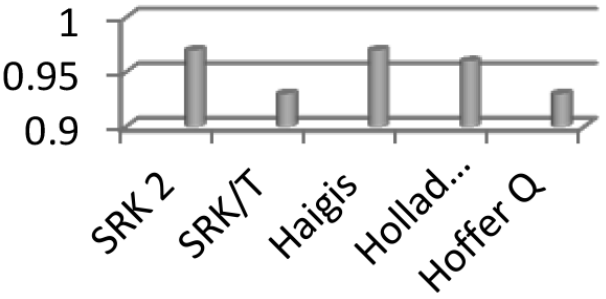


Figure 3 (Med AE in Group 3- Long Eyes)

None of the comparisons were statistically significant.

Discussion

Implant power calculation formulas attempt to provide a predictable refractive outcome based on preoperative assessments. With modern phacoemulsification the preoperative and postoperative axial length and keratometry are broadly unchanged. Therefore, the ultimate determinate of the refractive outcome is the actual anterior chamber depth (ACD) of the implanted intraocular lens (IOL). Because the crystalline lens is approximately 5 mm thick and an IOL is about 1 mm thick, an implant placed within the capsular bag is subject to a variety of potential influences on the final lens location and hence ACD is important. All formulas use some sort of "constant" that can be optimised for an individual surgeon and IOL type. With the PCI devices, the single constant IOL formulae show a linear trend towards myopic outcomes in short axial lengths and hyperopic outcomes in long axial lengths, although in the case of the Haigis triple optimised formula, the relationship was not statistically significant. This stems from using three lens constants instead of just one as it serves to remove the assumed relationship between the axial length (AL) and anterior chamber depth as is present in the other single constant formulae(8).

	SHORT	MEDIUM	LONG
ARBISSER et.al	HOFFER Q (20 – 20.99). Hoffer Q & Holladay 1(21 - 21.49)	Holladay 1 (23.50-25.99)	SRK/T(>/= 27mm)
Wang et.al	Haigis & Hoffer Q (,22MM & Open loop IOL)	HAIGIS,HOFFER Q, HOLLADAY 1, SRK/T	SRK/T & HAIGIS (>26MM)
Sanders et al	SRK/T , HOLLADAY, SRK-II,HOFFER(<22mm)		SRK/T,Holladay, Hoffer (>27mm)
Present Study	SRK II, SRK/T, Haigis, Holladay & Hoffer Q	SRK II, SRK/T, Haigis, Holladay	SRK/T, Hoffer Q

Table 1 Comparison of Various Studies in Short, Medium & Long Eyes

Moschos et al (7)	Haigis (< 22)
Narvaez et al	Holladay1, Holladay 2, Hoffer Q, SRK/T
Aristodemou et.al	HOFFER Q (<22MM)
Roh et.al	Haigis (<22mm)
Gavin et.al	Hoffer Q (<22mm)
MacLaren et.al	Haigis (open loop haptic) Hoffer Q (plate haptic)
Present Study	SRK II, SRK/T, Haigis, Holladay, Hoffer Q

Table 2 Comparison of Various Studies in Short Eyes

There is much variability between the formulas and between different AL in the present study and also in various previous studies. Manufacturers of IOLs always advised optimization of these constants rather than depending on those provided by manufacturers in order to achieve higher rates of accuracy. Nemeth et al. illustrated that optimization

Mitra et al (5)	Holladay 1(>24.5),Hoffer Q (Comparable to Holladay 1 in 24.5 – 26.5)
Olsen et al	Holladay
STOPYRA et.al	Holladay 1 -88.5% full v/a on snellen, SRT/T (24.5 -26.7)63.9%
Kijima et.al	Holladay, SRK/T –(24.5-26.9) SRK/T , L- SRK –(>27)
Tsang CS et.al	Hoffer Q,Holladay 1 , SRK/T (25) Holladay1, SRK/T (28)
Ghanem et.al	SRK/T, Hoffer Q, Holladay2, Haigis- low plus power, Haigis – minus powered IOL
Hoffer	SRK/T, HOLLADAY, HOFFER (>26mm)
Roessler et.al	HAIGIS (>26.5MM)
Bang et.al	HAIGIS (>27MM)
Present Study	SRK/T, Hoffer Q (>25.5MM)

Table 3 Comparison of Various Studies in Long Eyes

of A-constant was the main factor leading to significantly better outcomes. Haigis reported the strong dependence of A-constants on axial length. He emphasized that even for the same IOL and same instrumentation, different IOL constants were necessary for different ranges of axial lengths. Nejima et al. reported that MA60AC (3-piece) showed some forward shift when compared to single-piece IOLs. This forward shift could possibly induce some myopia that counteracted with the comparative hyperopia found with the same range of axial lengths in Tecnis 1(6). In conclusion, different IOLs showed different trends when personalizing their A-constant even for the same range of axial lengths.

Arbisser et al have suggested that use of optimized constants can produce refractive outcomes in the range of 40 percent within 0.25 D, 75 percent within 0.50 D and 95 percent within 1.00 D. They say this suggests that if the IOL constant varied with respect to the AL, the formulas may have improved refractive outcomes in these groups.(2)

Using the IOLMaster ALs and manufacturer's lens constants, a study in high myopic eyes found that the majority of myopic eyes (AL >25 mm) would be left hyperopic postoperatively with all formulas, which is consistent with findings in previous studies (3). IOL constant must be optimised for AL, individual surgeon and IOL type. This optimisation is achieved by taking preoperative parameters & postoperative outcomes of a given database of patients & back calculating the constant (4).

Limitations

7 IOL types were used. Optimised IOL constants with

respect to AL was not used.

Conclusion

In short eyes all formulas yielded a comparable refractive result while in Medium eyes Hoffer Q was not upto the mark. In Long eyes SRK/T and Hoffer Q yielded a superior refractive result. SRK/T was the formula which gave consistent superior refractive results in the wide range of Axial lengths analysed. There is much variability between the formulas and between different AL in the present study and also in various previous studies.The PCI devices currently spit out a full page of lens choices based on a single formula, regardless of AL, but it might be more helpful if it included on one page several formulas known to provide the highest accuracy given the biometry. This would reduce errors from physicians choosing lenses using suboptimal formulas. So the need of the hour is to optimise the IOL constant for AL, individual surgeon and IOL type to achieve more predictable & accurate refractive outcome for each patient undergoing cataract surgery.

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Thorny Lash Conquered

Rajiv Sukumaran, Jayasree Rajiv

Introduction

Trichiasis is such an annoying condition for the patient even if it is a single lash. People normally resort to self-epilation which gives relief for a short time. This usually recurs after a few weeks. There may be various causes ranging from trachoma (globally) to trauma, S J Syndrome, idiopathic, etc. Few lashes can be corrected surgically by redirecting the lashes. It is very simple, cost effective and gives almost cent percent cure.

Here we present a new method by which the direction of the lash is changed surgically.

Method

The misdirected lashes are identified and the skin around it is marked using Gentian Violet. The surrounding skin is infiltrated with Xylocaine. A chalazion clamp is applied on the lid just exposing the lid margin with the marked lashes. A vertical incision is made in the lid margin along the root of the lash towards the skin side using a 15 degree paracentesis blade. The root of the misdirected lash is identified and the direction of the lash is moved to exteriorise the lash. A 10-O suture is applied behind the lash so as to maintain the new direction of the lash. Antibiotic ointment is applied and the eye is patched for a day.

Result: Out of the eleven cases done, all but one are doing well, retaining the new direction of the lash, during the follow up period ranging from 5 months to 2 years. In one case the lash went back to its original position due to the slippage of the suture.

Discussion

Even today most of the ophthalmologists resort to epilation for single or few trichiasis, which is going to recur in no time. Electrolysis is done only in few centres and the results are not so encouraging. Use of trephine to remove the root has been described but not so popular. This method is found to be effective.

Conclusion

Trichiasis of few lashes, say upto 4 to 5, can be corrected by this method. It was found to be very simple, effective and above all very cost effective.

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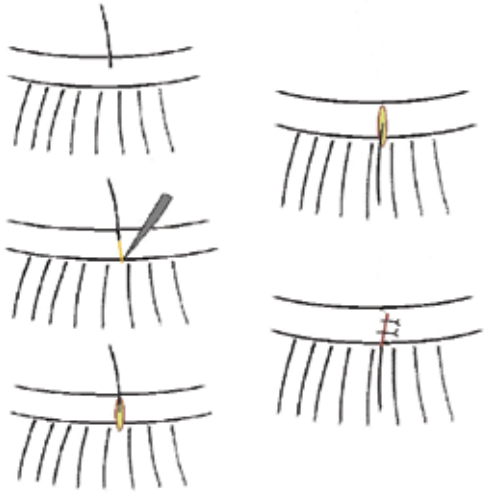
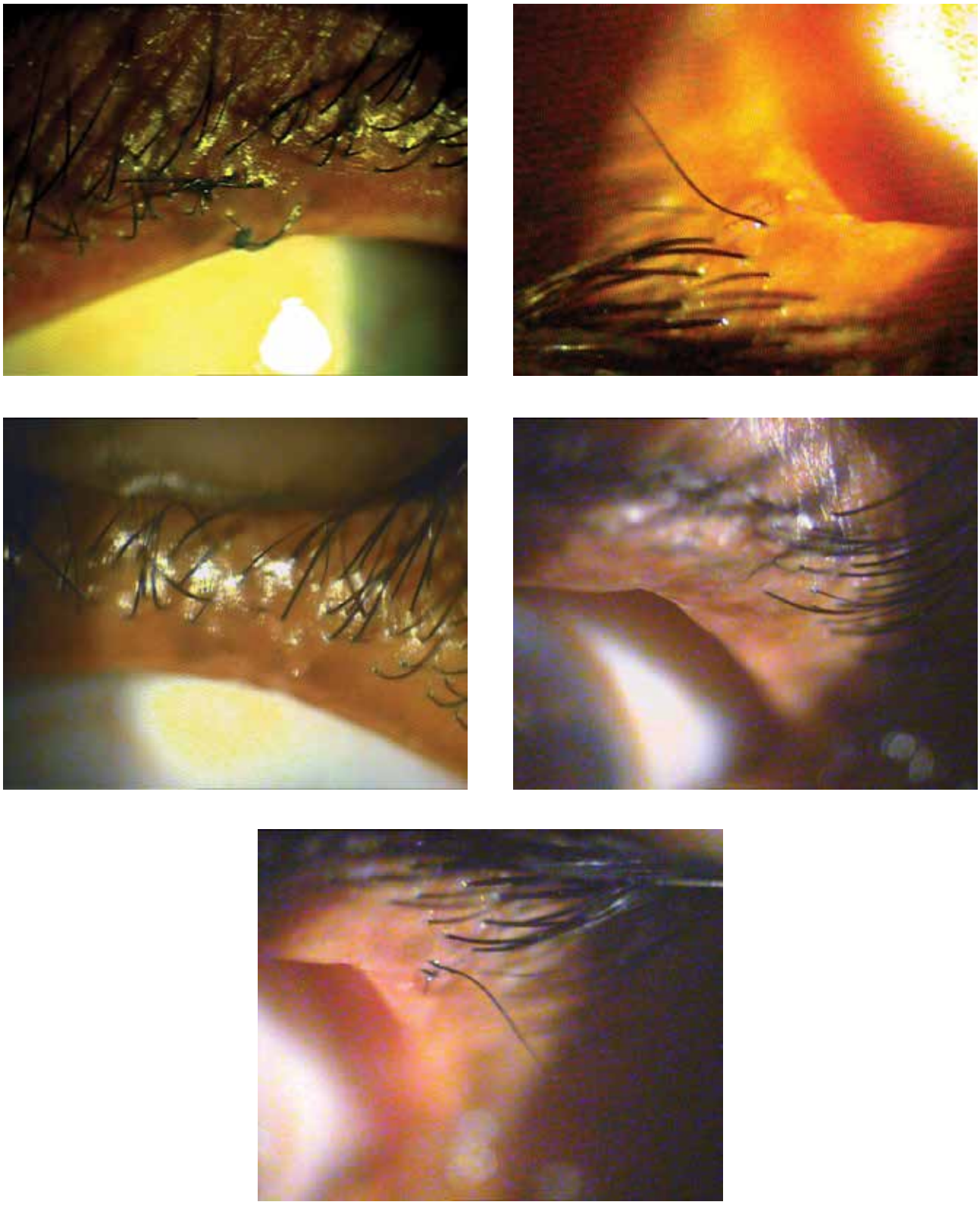


Fig 1: Steps of Surgery

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Fig 2: Post OP pictures



To view this video visit www.ksos.in

Common Sterilisation and Disinfection Practices in Ophthalmic Out Patient

Nikita Nair MS

India is one of leading countries in eye care practices. The paradigm is now shifting from quantity to quality. Safety is the foundation of quality.In eye hospital safety largely depends on sterilisation and disinfection. As ophthalmic surgeons we take every possible precaution in the eye theatre to avoid a nightmare of post operative endopthalmitis .But we tend to miss the fact that the post operatives do come to the out patient department for follow ups and especially due to rising trend of day cases ,even the immediate post operative period makes OPD sterilisation more pertinent .As eyecare professionals, we have an obligation to protect our patients and our staff from infection while in our offices. Infection in an ophthalmic practice may be transmitted in a myriad of ways: patient to staff, staff to patient, between patients and among staff by direct contact, airborne transmission or from contaminated equipment or instruments used in the practice. There are numerous opportunities where eyecare providers may be exposed to infection:

- Removal of foreign bodies
- Patients with ocular trauma
- Conjunctivitis
- Microbial keratitis
- Lacrimal irrigation
- Meibomian gland expression
- Contact lens fitting
- Intra ocular pressure measurements.

Decontamination, disinfection and sterilisation are basic components of infection control .The basic of the technology-chemicals for disinfection-heat for sterlisation go well back to the 19th century, with Koch, Pasteur, and Lister. Lack of knowledge or negligence in infection or standard practices would result in hazardous effects, as sterile instruments and environment are essential for successful eyecare service. In ophthalmic practice major hospital associated infectious (HAI) diseases are preventable .

Sterilization is defined as the complete absence of any viable microorganisms including spores. The objective of sterilization is to remove or destroy microorganisms, since they causecontamination, infection and decay. The purpose for sterilization, the material to be sterilized and the nature of the microorganisms that are to be removed ordestroyed decides on the methods of sterilization employed. Any sterilization process must be monitored by chemical and biological method. It includes pressure, temperature and other methods depending on the sterilization method. The sterilization procedure chosen should be appropriate for the item to be sterilized.

Methods:

The methods of sterilization most commonly used are

1. Dry heat
2. Wet heat
3. Formaldehyde and gas

Disinfection is reducing the number of viable microorganisms but not inactivating all viruses and bacterial spores.

The most important factor in using disinfectant is its concentration, time of contact with the disinfectant and precautions advised by the manufacturer. Several methods of disinfection are available, but standardization and uniformity throughout a hospital is essential. Disinfection is not a substitute for sterilization.Boiling achieves high level disinfection and kills bacteria, viruses. Spores are killed only after 4 hours of boiling. It is suitable for metal and some plastics.

The common disinfectants used in ophthalmology are:

1. Glutaraldehyde 2%: It is a saturated dialdehyde, which acts against the amino group of proteins. A contact time of 20 min in alkaline 2% buffered solution at pH 8-9 achieves a high level disinfection. It inactivates vegetative bacteria ,fungi, viruses etc[1]

2. Chlorhexidine: A bisbiguanide disinfectant, it is often combined with compatible detergents or with alcohol as hand rub. A 4% chlorhexidine gluconate is used for hand

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scrub and wash. RCTs have shown that chlorhexidine is more effective immediately and action lasts up to 6 hrs at reducing Colony Forming Units.[2]

3. Iodine: Povidone iodine used prior to surgeries.

4. Alcohol: ethyl ,isopropyl ,trichlorbutanol : isopropylalcohol is preferred as it is better fat solvent ,more bactericidal and less volatile .They have limited to no action on spores. They can be used to wipe equipment monitors(not optical lenses),scissors etc .After soaking, instruments must be thoroughly rinsed in distilled water before use.

5. Hydrogen Peroxide: it is a high level disinfectant , which acts by producing hydroxyl free radicals . A 7% H2O2 is highly active against bacteria (3 min) ,yeast ,fungi (5 min) , viruses , spores (6 hrs). It can be used for disinfection of tonometer biprisms.

Prior to disinfection thorough cleaning of the surface is essential .Thorough wiping of the walls and floors with disinfectants is needed and is a better option than fumigation.Manufacturers instruction must be noted when using chemicals . Instruments may corrode over prolonged exposure . For example ,Isopropanol can damage some materials, so make sure it is compatible with the surface you're cleaning.

Cleaning involves the removal of foreign material with water, detergents, or enzymatic products.Instrument cleaning is essential because dried mucus, tears, tissue, or cosmetics may contain dangerous concentrations of infectious organisms. Cleaning requires scrubbing of all instrument surfaces to remove debris. Isopropanol alcohol might be needed for insoluble deposits left on the surface. Efficient cleaning can remove up to 99% of bacteria present. Soak the area with hot water and detergent or other cleaning agent, then wash by wiping, spraying, or scrubbing. Application of washing solution can be improved by use of low pressure (90-120 psi) garden hose applicator. Steam and high pressure washers (200-1000 psi) can be very useful for cleaning porous surfaces .

Evaluation

To verify that the disease agent(s) have been destroyed, a follow-up evaluation of the premises should be conducted. While visual inspection of cleanliness is important, bacteriological samples should be obtained to determine the effectiveness of the cleaning and disinfection protocol. Failure of a disinfection program may relate to the selection of an ineffective disinfectant, careless use of an effective disinfectant, or environmental factors, such as temperature, relative humidity. The timing of sample collection is important. The best time to sample is 2-3 days after disinfection. Samples for microbiological testing should not be taken from a wet surface (the disinfectant may still be acting and disinfectant residues may prevent growth of microorganisms in culture media). Therefore the sample area should be allowed to dry before sampling.Surface samples for small, smooth areas, can be collected by wiping or swabbing a moistened, absorptive medium (sterile swab) across a non-porous surfaces. For larger areas, sterile gauze wipes or swiffers may be used. Commercially available methods include RODAC™ and Petrifilm™ Plates (3M). RODAC (Replicate Organism Detection and Counting) plates (Merck) are specially designed agar plates that can be applied directly to surfaces areas due to their convex shape3. They are useful for dry, flat, impervious surfaces. The plates are then incubated 48-68 hours at 25-30 ^{0}C (77-86 ^{0}F). Visible colonies within areas of the plate are then counted to provide an indication of the degree of contamination. There are RODAC plates also available for the growth and detection of yeast and molds. Additionally Petrifilm™ Plates (3M) may also be used. These small, flat, sample-ready plates allow on-site microbial testing and are commonly used for food processors. These plates are are available for a variety of specific microorganisms or classes (i.e., aerobic count plates, coliform count plates, environmental Listeria plates) as well as yeast and mold counts and can also be used for air sampling, direct contact or swab applications. Other methods of environmental sampling include surface samples collected by high-efficiency particulate air (HEPA) vacuuming and as well as other types of air sampling pumps and filters.

in use test of disinfectants samples from containers of disinfectants should be tested .the sample is removed with apipette (1ml) and 9 ml nutrient broth added . inoculate the disinfectant 10 spots in two nutrient agar plates each .each plate is incubated at 37^0 c for 3 days and room temperature for 7 days .any growth in any one or more plates (5 or more) means contamination .

Surprise checks for bottle sterility is good . Refill date must be clearly mentioned . All sterile precautions while filling, dilution must be maintained.[4]

Preventive Methods:

Sources of infection to the outpatient are mainly due to the contamination on the surgeon's and paramedics' hands, tonometer, slit lamp, opened old medication bottles etc

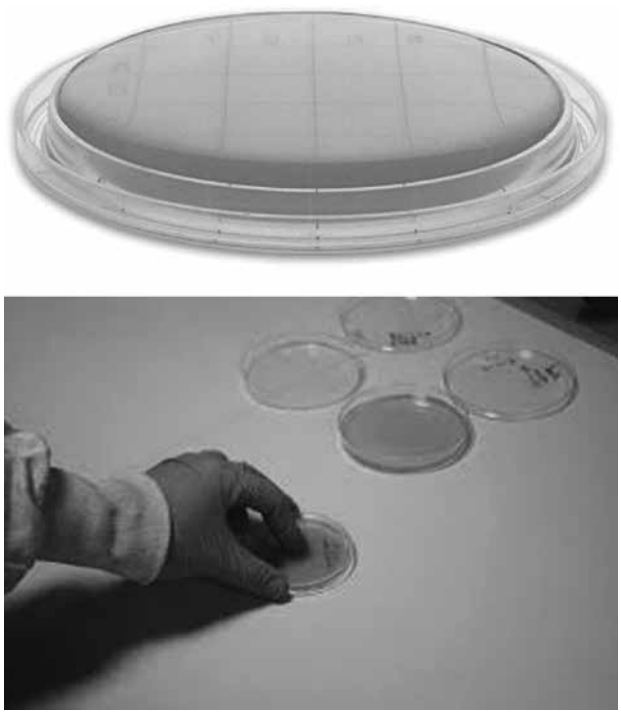


Figure 1 RODAC PLATES

Hand-washing:

This is the most important procedure for preventing infections[5]

1. Hands should be washed incase of the following:
   a. When hands are soiled obviously
   b. After direct patient contact, like. eversion of lids, meibomian gland expression[6]
   c. During personal hygiene
   d. Before handling sterile products
   e. Before eating

2. What about alcohol-based hand rubs and gels? While they are more effective at encouraging ophthalmic workers to clean their hands between patients, they are poor antimicrobials.[7] In high-risk areas, an antiseptic liquid hand-washing agent (such as an iodophor or chlorhexidine gluconate) should be used, both before and after direct patient contact[8]. High-risk areas include cornea clinic and minor operation theatre. When using an alcohol-based hand rub, the Centers for Disease Control (CDC) recommends that the hands should be rubbed until dry, ensuring the entire skin surface of the hands and fingers are covered with the hand rub. Hand rubs are not recommended for use with contact lenses because residual debris and bacterial toxins on the hands and chemicals from the hand-rub may be transferred to the lens prior to it being placed on the patient's eye. Wash your hands when working with contact lenses, and anytime the hands are visibly soiled.[9]



3. General patient care areas, outpatient clinics and clinical laboratories require only a general liquid hand-washing agent.

4. Bar soap and towels should not be used for multipatient use.

Needle Stick/Splash Policy

Splash policy is to be strictly adhered, to avoid transmission of infection through accidental splash of a needle stick with blood contamination, body fluids, mucous membranes or non-intact skin. The needle stick injuries should be thoroughly cleaned, and the affected area rinsed with soap and water.

Masks and other protectiveequipment such as faceshields and goggles is used when one is likely to be splashed in the face with infective material, which maylead to contamination of the eyes, nose or mouth.

Use of Gloves when direct contact with blood and body fluids, mucous membranes non-intact skin surfaces or infectious material is anticipated, when performing vascular access or other invasive procedures and when handling specimens, cultures, ortissues that are visibly contaminated with blood or other infectious material. .Hands must be washed each time gloves are removed.Those with non intact skin must wear gloves when indirect handling of infectious material is a possibility.[10]

Universal Precaution Instruction

Blood, body fluids(including tears especially if blood stained example following trauma), and tissue of all patients are considered potentially infectious and therefore should be handled accordingly.

This is also called as standard precautions.

- Wash hands before and after all patient / specimen contact
- Handle blood of all patients aspotentially infectious
- Always use gloves for contact withblood/body fluids
- Place used syringes in puncture proof containers

• Do not recap or manipulate needles (usally performed in OPD for small corneal /conjunctival FB)
• Wear masks while examination and treatment of TB patients (While using direct ophthalmoscopy)

Safe Handling Of Sharps

•Pass syringes and needles in a tray, cut it with electric / manual needle cutlers after use
•Put needle and syringes in a puncture proof white container, containing 2% hypochloritesolution
•Remove cap of needle near the site of use
•Pick up open needle from tray/drum with forceps
•Destroy syringes by burning their tips/cutters
•Never pass syringe and needle on directly to next person
•Do not bent/or break used needle with hands
•Never test the fineness of the needle's tip before use with bare or gloved hand
•Never pick up open needle by hand
•Never dispose it off by breaking it with hammer/stone
•Always dispose of your own sharps, into a Sharp pit
•During exposure-prone procedure, the risk of injury should be minimized by ensuring thatthe operator has the best possible visibility, e.g. by positioning the patient, adjusting goodlight source etc

Guidelines for management of Medical Asepsis

•Remember that thorough hand washing is the most important and basic technique for infection control,
•Always know a patient's susceptibility to infection. Age, nutritional status, stress, diseaseprocesses, and forms of medical therapy can place them at risk.
•Recognize the elements of the infection chain and initiate measures to prevent the onset andspread of infection.
•Never practice aseptic techniques haphazardly. Rigid adherence to aseptic procedures is the onlyway to ensure that a patient is at minimal risk for infection,
•Protect fellow health care workers from exposure to infectious agents. Nosocomial infections occur with greater frequency whenpatients become exposed to health care workers who are carriers of infection.

Instruments needed in outpatient department

Schiotz tonometer, Flashlight (battery/electric), Slit lamp, Direct ophthalmoscope, Indirect ophthalmoscope, 90 D lens, 20 D lens Gonioprism, Applanation tonometer ,Kimura spatula, No 15 surgical blade, Binocular microscope, Tangent screen (field test chart), 15 cm glass ruler , Material for diplopia charting, Torch light with red and green glass, Slit light source, Red, green Goggles, HFA, YAG LASER etc. All contact methods like applanation, immersion Ascan, UBM requires special care and extra precautions for disinfection.

Surgical instruments vary in configuration from plain surfaces, which respond to most types of cleansing, to complicated devices that contain box locks, blind holes and interstices. Sharp and blunt instruments should be separated. Instrument should be thoroughly cleansed by washing in sterile distilled water or mineral water .

Methods to disinfect slit lamp are as below:

1. Mechanical cleaning with disposable wipe / sterile gauze
2. Wipe with gauze soaked in alcohol or chemicals like hydrogen peroxide



Instrument disinfection

All instruments that come in contact with the patient's ocular surfaces, such as tonometers, gonioscopy lenses, and fundus contact lenses, should be wiped clean and thoroughly disinfected and/or sterilized as appropriate after each use. Single-use instruments and equipment should be used whenever possible in the ophthalmic practice, but several items are reused. All reusable instruments need to be cleaned immediately and then disinfected or sterilized, depending on the intended use.

Tonometers and gonioscopes should not be used in the presence of clinically manifest conjunctivitis and keratitis. The Schiotz tonometer should be dipped in a 1:1000 merthiolate solution, and rinsed in saline/ distilled water prior to use[11].The methods for sterilzation of such tonometers include:

1. Heating the base of the instrument with the flame of a spirit lamp for 10 seconds and allowing sufficient time for cooling before use. Repeated heating may, however, distort the curvature of the foot plate and plunger, resulting in erroneous readings.
2. Cleaning the foot plate with ether or alcohol swab (allowing sufficient time for drying of chemical).

3. Ultraviolet rays.
4. Soaking the assembled foot plate in a bowl with 1:1000 merthiolate solution.(also commonly used)
5. Use of tonofilm.

All these methods of sterlization may be unsatisfactory because sterility is not achieved in all parts of the tonometer. Applanation tonometer probes are the most common item in the exam room that regularly contacts the cornea and tears of patients, so steps must be taken to ensure they are adequately cleaned and maintained. They should be cleaned before and after use. The instructions from the manufacturers of Haag-Streit tonometer (Goldmann) do not recommend exposing the tonometer prism to alcohol.[12] Two reports have noted isopropyl alcohol, although effective in removal of viruses, may damage Goldmann applanation tonometer tips over time.[13,14] The manufacturers advise removing the prism and cleaning with mild soap and cold water (due to the potential for Acanthamoeba contamination of water supplies, use sterile water/saline), followed by a soak in 3% hydrogen peroxide solution for 10 minutes. The prism is then rinsed thoroughly with sterile saline, dried with a tissue, and stored in a clean, dry container. Alternative solutions are listed on the Haag-Streit website.[15]

Removal of the applanating head is more cumbersone and time consuming. Van Buskirk described a method of drilling two 11 mm holes in the cover of a perti dish.The dish can be filled with 3% hydrogen peroxide, 1:1000 merthiolate or diluted household bleach, prepared fresh each morning. Goldmann applanating prisms, prism end down are placed through the hole and kept soaked for 5-10 minutes. The part of the tonometer tip outside allows easy removal. The tip is irrigated with saline, dried and put on the tonometer. After use the tip is returned to the petri dish and a second disinfected tip is placed on the tonometer. An important point to note in this method includes a fresh preparation of solution[16]. For practical considerations a sterile gauze soaked in 70% isopropyl alcohol is used for wiping the tip of the prism provides safety by inactivitating adenovirusus, lymphoadenopathy virus type I, and herpes simplex virus types I and II. The use of ultraviolet rays tends to damage the plastic and therefore is not practical. The tip of a digital pneumotonometer or tonopen should be covered with a disposable latex cover that is discarded after use.

For non contact tonometers :These do not make contact with the cornea or tears and are perhaps ideally suited for measurement of intraocular pressure in patients suspected of having contagious viral infections or in the immediate postoperative period.The front surface may however be cleaned with the special soft tissue/cloth as the front surface may occassionally touch the eyelashes.this holds true for other non contact instruments in OPD like AS OCT ,Fundus camera etc

Disinfection of gonioscopy lenses usually mirror tonometry guidelines, but also consider the manufacturer's instructions. The manufacturers of the Volk Gonioscopy lens recommend cleaning the entire lens using a mild cleaning solution (such as diluted dishwashing liquid) and a clean soft cotton cloth.[17] The lens is then disinfected with either 2% aqueous glutaraldehyde or 1:10 dilution of sodium hypochlorite/ household bleach, using fresh solution each time the lens is disinfected. Position the lens on its side, then immerse the entire lens in the selected solution for 25 minutes. Remove the lens from the solution and rinse thoroughly with room temperature water or saline , then dry with a soft, lint-free cloth. Both sides of the anterior glass element and the inside of the ring should be cleaned with Volk Precision Optical Lens Cleaner (POLC). Following disinfection, the gonioscopy lens is stored in a closed case or container.

Fundus lenses should be cleaned with mild detergent and water and air-dried or dried with a lint-free cloth. If you suspect the lens has become contaminated, the lens should be disinfected according to manufacturer's instructions. The Volk lens fundus lens cleaning procedure mirrors that of the gonioscopy lens.

Sodium Hypochlorite - This is readily available and very effective for bacteria, spores and viruses and can be used for most OPD Instruments.

Boiling is not an acceptable method for sterilizing equipment, neither is the use of ultraviolet light. A small tabletop steam autoclave unit is the most efficient and cost-effective method of in-office sterilization. Items requiring sterilization should be properly prepared by wrapping in peel pouches before sterilization to maintain instrument sterility after processing. Recommendations for steam sterilization require a minimum of 15 minutes at 121°C. Instruments should be cleaned before sterilization and should be dry when removed from the autoclave.[18] Autoclaves are fairly expensive pieces of equipment and are necessary in offices where work is performed on sterile tissue or the instrument comes into contact with blood or blood products.

An ultrasonic cleaner can be used for cleaning the instruments. It thoroughly cleanses every part of the instruments, including the depths of the cannula, tubes and other unreachable parts, with high frequency sound

waves generating bubbles and vacuum zones. The tank of the cleaner should be filled above the level of the top of the instruments, suitable detergent as specified by the manufacturer is added. The temperature of water should be 80 to 110 degrees Fahrenheit and instruments should be kept in the ultrasonic cleaner for at least 30 minutes. However, ultrasonic cleaners are not essential. One can use four bowl technique for the cleaning of the instruments as described below . After removing the instruments from ultrasonic cleaner, the instruments are first brushed with a soft tooth brush .Then washed in four basins containing mineral water or boiled water one after the other the first one contains mineral water with disinfectant. This should be done even if ultrasonic cleaner is not used. They are then dried with clean towel; tipped with plastic sleeve and are segregated into separate sets. They are then packed in individual perforated stainless steel trays, which are placed in the bins with indicator and put in the autoclave. Three indicator tapes should be placed, one in the bottom, one in the middle and one at the top of the bin, of course one strip on the external surface of the bin is required to tell us whether the bin is sterile or not, even without opening the lid. The bins/ packages must be properly labelled with the date, opd number etc.

Contact lens disinfection

Ideally, trial contact lenses should for single use only. Today's single-use soft disposable lenses have practically eliminated the need for disinfecting trial soft contact lenses. Soft contact lenses can be disinfected with an approved hydrogen peroxide system.Hydrogen peroxide disinfection is the only system approved by the CDC for the disinfection of HIV.

Rigid gas permeable lenses are a different matter. The following procedure is recommended for cleaning these lenses:

- Clean contact lens with approved gas permeable (GP) cleaner via digital cleaning (20 seconds per side). Rinse with sterile preserved/aerosol saline.
- Gas-permeable (GP) lenses can be disinfected using a commercially available hydrogen peroxide system approved for use with soft contact lenses. Soak in 3% hydrogen peroxide for a minimum of three hours. Rinse with sterile preserved/aerosol saline.
- Dry GP lens with a clean tissue and store in a dry container. There is significantly less risk of contamination during dry storage compared to long-term storage in conditioning solutions.
- GP lenses must be thoroughly cleaned and rinsed once again prior to reuse.

With the growing concern over the potential hazards to contact lens wearers, evaluation of the disinfecting activity of the contact lens products has been an interesting area of research.[19,20,21] Such studies were mainly aimed at achieving the best desirable characteristics of the disinfecting systems.

Biomedical Waste Management

Handling and Segregation of bio-medical waste is done at the point of generation/source and is putinto a different color bags in same color bins. The "Bio Medical Waste Management and HandlingRules, 1998" are followed for the proper handling and final disposal of BioMedical Waste.

Biomedical waste is the leading cause for spreading of nosocomial infections in the hospital.Improper maintenance of Biomedical Waste may lead to increased risk of blood born; air born andneedle prick injuries in the Staff as well as the patients and their attendants. For Proper treatment andDisposal of Biomedical Waste in the facility following steps should be ensured.

Nomination of Biomedical Waste Management In-charge:
From within the Hospital Infection Control Committee, one member preferably the Hospitalconsultant or the Matron should be nominated as the biomedical waste management in charge of thefacility.

Roles and Responsibilities of BMW In-charge includes following but not limited to

- Daily inspection of waste segregation and reporting
- Supervising the maintenance of registers
- Ensure availability of equipments like needle cutters,

Collection Treatment and Disposal of Various Categories of Waste in the Hospital

Segregation, Treatment and Disposal Options			
Colour Coding	**Type of Container**	**Waste Category**	**Treatment and Disposal Options**
Yellow	Plastic Bag – Non Chlorinated	Cat -1 Human Anatomical Waste Cat -2 Animal Waste Cat -3 Microbiology & Biotechnology Waste Cat-6 Soiled Waste	Incineration/ Deep Burial
Blue	Plastic Bag	Cat -7 Solid Waste	Autoclaving / Microwave/ Chemical Treatment(with 1 percent hypochloride sholution or bleaching powder for 4 hrs) and Destruction(mutilation) / Shredding
White/ Translucent	Puncture Proof Translucent Container	Cat – 4 Sharps Waste	Autoclaving/ Microwave/ Chemical Treatment (with 1 percent hypochloride sholution or bleaching powder for 4 hrs) and Destruction / Sharp pits.
Red	Disinfected container / plastic bag	Cat-3 Microbiology & Biotechnology Waste Cat – 6 Soiled Waste Cat-7 Solid Waste	Autoclave/ Microwave/ Chemical Treatment(with 1 percent hypochloride sholution or bleaching powder for 4 hrs)
Black	Plastic bag	Cat-5 Discarded Medicine & Cytotoxic Drugs Cat – 9 Incineration Ash Cat – 10 Chemical Waste (solid)	Disposal in Secured Landfill

autoclaves and sterilizers, wastecarrying trolleys, personnel protective gears (masks, apron , gloves etc) and other materialslike bleaching solution or hypohloride solution.

•Ensuring availability of color coded bins and bags as per Biomedical Waste Management andHandling Rules, 1998.



Do's and Don'ts in Bio Medical Waste Management

Do's

1. Segregate waste as soon as it is generated into different categories of waste.
2. Collect the waste in properly labeled specific color coded covered bins.
3. Keep same color bags in the bins.
4. Clean regularly with soap and water and disinfect the bins.
5. Collect the domestic waste (eatables, wrappers, fruit peels, papers etc., in green bin).
6. Use dedicated waste collection bins/trolleys/ wheel barrows for transporting waste.
7. Transport waste through a pre- defined route and time within the hospital.
8. Mutilate and disinfect the needle soon after administration of injection.
9. Mutilate and disinfect solid waste (plastic waste) as soon as it is generated.
10. Always disinfect the sharps and the solid waste with either hypochlorite solution or Bleaching powderbefore disposing.
11. Disinfect needle and solid waste (plastic) after mutilation.
12. Dispose body parts in yellow bin.
13. Dispose waste within 48 hours.
14. Always use protective gears while handling the waste.

Don'ts

1. Never mix infectious and non- infectious waste
2. Never mix plastic wastes with the waste which goes forincineration.
3. Never overfill the bins.
4. Never store waste beyond 48 hours.
5. There should not be any spillage of waste on the way oftransport.
6. Avoid transport of waste through crowded areas.
7. Do not put infectious waste into general waste.
8. Don't dispose the body part into deep burial wherepopulation is more than 500000.
9. Don't dispose waste sharps with other wastes.
10. Don't dispose the solid waste and sharp waste without mutilation and disinfection.
11. Overloading of the Bags and the bins should be avoided. Colour coded bags to be replaced whenhalf full.
12. Never drag filled waste liners.



Effective Sterilization and disinfection practices depend on discipline and commitment of staff. Leadership of the hospital should create a culture of quality consciousness and put a process of measuring the quality outcome. Infection Control Committee should meet regularly .Most important is sharing the data with paramedical staff and include them actively in the process of quality assurance.

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Therapeutic Challenge Glaucoma

Dr.Sumi Lukose DNB

Case report

A 38 year old female, teacher by profession presented to us with decreased vision both eyes (BE). She had defective vision BE since childhood which was corrected with spectacles.

Past medical history: history of cardiac surgery for aortic dissection in 2009. She is hypertensive on regular medication.

General physical examination : Well built female with high arched palate.Her arms pan / height was 160cm/ 170 cm . There was no arachnodactyly

Visual acuity	RE	LE
unaided	CF 1 M	CFCF
aided	WITH -14 DSP CF 1 M	WITH -11 DSP 6/24
Subjective refraction	+10 DSP 6/12 NVADD +3.00 DSP J2	-8.00 DSP 6/18 NVADD +3.00 DSP J2

Anterior segment examination by slit lamp evaluation showed bilateral inferotemporal subluxation of clear lens right eye more than left.

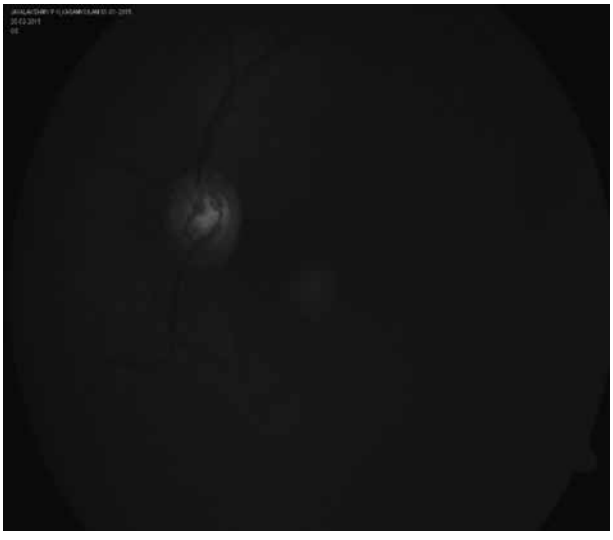


Right Eye **Left Eye**

Fundus examination right eye (RE) showed CDR 0.8 with inferior notching , macula was normal. Left eye (LE) showed CDR 0.5 macula was normal.Both eyes periphery showed lattice degeneration without holes.



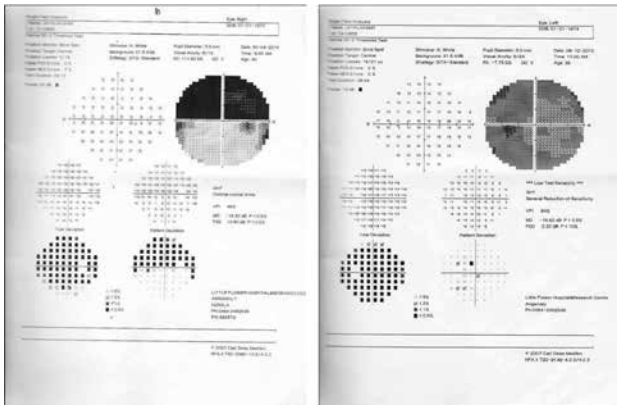
Right Eye



Left Eye

IOP by applanation tonometry was 28 mm of hg in RE and 20 mm of hg LE . Visual fields BE were done with HFA 30 - 2. RE showed superior arcuate scotoma and LE fields were not reliable

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Gonioscopy showed open angles in both eyes.

She was diagnosed as bilateral inferotemporal subluxation of lens with primary open angle glaucoma with marfanoid habitus.

How can this case be managed further?

Dr. Saikumar S.J.

Giridhar eye Hospital, Kochi.

This patient with history of defective vision since childhood has bilateral lens sub-luxation associated with glaucoma. Looking at her high arched palate and history of cardiac surgery for aortic dissection it is almost certain that she has Marfan's syndrome. Angle closure glaucoma is relatively less in Marfan's syndrome compared to other causes of ectopia lentis like homocystinuria and Weil-Marchesani syndrome. Association of primary open angle glaucoma with Marfan's syndrome has been reported.

Examination of the optic disc and field shows significant glaucomatous damage in the right eye and correspondingly the intra ocular pressure in the right eye is also elevated. Basically we need to manage two aspects in this case. One is control of the intra ocular pressure and second is restoration of the best possible vision by lens removal and intra ocular lens implantation. Initial management of glaucoma can be medical and my preferred line of treatment would be a combination of Betablocker and Carbonicanhydrase inhibitor. The lens removal can be either through the anterior route or through parsplanavitrectomy. Parsplanavitrectomy has the advantage of minimal damage to conjunctiva which may be preserved for a later Trabeculectomy, if necessary. Re-fixation of the sub-luxated bag using sutured CTR may be tried, although, I feel that the amount of sub-luxation is too much to attempt such a procedure. My personal preference in this scenario will be SF IOL. If the intra ocular pressure does not get controlled with medications a Trabeculectomy can be considered and for this an area of intact conjunctiva is very essential. If not, the other option would be a glaucoma drainage device. While all these procedure are being done, it is very important to keep a watch on the retinal periphery since peripheral breaks and retinal detachment is quite common in patients with Marfan's syndrome.

Dr. Girija K.

Little Flower Hospital and Research Centre , Angamaly

Since the IOP is high in RE she may be started on AGM (anti gluacoma medication) preferably a Prostaglandiun (PG) analogue. RE visual field shows superior arcuate scotoma (at the age of 38 yrs). Trabeculectomy with antimetabolites has to be considered for the RE.

Her BCVA is 6/12 with +10.0D in RE and 6/18 with -8.0 D in LE. Since this can result in diplopia, correction can be given only for RE. Change in refractive error from myopia to hypermetropia in RE is an indication of progressive subluxation. She was seeing through the phakic portion of pupil with myopic correction previously and now more of pupil has become aphakic. She may have to undergo lens removal with vitrectomy preferably through parsplana along with scleral fixated IOL (primary or secondary) first in the RE followed by LE.

Dr. Sonia K. Njavally M.S

Dr. Tony Fernandez Eye Hospital, Aluva, Kochi

Here is a young patient with bilateral ectopialent is and right eye advanced glaucoma. Glaucoma most probably is due to the angle anomaly associated with this syndrome.

Right eye needs immediate attention .Better to do the central 10-2 & macular threshold tests in right eye because points close to fixation are involved in 30-2.

She will best benefit from glaucoma drainage implant in the anterior chamber . Once it starts functioning, subluxated lens can be managed with pars plana lensectomy + vitrectomy + scleral fixated IOL implantation.

Other options are available are

1. Medical management of glaucoma to bring down the IOP to low teens & manage the subluxated lens as mentioned above . Monitor carefully and if there is progression do a trabeculectomy or drainage implantation . But if glaucoma is due to angle anomaly medical management may not be very effective. Also the post operative IOP spikes during lens surgery will worsen the optic disc and field.

2. Primary trabeculectomy with ologen implant (avoid Mitomycin-C due to possible scleral thinning in Marfan's syndrome) followed by management of lens in the same way. But this is likely to fail after the vitreous manipulations for the second surgery.

Considering the age of the patient(long life expectancy), nature of glaucoma , IOP spikes during surgery for lens and high chances of trabeculectomy failure in cases with vitreous disturbances primary tube is the ideal option.

Left eye can be managed with pars planalensectomy + vitrectomy + scleral fixated IOL implantation. Closely monitor for progression of glaucoma postoperatively in the both eyes.

Dr. Thomas George T

Consultant, Chaithanya Eye Hospital And Research Centre, Thiruvananthapuram

Having gone through the case history I feel a working diagnosis of Marfans syndrome with subluxated lenses and glaucoma is in order.

At the outset I feel some data is missing. I assume the patient is at present on nil treatment for intraocular pressures.

Mechanism of glaucoma: Though a large number of Marfans patients have open angle glaucoma, secondary angle closure is also quite prevalent. Pupillary block by the subluxated lens in earlier stages could have kept the angle closed and a synechial closure can persist. Even now if the vitreous face is intact it can still move forward and cause pupillary block even now. If the vitreous face be broken it can cause free vitreous blockage at the trabeculum and raise IOP. (I will assume that this is an open angle/chronic synechial closure causing glaucoma.)

Functional status -Fields: The fields in the right eye correspond to the disc picture in that there is a dense superior hemifield loss that agrees with the total loss of inferior rim. The left eye disc is fairly normal and the fields unreliable. The field in the left eye needs repeating (with such high refractive error with contact lens correction rather than spectacle lens correction).

The field loss in the right eye is till fixation on the 30-2 programme. We should do a 10 -2 to see if it is an arcuate. It could also be a vascular compromise causing an altitudinal field loss. (This could have happened if there was an embolic episode at the time of the dissecting aneurism / the surgical management of the same.)
Also this patient may need ocular surgery and so a macular threshold with size V target also needs to be done. If there is split macular fixation wipe out as a possibility should be considered and explained to the patient (considered rare now but is medicolegally important).

Management

The Intraocular pressure: As the left eye disc looks healthy, if the repeat fields are normal, one can observe the left eye even without treatment.

The right eye has very advanced field loss and that would entail a target pressure less than 16 mm Hg at least. First option is medical management. The first line therapy can be a prostaglandin analogue which can give us maximum reduction in IOP. Add more topical medications if required. As pilocarpine can cause peripheral retinal tears, in a predisposed patient it is best avoided. The rest can all be used.

If medical therapy is inadequate one can consider surgical options. In grossly subluxated lens situations, a trabeculectomy may fail due to vitreous blocking the osteum. Even after a vitrectomy the peripheral vitreous skirt may be wide enough to block a trabeculectomyosteum. Hence I may consider a primary tube shunt after a good vitreous clearance as we can place the tube tip far from the residual vitreous skirt at the vitreous base.

Once target pressures are achieved one has to follow up both eyes of the patient for - new events, loss of control of IOP and progression of disc and corresponding field damage. If any of these occur the management has to be tailored accordingly.

Visual rehabilitation: I also noted that the best corrected visual acuity was achieved with myopic correction in one eye and hyperopic in the other. If one is managing the IOP medically, contact lens correction in both eyes may be the most conservative option. (Once there is a filtering bleb contact lenses may not be tolerated.)

If surgery is contemplated or if contact lenses are not tolerated, then one can go for lensectomy, vitrectomy with sclerally fixated IOL. (ACIOL is contraindicated in glaucoma especially where angle compromise is possible. And these lenses look too far out for attempting fixation of the bag with Cioni rings)

Conclusion

This is a case of primary open angle glaucoma in Marfans syndrome with bilateral lens sub luxation. Ectopia Lentis is a major criteria for diagnosis of Marfans. Usually the subluxation is superotemporal.However other cases has also been described.In this patient the priorities are IOP control and visual rehabilitation.IOP control may be achieved initially with anti glaucoma medication. Lens may be better tackled by parsplanalensectomy and vitrectomy right eye first and then left followed by implantation of scleral fixated intraocular lens.Trabeculectomy might be needed for control of glaucoma later.

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Brief Report

A Rare Presentation of Lymphoplasmacytic Lymphoma: A Case Report

Dr. Shimnalqbal MS,DO, Dr. Nima M A, Dr. Padmaja Krishnan

INTRODUCTION

Lymphoplasmacyticlymphoma is an uncommon mature B cell lymphoma usually involving the bone marrow and, less commonly, the spleen and/or lymph nodes[1] LPL accounts for roughly 1 percent of hematologic malignancies in the United States and Western Europe with an incidence of approximately 8.3 cases per million persons per year[2-5]. The incidence is approximately 10-fold lower in Asia[6].We present this case for its rarity and its clinical presentation as a subconjunctival hemorrhage which has not yet been reported. We would also like to stress on the importance of fundus examination in all patients.

CASE REPORT

A 53 year old apparently healthy woman presented with three days' history of redness in her right eye unassociated with pain, watering or visual loss. Her past ocular and systemic history was uneventful except for a severe dry cough of three weeks' duration. She was not on anticoagulants and gave no history of trauma to the eye or ofbleeding elsewhere in the body.

She was found to have a large subconjunctival hemorrhage on the temporal aspect of her right eye (Fig 1) with otherwise normal anterior segments in both eyes. Her best corrected visual acuity was 6/18 OD and 6/9 OS. The fundus showed retinal, subretinal and disc hemorrhages in both eye along with a few cotton wool spots. (Fig 2)



Figure 1 : Subconjunctival hemorrhage

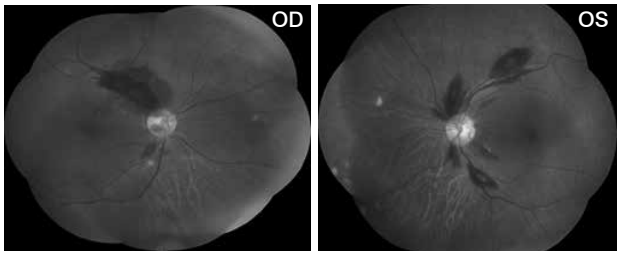


Figure 2 : Fundus picture showing retinal, subretinal and disc hemorrhages in both eye along with a few cotton wool spots.

She was very pale, mildly icteric and had an ecchymosis over the right arm of which she was unaware. Examination of systems was normal but for mild hepatomegaly.

Investigations in view of the clinical findings showed severe pancytopenia with atypical lymphocytes, a raised ESR, an absent M band on serum electrophoresis. A diagnosis of Lymphoplasmacytic lymphoma was made on bone marrow biopsy.

Chemotherapy with Rituximab, Cyclophosphamide, Vincristine and Prednisolone was started but the patient died three months later due to febrile neutropenia.

DISCUSSION

Lymphoplasmacytic lymphoma is a rare type of Non Hodgkins Lymphoma that develops from B cells. It is a low grade lymphoma with an indolent course. The median age is 65 years and.50 to 60 percent of patients are male. It is so called as the biopsy shows a mixture of atypical lymphocytes and plasma cells.

Waldenstrom's macroglobulinemia is the commonest type

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of lymphoplasmacytic lymphoma in which abnormal B cells produce the IgM protein leading to hyper viscosity. Although of no use to the body, these cells keep being made and accumulate within the bone marrow, lymph nodes, spleen and other organs. In the bone marrow this build up "crowds out" the normal blood cells leading to a gradual reduction of the blood count. If the build-up occurs in the lymph nodes, spleen or elsewhere, these tissues swell up resulting in visible or palpable lumps. In around 1 in 20 people with an lymphoplasmacytic lymphoma, the abnormal B cells produce either no abnormal immunoglobulin or a different type of immunoglobulin (IgG or IgA) In these cases the lymphoma is called 'lymphoplasmacytic lymphoma' rather than Waldenstrom'smacroglobulinemia. Patients with no abnormal proteins or with increased levels of IgG or IgA are less likely to have problems due to hyperviscosity becauseIgG or IgA are smaller than IgM. Follow up in patients who have no abnormal protein in the blood is by bone marrow examination.

Apart from these differences in immunoglobulins, the tests and treatments for Lymphoplasmacytic lymphoma and Waldenstrom'smacroglobulinemia are the same. Many patients with the disease are asymptomatic as Lymphoplasmacytic lymphoma often develops over a long period of time. The diagnosis is often made by chance - during investigations for another condition or on a routine blood test. Symptoms when they develop are due to two main reasons- marrow infiltration and hyper viscosity and include tiredness, bleeding tendency recurrent infections and sometimes weight loss. The causes of Waldenström'smacroglobulinaemia are unknown. However there does seem to be a familial tendency with a higher incidence in first degree relatives.

Therapies available for initiation of treatment include alkylating agents, purine nucleoside analogs, and rituximab[8]. The two commonly used chemotherapy regimens are CHOP (Cyclophosphamide, Hydroxydaunorubicin, Oncovin Prednisolone) and CVP (Cyclophosphamide, Vincristine, Prednisolone). Of late, Rituximab has gained importance for treating this disease because of its acceptable toxicity and lack of therapy-associated myelosuppression and myelodysplasia. Emerging therapies include stem cell transplantation (autologous and allogeneic) which may be used for people who are refractory to chemotherapy or in case of relapse. Stem cell transplantation is usually not considered in older patients.

With current therapies it is not possible to eradicate every last abnormal cell from the body and thus Waldenström'smacroglobulinaemia is very likely to relapse at some point after treatment. Consequently, all patients need to be followed up regularly in the outpatient department even when in remission.

Summary

Subconjunctival hemorrhage is a very common finding in routine ophthalmic practice with trauma, violent bouts of coughing and the so-called spontaneous hemorrhages in older patients especially those with hypertension or arteriosclerosis being common causes. Sub conjunctival hemorrhage as the first presentation of a blood dyscrasia is rare as is the occurrence of Lymphoplasmacytic lymphoma in routine clinical practice. This case highlights the features of Lymphoplasmacytic lymphoma, a disease with an indolent course and poor outcome and the importance of fundus examination in all patients .

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Brief Report

Tick Bite in the Eyes

Dr. P. Rajeevan M.S. D.O, DNB, MPhil, Dr. Silni Chandra MS, Dr. Smitha Mohan MS, DO

Introduction

Tick bite in human eye is a rarity in our geographical location and since this is being rarely reported in literature, we are reporting a series of three cases which we came across in our department during the last two months.

Blood sucking ticks are parasites of animals. Since habitat of human beings in rural areas of Palakkad, is quite near to animal herds, they may contract this sort of infestation.

Case number one

A fifty one year old female reported to the outpatient department of Ophthalmology of Government Medical College, Palakkad (district hospital , Palakkad) in December 2014 with pain, irritation and foreign body sensation in left eye since two days. On examination there was edema of the lower eye lid and conjunctiva showed congestion. Slit lamp biomicroscopy showed blood sucking tick biting the lower lid margin.All other ocular examination parameters were within normal limits. All other systemic examination were within normal limits.

The insect was removed under local anaesthesia with fine forceps and was examined under microscope to confirm removal in toto.

After removing the insect from the eye topical antibiotic drops and ointment were given. Follow up was done after forty eight hours and symptoms were found to be relieved. She was kept on follow up for two months and remained symptom free.

Case number two

A sixty three year old male patient reported to the outpatient department of Ophthalmology of Government Medical College, Palakkad (district hospital, Palakkad) in November 2014 with pain ,foreign body sensation and redness in right eye since five days. He was a rubber plantation worker. On examination a blood sucking bug was found biting the upper lid along with localised edema of the lid.(see clinical photograph) All other ocular examination parameters were within normal limits. All other systemic examination were within normal limits

The insect was removed and examined under microscope in the entomology department of Government Medical College, Palakkad. The patient was prescribed topical antibiotic drops and ointment and was followed up after twenty four hours. Symptoms were relieved on review.The insect was identified as a hard tick. He remained symptom free for the next two months.



Case number Three

A male patient,fifty five years old,reported to the outpatient department of Ophthalmology of Government Medical College, Palakkad(District Hospital, Palakkad) in January 2015, with pain and redness in left eye since two days. He was a manual labourer. On examination lower lid showed edema and conjunctiva showed congestion. Slit lamp biomicroscopy showed blood sucking tick biting lower lid margin of left eye. All other ocular examination parameters were within normal limits. All other systemic examination were within normal limits.

The insect was removed and examined in Parasitology department of Veterinary College, Mannuthy,Trichur and was morphologically identified as longistrate tick belonging to the Amblyomma species.

All these three patients were followed up for two months during which they did not develop any systemic symptoms indicating that they had suffered only a tick bite and did not acquire any tick transmitted disease.

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Discussion

Ticks are blood sucking arthropods which are important vectors of human and animal diseases including Lyme disease, Q fever, tick borne lymphadenopathy, secondary bacterial skin infection, reaction against tick allergens etc. These belong to the phylum Arthropoda and class of arachnida which includes spiders scorpions and mites. Of the three families of ticks, only two families of ticks, Ixodidae (Hard Ticks) and Argasidae (soft ticks) are known to transmit diseases to humans. Hard tick have a scutum or hard plate on its back while soft ticks do not.

Ticks live in the fur and feathers of many birds and animals. Ticks are transmitters of numerous kinds of virus, bacteria and protozoa in domestic animals and humans. These microbes cause diseases which can be severely debilitating or fatal to domestic animals & also humans. These are especially important to domestic animals of tropical and sub tropical countries as the warm climate helps these ticks to flourish and the large population of wild animals in tropical countries provide a reservoir of ticks and infective microbes that spread to domestic animals.

Existing co morbidities in humans may worsen the situation if not identified properly, eg : tick bites in anaemic patients may worsen anaemia

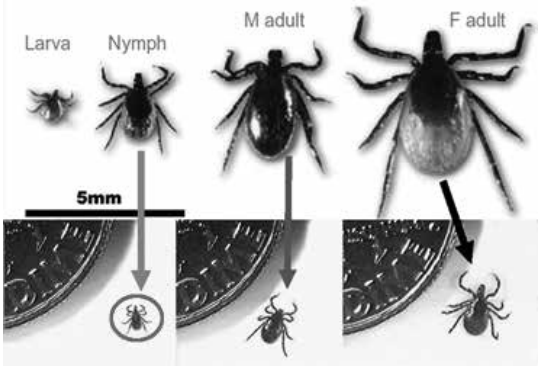
Risk factors for human beings in contracting this infestation

People living in close contact with domestic animals
People living in unclean clothes where ticks habitually lives
People working outdoors

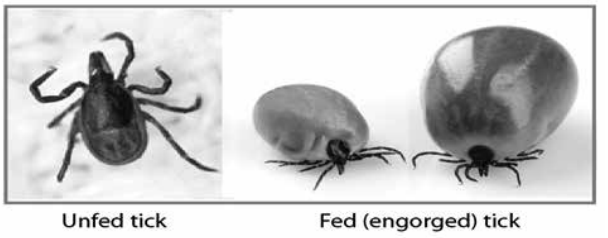
Anatomy & Physiology of Ticks

- Anatomy- Ticks have bodies which are divided into two primary sections-

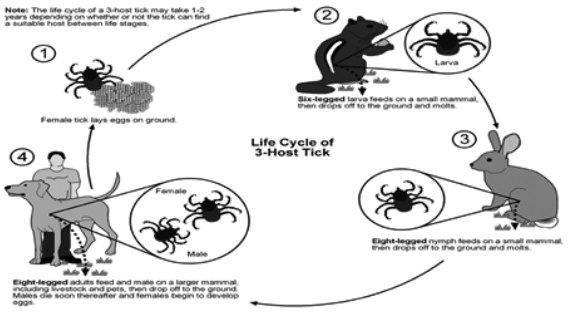
Anterior Capitulum(gnathosoma) which contains head and mouth parts.
Posterior idiosoma which contains legs, digestive tract and reproductive organs.



Diet- These are ectoparasites feeding on blood,known as obligate hematophages as they need blood to survive and move from one stage of life to another.Ticks extract blood by cutting a hole in hosts epidermis into which they insert their hypostome, in order to keep blood from clotting they excrete an anti coagulant or platelet aggregation inhibitor.



Life cycle- Ticks undergo the following primary stages of development-eggs, larval, nymphal and adult.male and female ticks. Usually the female adult hard ticks is the one causing most bites as males die after mating. They don't jump of or fly. They simply reach out with their legs and grab or crawl onto a host. Most ticks in nymph and adult stage will attach to different kinds of animals, including humans, to get a blood meal. Disease transmission occurs at the end of the meal as tick becomes full of blood. Larvae hatch from eggs. They have only six eggs in this stage.larvae after successfully getting a blood meal fall of the host and live in the soil or decaying matter. These molt into eight legged nymph which seek blood from small vertebrates and eventually molt into eight legged adults, which are somewhat larger and therefore seek a larger host.



Habitat- tick species are widely distributed around the world, more commonly in countries with warm and humid climate.

Amblyomma species- The ticks identified in this case series belonged to the genus of Amblyomma. These ticks are three host parasites. Immature Amblyomma ticks parasitize reptiles and ground feeding birds. In the adult stage they parasitize mammals. They have long mouth parts which make it difficult to remove manually. Amblyomma testudinarium inhabits Asian environment. Adults are abundant on pigs, cattle, deer and humans. Immature parasitize birds, small mammals and humans.

Conclusion

Three cases of tick bite in the eye which have been treated at Government Medical College, Palakkad , being rare cases are reported. Careful history taking, High index of suspicion and slit lamp biomicroscopy will help in accurate diagnosis. Careful and complete removal of parasite will help in curing the condition. Public health awareness regarding parasite infestation , vector control and personal hygiene are mandatory.

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Brief Report

A Rare Presentation of Retinal Vasculitis

Reesha K.R. DNB

Introduction

Retinal vasculitis is a sight-threatening intraocular inflammation affecting the retinal vessels. It may occur as an isolated ocular condition, as a manifestation of infectious or neoplastic disorders, or in association with a systemic inflammatory disease. Retinal vasculitis affecting predominantly the veins has been described in association with Behcet's disease, tuberculosis, sarcoidosis, multiple sclerosis, pars planitis, retinal vasculitis associated with tuberculoprotein hypersensitivity (Eales' disease), and human immunodeficiency virus (HIV) infection. In certain diseases with predominantly arterial involvement (e.g., systemic lupus erythematosus and polyarteritis nodosa), the retinal arteries bear the brunt of the disease. Here we report a rare association of Kikuchi Fujimoto's disease (KFD) with Systemic Lupus Erythematosis (SLE)

Case Report

A 22 year old apparently healthy female presented with defective vision left eye of one week duration. She had a history of fever and recent onset of weight loss and was diagnosed to have tuberculosis lymphadenopathy after lymph node biopsy and was on Anti Tuberculosis Treatment (ATT) for four weeks. But in spite of treatment her systemic condition was not improving and she developed defective vision.

On examination her Best Corrected Visual Acuiy in Right eye was 6/12 and left eye was counting fingers 1 metre.The Intra ocular pressure recorded by Goldmann applanation Tonometry was within normal limits. Anterior segment findings were unremarkable in both eyes. Anterior vireous was quiet and there was no vitritis. Right eye fundus showed normal disc, multiple cotton wool patches and few flame shaped hemorrhages. Patchy vasculitis was mainly involving the arteries. Left eye fundus revealed vasculitis mainly involving arteries and cystoid macular edema. Cotton wool patches and hemorrhages were seen more in left eye.(Fig:1)

Optical Coherence Tomography(OCT) revealed Cystoid macular edema(CME) in both eyes but more in left eye. (Fig:2) Fundus Fluorescence Angiogram (FFA) findings were suggestive oclusive vasculites with both arteritis and periphlebitis (Fig:3).

Results

Routine blood investigations were normal. Mantoux test was non reactive. Serum ANA was positive. Skin biopsy with direct immunofluorescence revealed perivascular and periadnexal inflammation. RNP(sm) antibody was also positive. Repeat Lymph node biopsy detected Histiocytic necrotizing lymphadenitis (Kikuchi- Fujimoto's Disease) associated with SLE. (Fig:4).

ATT was stopped and patient was started on Systemic steroids and azathioprine . By third month vasculitis and cystoid macula edema completely resolved and vision improved to 6/6 right eye and 6/12 left eye. (Fig:5)

Discussion

Prevalence of lymphadenopathy is reported to be only 23-34% of SLE patients and is not included in the diagnostic criteria of SLE. Lymphadenopathy has been reported as the first clinical manifestation of SLE mostly in children[1]. Histiocytic necrotizing lymphadenitis is rarely associated with SLE. The diagnosis of KFD can precede, postdate or coincide with the diagnosis of SLE. Lymphadenopathy is a common clinical presentation in KFD. Patients with KFD should be assessed for SLE and kept on long-term follow-up. KFD should be ruled out in SLE flare-up accompanied by lymphadenopathy.

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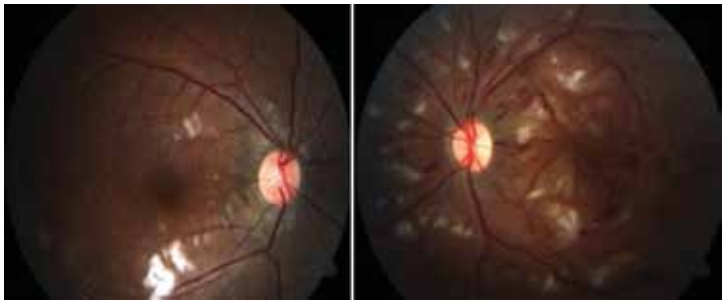


Fig:1 Fundus Pictures of both eyes showing vasculitis.

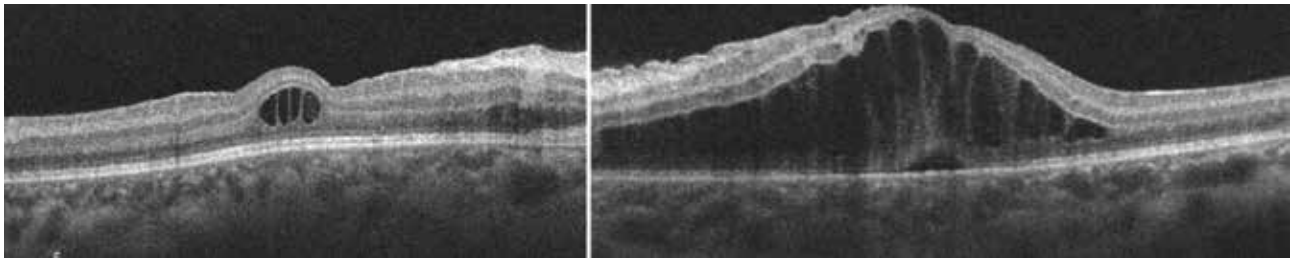


Fig:2 OCT Images showing CME.

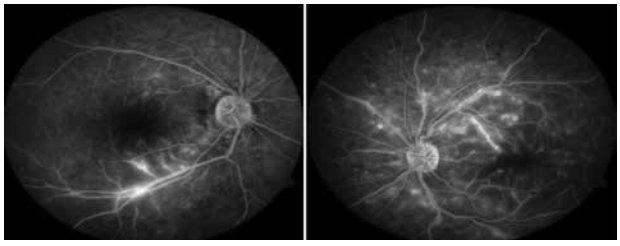


Fig:3 FFA showing leakage of vessels

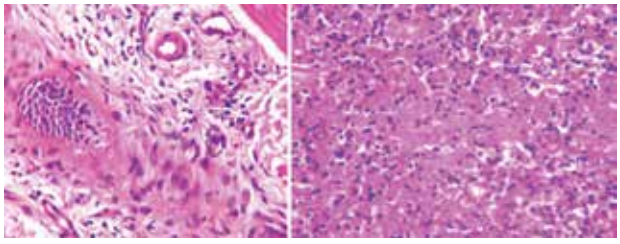


Fig:4 Skin and Lymph node biopsy suggestive of SLE

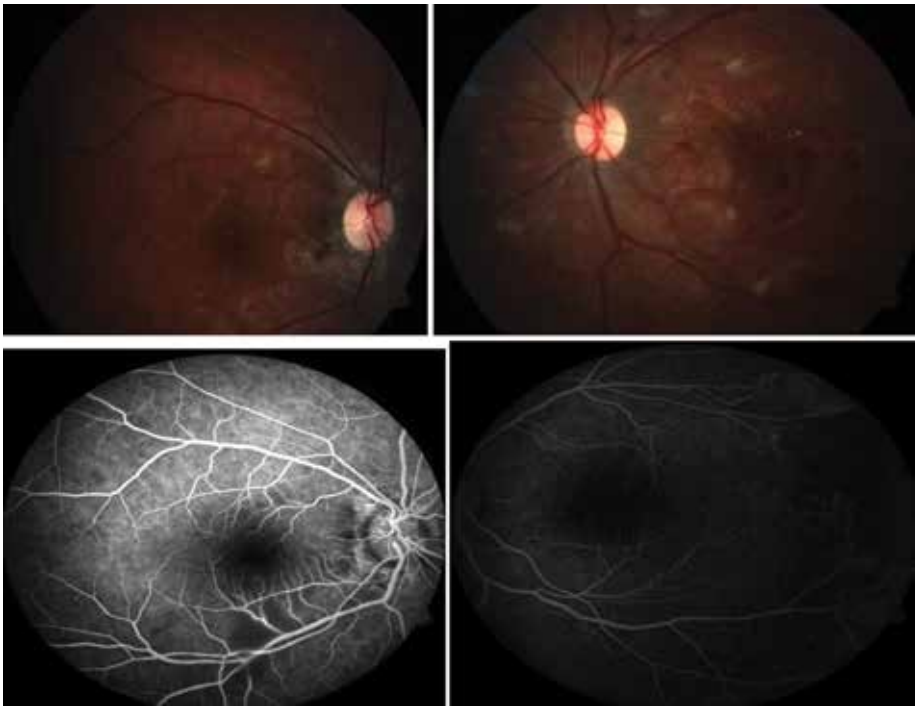


Fig:5 Fundus Photo and FFA on 3 months follow up

PG Tear Sheet

Ocularsporidiosis

Dr. J. ANTONY MS, DO

Ocularsporidiosis comprises the various clinical manifestations resulting from infestation of eye by the parasite Rhinosporidum Seeberi. It produces a chronic granulomatous inflammatory disease in many parts of eye leading to the growth of a pink bleeding mass.

The parasite attacks many parts of eye like the lacrimal passages, eye lids, orbits, conjunctiva, cornea, sclera and skin. So it is better to name the disease as ophthalmosporidiosis than ocularsporidiosis. The disease also affect nasal mucosa, throat, mouth, pharynx, vagina, penis and skin.

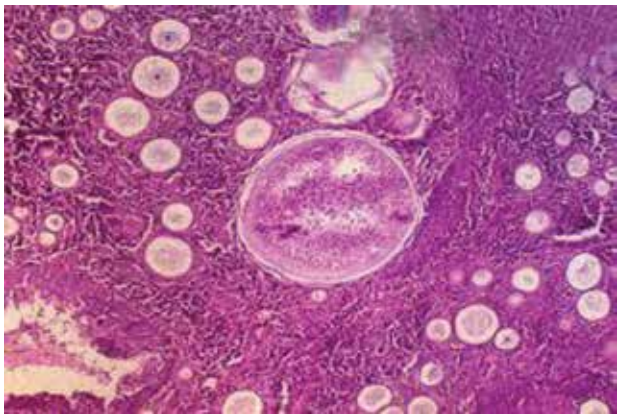
The condition was first described by Guillermo Seeber in 1900 in a patient from Argentina. Seeber published the report in his thesis for doctorate and his professor Wernicke named it after him.

Though the disease has been reported from about 90 countries of world, it is more prevelent in Africa, South America, South East Asia, Nepal and endemic in South India and Sreelanka. In India many cases have been reported from UP, Madhyapradesh, West Bengal, Rajastan, Bihar, Orissa, Maharastra, Tamil Nadu and Kerala (Thrissur, Ernakulam, Thiruvananthapuram). But majority of cases (88%) have been reported from India and Sreelanka. This is due to the habit of some people taking bath in river and pond water.

Aetiopathogenesis

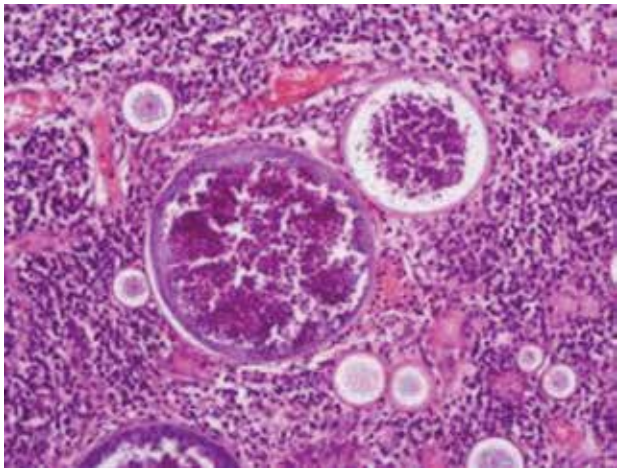
Seeber when discribed this organism for the first time, believed that it was a protozoan and Asworth who studied its life cycle considered it as a fungus. Now it is accepted as an aquatic protozoan parasite and is included in the new class Mesomycetozoea. Disease is water borne. Infection occurs from ponds and lakes (84%), rivers (11%) whille swimming or taking bath and also from domestic water (5%). Rarely organism can enter body via air or dust. Natural hosts are fish and amphibians. Males are more affected than females.

The organism was first cultured in laboratory and cultivated in an epithelial cell line in 1986 by Levi and others.



Histology of ocularsporidiosis

The earliest stage of the organism observed (Trophocyte) was a round or oval cell. When the parasite reaches about 50nm diameter first nuclear devision occurs. When the number of free nuclei reaches about 2000, the cytoplasm gets cleaved and each nucleus become surrounded by some cytoplasm and develop in to spore. The whole represent sporangium containing numerous daughter spores of 6to8μ diameter in different stages of development.



Vascular fibro connective tissue stroma containins sporangia and inflammatory infiltrate

Each of these sporangia or cyst has a thick wall with an inner cellulose and outer chitinous layer and is about 200μ in diameter. These appear as white dots on surface of lesion (specks) seen through submucosa. From mature sporangium endospores (the infective units) are released and they produce the classical lesions of ocularsporidiosis

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upon entry through a break in the epithelium on the surface of body.

Laboratory diagnosis is not by culture but by biopsy. Histological examination of the polypoid tissue reveals a vascular fibro connective tissue stroma containing globular cysts or sporangia and inflammatory infiltrate. The sporangia and spores can be stained and highlighted with periodic acid-Schiff (PAS), Gomori's methenamine silver, and mucicarmine.

Clinical Features

Of the affected patients Ocularsporidiosis produce disease in

- Conjunctiva in 69% of parents
- Lacrimal sac in 24% of Patients
- Canaliculi in 4% of patients
- Sclera, Cornea, Lids and orbits in 4% of patients

SYMPTOMS

- Recurrent watering from eyes
- Intermittent redness and discharge
- Rarely bleeding from eyes
- Swelling of lids and between eyes and nose.

SIGNS

Conjuctival Ocularsporidiosis

Palpebral conjuctiva lis the most of common site of infection and results in the growth of a painless, Pedunculated or sessile polypoidal mass with white dots representing numerous sporangia on the surface. If the bulbar conjuctiva is involved there is danger of melting of underlying sclera leading to staphyloma formation.

Treatment : is excision of polyp followed by thermocauterisation of base or application of Betadine solution in the affected area.



Conjunctival ocularsporidial granuloma

Scleral Ocularsporidiosis

Scleral Oculospiridiosis produces thinning of sclera usually leading to the formatiion of an intercalary staphyloma, about 2mms from the limbus due to the incarceration of root of iris and anterior portion of ciliarybody to the thin sclera. The scleral melting may be due to the enzymatic lysis by the lysosomal bodies with the nuclear bodies.



Treatment - is staphylectomy with partial or full thickness scleral grafting



Scleral grafting – Partial Thickness



Scleral grafting – Full Thickness

Corneal Ocularsporidiosis

Corneal ocularsporidiosis is rare and the reported cases resulted from injury to the cornea during swimming in pond

and subsequent removal of intracorneal foreign body an year prior to clinical presentation. It produced an intracorneal mass with lobulated edges having many tiny greyish white dots. The growth was at deep stormal and DM level.

Treatment is Deep Anterior Lamellar Keratoplasty.



Corneal Ocularsporidiosis

Lid and Cutaneous Ocularsporidiosis

Lid ocularspordiosis usually affects lid margins leading to lid swelling, ptosis, lid margin distortions and ectropion or entropion. It also affects the skin over lacrimal sac.

Treatment - is excision of growth cauterisation of stalk and plastic repair of lid defect.



Lid and Cutaneous Ocularsporidiosis

Orbital Ocularsporidiosis

Orbital ocularspordiosis affects the orbital tissue leading to the formation of a painless or painfull (like orbital cellulitis) swelling in the periocular region. It presents as a fluctuant, tense, tender, mass with well defined margins. It can spread to the overlying skin.

CT Scan may reveal a soft tissue attenuating lesion in the involved orbit and sometimes extending to paranasal air sinuses.



Orbital Ocularsporidiosis

Treatment - is excision of mass after orbitotomy.

Canalicular ocularspodiosis

is rare and presents as a canalicular swelling (polyp) and can lead to canaliculitis.

Treatment - is excision of polyp after dilatation of punctum and slitting of canaliculus so that its base can be found out.



Canaliculitis

Lacrimal Sac Ocularsporidiosis

Growth in to the sac produce chronic dacryocytitis. Patient may complain of intermittent watering and mucopurlent discharge from eyes. If the infection is pericanlicur or perisacular, epiphora is uncommon. This Lacrimal sac disease is usually not associated with pain.

Local examination may show a diffuse soft, swelling, in the medial infraorbital region. Pressure over the swelling can produce regurgitation of mucopurlent fluid through puncta. Syringing test may give a free flow of fluid or partial block. ENT checkup, Dacrycystography and CT Scan may be helpful in diagnosis and to rule out spread of growth in to the neibouring structures.

In CT Scan, sac oculosporidial growth usually appears like an isodense mass with mild enhancement in preseptal compartment along inferior aspect of orbit.

In any atypical presentation of lacrimal sac diseases,



Lacrimal Sac Ocularsporidiosis

ophthalmologist should keep this condition in mind in diagnosis especially in endemic areas.

Treatment - is Dacrycystectomy followed by Dapson therapy

SPECIAL PRECAUTIONS AND STEPS OF OCULAR SPORIDIAL LACRIMAL SACSURGERY (DCT) TO AVOID PEROPERATIVE & POST OPERATIVE BLEEDING

- ENT Checkup to exclude any growth in nose & throat especially tumours of sac and other nasal disorders
- Bleeding and clotting time evaluation
- Blood grouping, Cross matching, keeping blood ready for transfusion
- Cautery, suction and cellulose sponge for packing
- The vessels of ocularsporidial mass are very much dilated due to the high histamine content and they bleed easily.
- Better to pass local anaesthetic injenction needle through normal skin and a larger area around lesion avoiding mass to prevent bleeding during surgery
- 1 ml of local anaesthetic (2% xylocaine and 1:1000 adrenaline) solution is injected to the junction of sac and NLD where the stalk of granuloma is situated. This will shrink the mass considerably.
- It is better to put skin incision little nearer the nose than classical one through normal skin, leaving provision for excision of affected skin at the last stage of surgery.



Incision-Dacryocystectomy

- It is better to avoid handling of granuloma much by dissecting close to the anterior lacrimal crest and go round the granuloma till we get its stalk
- Bleeding is controlled by applying pressure in the area with cotton soaked in phenylephrile solution and use suction apparatus, if view is obstructed by blood.
- Once we reach the stalk introduce a narrow mosquito forceps and catch hold of
- the neck and excise it.
- Involved areas and infiltrated tissues are inspected, scraped, and bleeding areas are packed with cellulose sponge which imbibe fluid, swell and plug the bleeding points
- In advance cases there may be loss of skin and some mobilisation of skin may be necessary for primary closure.



Anterior Lacrimal Crest



Excised Sac





Closure of wound

- Involved area may painted with Povidone Iodine (Betadine) solution which has local antiocularspoidial activity
- Dapsone 100mg (4,4 – diamini sulphenyle sulphone) orally on alternate days for one year to reduce post operative recurrences

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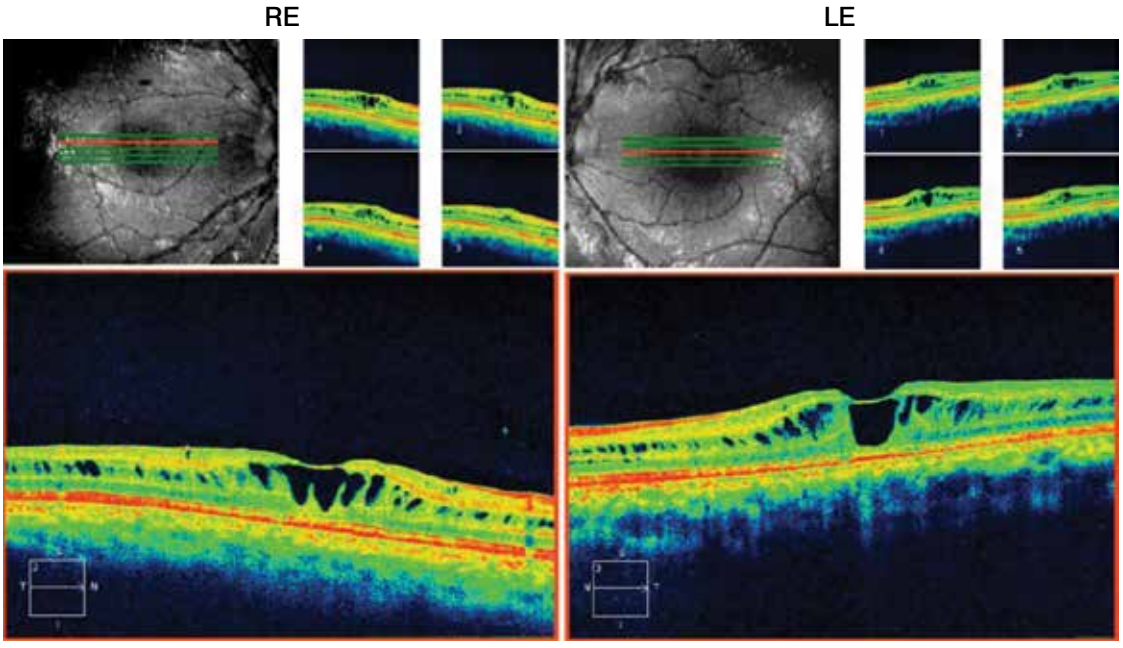
Awaneesh M Upadhyay DNB, Ashok Nataraj MS

11 year old boy came to our OPD with complaints of blurring of vision in both eyes since 1 year associated with headache. Family history is not significant. General examination was normal. No night blindness or colour vision defects. His best visual acuity was 6/9 in right eye, 6/12 in left eye. Anterior segment was within normal limits. Indirect examination is as below

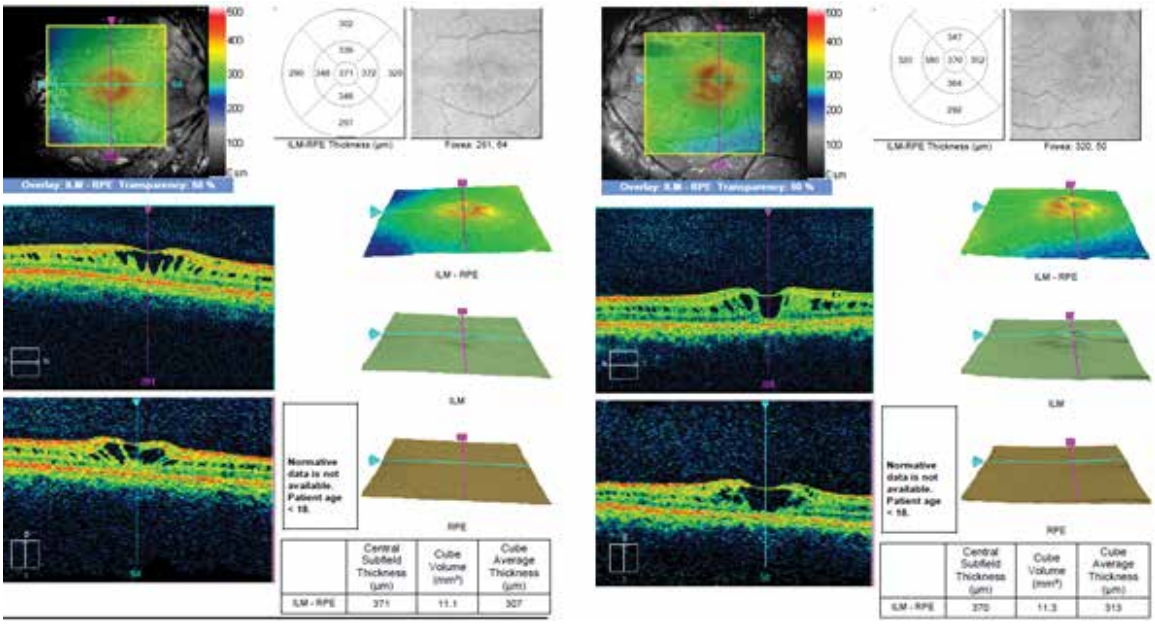


Both eyes clear media, disc and vessels normal. Posterior pole showed spoke-like schitic pattern at the fovea. Periphery was within normal limits.

OCT both eyes showed schitic cavities and cystoid pattern involving the fovea.



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ERG showed decreased amplitude of b- wave (negative ERG pattern).

Diagnosis - X-LINKED JUVENILE RETINOSCHISIS

This is a diagnosis that should be looked for unexplained loss of vision in young males with these typical findings.

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Comprehensive care to cataract surgery

MICRO LABS VISION

Moxigram

(Moxifloxacin 0.5%)Eye Drops

A step ahead in treating bacterial infections

Micronac

(Nepafenac 0.1%)Eye Drops

The NSAID care...
...for deep seated ocular inflammation

Sheera K R, Rutviben Ravjibhai Sadatia

Air Versus Gas Tamponade In Rhegmatogenous Retinal Detachment With Inferior Breaks After 23-Gauge Pars Plana Vitrectomy

Zhou C, Qiu Q, Zheng Z.RETINA 2015 ; 35(5)::886–891.

Pars plana vitrectomy (PPV) with gas tamponade remains an important surgical technique in the modern era in treating rhegmatogenous retinal detachments (RRDs). Octafluoropropane (C3F8) and sulfur hexafluoride (SF6) are the most widely used tamponade materials. However, C3F8 and SF6 demand good compliance of patients for long periods of postoperative prone positioning, promotes vitreous disturbance and can delay air or mountain travel. Compared with expansile gas, room air stays for a shorter time; therefore, the prone positioning period and visual recovery can also be shortened. Moreover, the expansile gases are expensive, especially in developing countries or remote areas; therefore, air would be a reasonable alternative for the tamponade in patients with RRD.

Aim was to compare the efficacy of air and octafluoropropane (C3F8) in treating rhegmatogenous retinal detachments with inferior breaks after 23-gauge pars plana vitrectomy.

It was a prospective, randomized comparative interventional study. Sixty-four patients with rhegmatogenous retinal detachment with inferior breaks underwent pars plana vitrectomy with air (32 eyes) or gas (32 eyes) tamponade. Anatomical and visual outcomes of the two groups were compared. The mean follow-up period was 13.09 ± 1.90 months. Significant differences were identified regarding prone positioning period (P , 0.01), intraocular pressure (P ,0.01), and gas volume (P = 0.03) on the first postoperative day. The single-operation success rates for the air and gas groups were 84.38% and 78.13% (P = 0.522), and the final surgery success rates increased to 100% and 96.88% (P = 0.313), respectively. The single-operation success rate between the groups was not statistically significant, even after adjustment for confounding factors. Multivariate logistic regression also indicated that the number of involved retinal quadrants (odds ratio = 19.88, P = 0.01) was an independent predictor of surgery failure. The only postoperative complication observed was new or missed breaks, which occurred in 12 patients (18.75%).

Air had equivalent tamponade effects to C3F8, with a shorter prone positioning period, fewer complications, and less expense, in the surgical management of rhegmatogenous retinal detachment with inferior breaks.

Stability Of The Acrysof Toric Intraocular Lens In Combined Cataract Surgery And Transconjunctival Sutureless Vitrectomy

Toussaint BW, Appenzeller MF, Miller DM, Petersen MR, Foster RE, Osher RH, Snyder ME, Hunt CK, Sisk RA, Riemann CD. RETINA, 2015; 35(6): 1065–1071

Since 1994, toric intraocular lenses (IOLs) have proven effective at correcting both cataractous and astigmatic vision loss with excellent visual results. Correct placement is essential as a rotation misalignment of 10° results in a 35% loss of astigmatic correction. There are theoretical concerns about the stability of the toric IOL axis and refractive outcomes in the setting of combined CE/IOL and TSV.

Aim of study was to report the outcomes of combined cataract surgery with toric intraocular lens (IOL) implantation when performed in conjunction with transconjunctival sutureless pars plana vitrectomy.

Retrospective interventional case series of 55 eyes of 51 patients who underwent combined simultaneous small incision cataract surgery, toric IOL implantation, and transconjunctival sutureless vitrectomy surgery. Main Outcome Measures were postoperative visual acuity, postoperative astigmatism, and rotational stability of the IOL. Preoperative best-corrected visual acuity was 0.32 ± 0.15 logMar (Snellen 20/43) and improved to 0.16 ± 0.10 (Snellen 20/29) postoperatively uncorrected (P , 0.01) and to 0.08 ± 0.11 best-corrected (Snellen 20/24) (P , 0.01). Preoperative astigmatism was 1.75 ± 1.0 diopters (D) (range, 0–4.75 D) and improved to 0.5 ± 0.50 D (range, 0–2.5 D) postoperatively (P , 0.01). Final measured postoperative IOL axis deviation from target axis was 4 ± 6° (range, 0–32). Final IOL axis was within 5° of target in 47 (85%) eyes, within 10 degrees of target in 51 (93%) eyes, and was within 15° of target in 52 (95%) eyes.

Combined CE/IOL and TSV has been shown to be feasible,noninferior to staged surgeries,and may be preferable in selected patients especially those older than 50 years and those receiving intraocular gas tamponade. Careful attention to refractive details, including astigmatic

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correction, is important to achieve the most optimized visual outcome for all patients including those with both cataract and vitreoretinal disease.Toric lens position and axis remained stable after implantation during combined cataract surgery and transconjunctival sutureless vitrectomy.

Case-Matched Comparison Of Vitrectomy, Peripheral Retinal Endolaser, And Endocyclophotocoagulation Versus Standard Care In Neovascular Glaucoma

Marra KV, Wagley S, Omar A, Kinoshita T, Kovacs KD, Silva P, Kuperwaser MC, Arroyo JG.
RETINA 2015; 35(6):1072–1083, 2015

Neovascular glaucoma (NVG) is a vision threatening disease caused by retinal or ocular ischemia, most commonly due to proliferative diabetic retinopathy (PDR) or central retinal vein occlusion (CRVO). Neovascular glaucoma often results in loss of vision and severe pain caused by rapid elevation of intraocular pressure (IOP). Panretinal photocoagulation (PRP), antiangiogenic drugs (such as bevacizumab,ranibizumab), medical reduction of IOP (glaucoma drops) and control of inflammation, and glaucoma surgery (such as filtration and Ahmed valve placement) are the usual recommended treatments of NVG. Endoscopic pars plana vitrectomy, panretinal photocoagulation, and cyclophotocoagulation are newer treatment options

Aim of this study was to evaluate the efficacy of combination pars plana vitrectomy, endoscopic peripheral panretinal photocoagulation, and endocyclophotocoagulation (ECP) as compared with standard care in patients with neovascular glaucoma. This age-matched case-controlled retrospective series of 54 eyes compared the clinical outcomes between a consecutive series of combination pars plana vitrectomy/ panretinal photocoagulation/ECP (n = 27) versus the current standard of care (n = 27) for patients with neovascular glaucoma. “Standard” treatments for patients with neovascular glaucoma include panretinal photocoagulation, intravitreal bevacizumab, filtration surgery, pars plana vitrectomy, and Ahmed valve placement. After 1 year, mean intraocular pressure reduced from 40.7 ± 12.40 mmHg preoperatively to 12.3 ± 4.84 mmHg (P , 0.001) in the ECP group and from 34.7 ± 12.38 mmHg to 23.2 ± 12.34 mmHg in the control group (P = 0.002). Compared with controls, the mean drop in intraocular pressure in the ECP group was significantly greater at all postoperative visits. Logarithm of the minimal angle of resolution visual acuity outcomes were similar in both groups. There were 2 cases (7.4%) of postoperative phthisis bulbi in each group.

Endoscopic pars plana vitrectomy, panretinal photocoagulation, and ECP seem to control intraocular pressure to a greater extent than standard glaucoma treatments in patients with neovascular glaucoma. In this aged-matched comparative case series, there was no significant difference between the two treatments’ effects on visual acuity.

Boston Keratoprosthesis: Outcomes and Complications: A Report by the American Academy of Ophthalmology.

Ophthalmology. 2015 Jul;122(7):1504-11.
Lee WB, Shtein RM, Kaufman SC, Deng SX, Rosenblatt MI

The approach of using an artificial material to replace an opaque cornea was first described by Pellier de Quengsy, more than 200 years ago. Since that time, several attempts to develop a modern keratoprosthesis to treat patients with corneal blindness and a poor prognosis for penetrating keratoplasty have been developed, with various models using different material, innovative designs and surgical techniques. Despite progress in the conception of keratoprosthesis, the heterogeneity of the results related to different devices and the serious complications historically described, hampered the acceptance of the keratoprosthesis as a safe option for surgical treatment. Currently, however, considering modifications made to the designs, and improvements in surgical technique and postoperative management, the keratoprosthesis emerged as a viable alternative in patients at high risk for conventional keratoplasty. One of the most commonly used device is the Boston type I keratoprosthesis (BKPro), developed initially by Dohlman et al., in 1974 and approved by the Food and Drug Administration in 1992. Its design and clinical management have undergone several important changes, which increased the popularity and improved its outcomes in the last several years.

Aim of this study was to review the published literature on safety and outcomes of the Boston type I keratoprosthesis (BI-KPro) for the surgical treatment of corneal opacification not amenable to human cadaveric corneal transplantation. Searches of peer-reviewed literature were conducted in PubMed and the Cochrane Library in December 2012, July 2013, and January 2014 without date restrictions. The searches were limited to studies published in English and yielded 587 citations. The abstracts of these articles were reviewed, 48 articles were selected for possible clinical relevance, and 22 were determined to be relevant for the

assessment objectives. Nine studies were rated as level II evidence and 13 studies were rated as level III evidence. Excluded were level III evidence, case reports, review articles, letters, editorials, and case series with fewer than 25 eyes. In 9 articles, a best-corrected Snellen visual acuity (BCSVA) of 20/200 or better occurred in 45% to 89% of eyes. Five articles described a BCSVA of 20/50 or better in 43% to 69% of eyes, and 4 articles found a BCSVA of 20/40 or better in 11% to 39% of eyes. Retention rates of the BI-KPro ranged from 65% to 100%. Reasons for loss of vision after BI-KPro implantation most commonly included corneal melts resulting from exposure keratopathy, endophthalmitis, and infectious keratitis or corneal ulceration. The 2 most common complications after surgery were retroprosthetic membrane formation (range, 1.0%-65.0%; mean ± standard deviation [SD], 30.0±19.0%) and elevated intraocular pressure (range, 2.4%-64.0%; mean ± SD, 27.5±18.1%). The 2 most common posterior segment complications were endophthalmitis (range, 0%-12.5%; mean ± SD, 4.6±4.6%) and vitritis (range, 0%-14.5%; mean ± SD, 5.6±4.7%).

The reviewed articles on BI-KPro use suggest that the device improves vision in cases of severe corneal opacification that were not amenable to corneal transplantation using human cadaveric keratoplasty techniques. A number of severe anterior and posterior segment complications can develop as follow-up continues, making ongoing close observation paramount for patients undergoing this surgery. These complications include infection, device extrusion, and permanent vision loss.

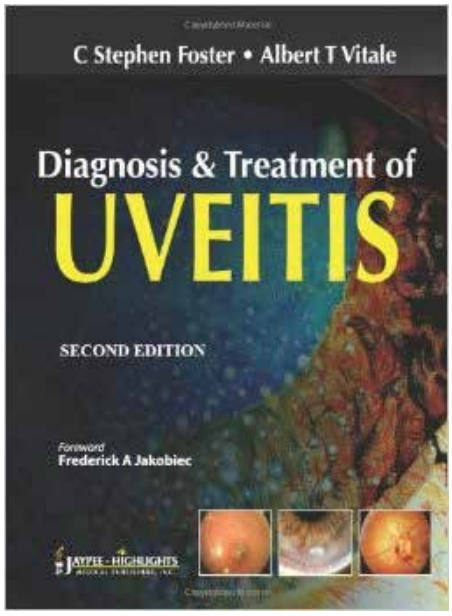
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The address for correspondence in the Case Report “Retina - A Strange Guide to the Diagnosis of Lukemia”, which was published in the March 2015 issue of KJO should have been Dr. Anabi Shahi, Consultant, Cataract Uvea and Medical Retina Services, Dr. Tony Fernandez Eye Hospital. We sincerely apologize for the error.

Vandhana Pradeep

DIAGNOSIS AND TREATMENT OF UVEITIS
AUTHORS: C STEPHEN FOSTER, ALBERT T VITALE

Publishing Year: 2013
Edition: 2nd
Publisher: Jaypee-Highlights Medical Publishers, Inc.
Number of Pages: 1290



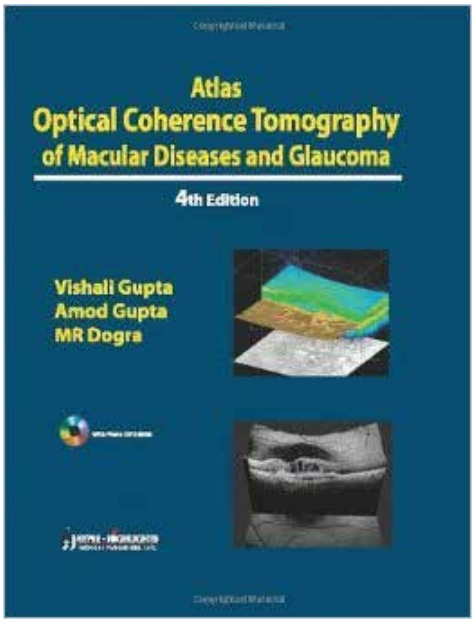
The book is a comprehensive volume on the subject of uveitis and holds an "encyclopaedic" flavour. The simplicity in language and ease of understanding is however maintained.

The work is organised into six sections encompassing the basic principles of uveitis, diagnostic and therapeutic approach, treatment of infectious and non-infectious diseases, masquerade syndromes and other uveitis entities. Extensive chapters on the relevant basics from anatomy and pathology to in depth discussions on individual conditions ensure accurate appreciation of the fundamentals. It is well illustrated with pictures and bristles with informative tables and charts.

The book brings ophthalmologist's fully up to date with latest developments in diagnosis and treatment and may definitely be considered as a must have in any ophthalmologists office. It serves justice in clarifying concepts and will most certainly prove useful for both postgraduate students as well as practicing consultants.

ATLAS OPTICAL COHERENCE TOMOGRAPHY OF MACULAR DISEASES AND GLAUCOMA
AUTHORS: VISHALI GUPTA, AMOD GUPTA, MR DOGRA

Publishing Year: 2012
Edition: 4th (With Photo Dvd Rom)
Publisher: Jaypee-Highlights Medical Publishers, Inc
Number of Pages: 752



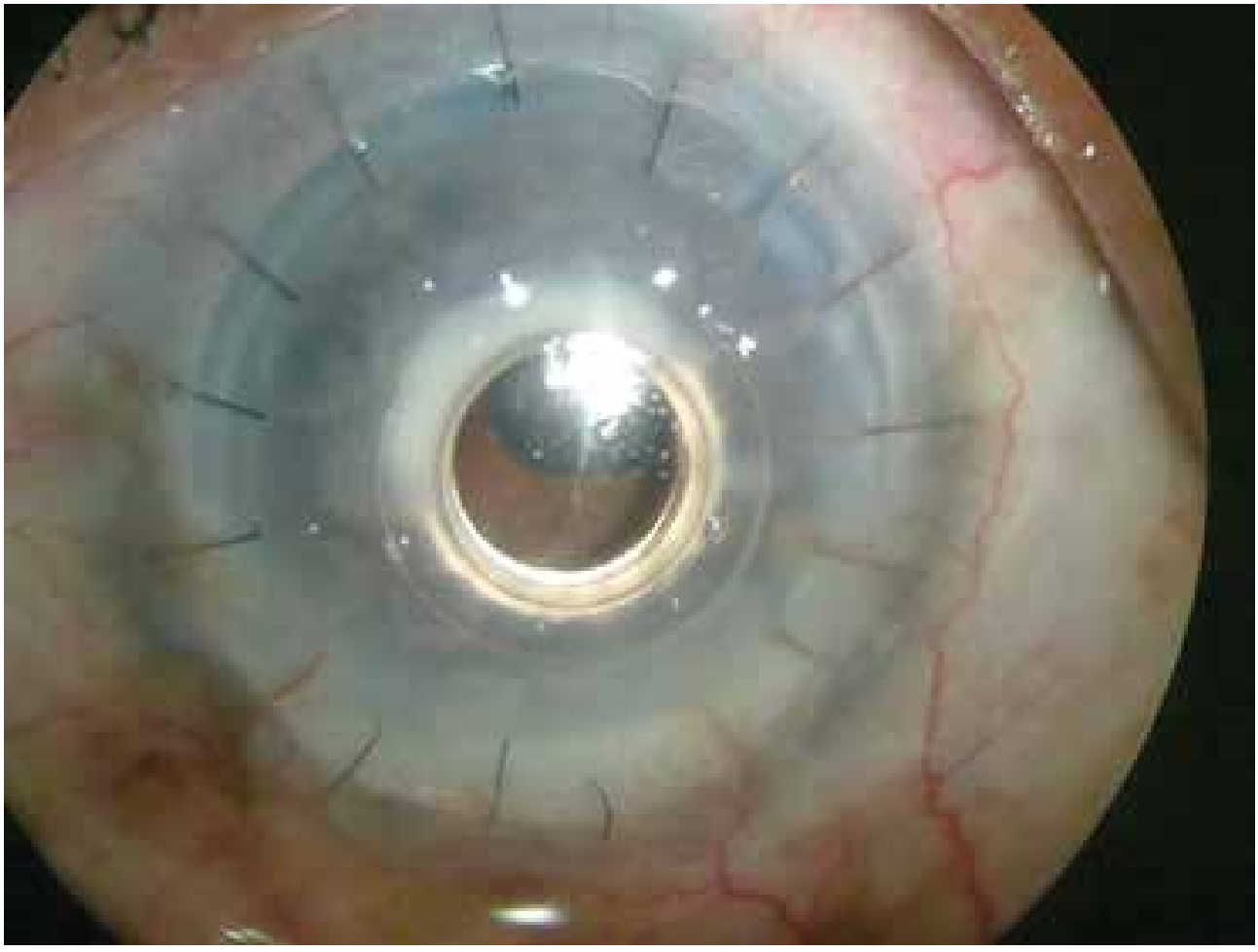
This book with photo DVD ROM is a comprehensive reference guide to optical coherence tomography findings of common macular diseases and glaucoma.

The book is divided into three sections, the first one being an introduction to OCT. The second and third sections examines the use OCT for diagnosis and management of various macular diseases and glaucoma respectively. Each section is divided into chapters relating to individual conditions making the book an easier affair for the reader.
Brief case studies are also described. The book features fundus photographs, fluorescein angiography and OCT images along with follow up images of the patients described.

Overall, this book is very well illustrated atlas of optical coherence tomography covering a wide range of macular diseases and glaucoma serving as a very useful tool for postgraduate students and fellows in particular.

Address for Correspondence: Little Flower Hospital & Research Centre, Angamaly. Email: vandana.pradeep89@gmail.com

Identify the condition



Send your answers to: drashok.eye@gmail.com

The answer for the question in the last issue is

Modified osteo odonto keratoprosthesis (MOOKP) with IOL.
Indications: Steven Johnson syndrome or cicatricial eye disease with cataract,
Autoimmune disorders, Failed donor graft after pkp,
Steroid responders or patients in whom long term steroids are contraindicated.

Winner: Dr. Liji Menon from MOSC Hospital Kolenchery

Dear Editor,

It is with great interest that I read the article on ILM Peeling in detached retina by Dr Rajesh et al.Certain points like doing a fluid air exchange before BBG staining and initiating peel from the nasal side ensures the practicality of the procedure.What I would like to know is whether ILM peel really helps in macular hole closure in a detached retina ?Many a time we see the hole expanding on table while doing a fluid air exchange over the disc.I once again congratulate the author for the wonderful article.

Dr Awaneesh
Little Flower Hospital
Angamaly,Kerala

Author's Reply

Dear Dr awaneesh. Thanks for the interest shown in the article on ilm peeling in rd associated with macular hole. This, not being a common situation that we encounter in our clinical practice cannot be easily subjected to a control based trial . My experience with the technique is limited to just 5 cases in the last one and half years .three of these patients had Rd which had no cause other than the macular hole. .

Ilm peeling has helped closure of the hole as well as reattachment of retina in 4 out of the 5 cases. I feel that most of these holes especially those cases with Rd and no other break have to be dealt with in the same way as idiopathic macular hole in an attached retina. Also being a condition more commonly seen in high myopes who are at high chance of having a layer of vitreous adherent to the posterior pole even when there is a complete pvd clinically, peeling ensures removal of the vitreous remnant on the retinal surface. this can also prevent the development of secondary erm which may subsequently prevent the closure of the hole.

I have not observed enlargement of the macular hole during fluid air exchange .I presume that your observation of enlargement of macular hole has happened when this step was done through the macular hole itself.

The egress of the viscous fluid might be exerting a shearing force on the edge of the hole leading to the enlargement of the hole. I suggest drainage of fluid through the primary break or a separate retinotomy to prevent this from happening. Once again I thank Dr awaneesh for the interest shown in our article.

Rajesh Puthussery

Dear Editor,

I would like to congratulate Ruby Moharana and Ramesh Kekunnaya for their exhaustive review of "Strabismus associated with cataract and refractive surgeries". The authors have systematically reviewed the causes and approach towards these patients presenting with double vision/ strabismus, who often turn out to be a pain in the neck for the operating surgeon.

I would like to highlight the importance of careful pre-operative selection and counseling for this subset of patients, likely to suffer from post-operative double vision. A sound understanding of the mechanisms of post-operative diplopia is extremely important for every cataract surgeon so that this 'double trouble' does not take us by surprise. As the authors have correctly mentioned, a preoperative orthoptic assessment and evaluation of binocular status should be done before any cataract/ refractive surgery.

I thank the authors for this valuable message given through this neatly drafted review.

Dr. Sanitha Sathyan
Pediatric Ophthalmology and Strabismus Unit,
Little Flower Hospital, Angamaly

Dear Editor,

The article 'Recurrent Corneal Erosion Syndrome' is extremely relevant and an understanding of the underlying pathogenesis is a must to achieve successful outcomes. It is not uncommon and the patient suffering from RCES is at times forced to go from doctor to doctor in search of better treatment.You have given a detailed discussion and also included a treatment protocol which will benefit the ophthalmologists battling with such patients.

Regarding the use of 'hypersol'; it a double edged sword. Hypsersol may be used initially with benefit but many patients complain of a stinging sensation. A long term usage may aggravate the underlying ocular surface disorder. However, as mentioned 6% hypersol ointment at night may be considered for a couple of months after the episode subsides.

Epithelial debridement should be gentle and if jeweller's forceps is used, removal in a spiralling fashion towards the centre to minimise trauma is advisable. It is also desirable to leave behind as much rim of healthy epithelium as is possible. Another common mistake is to remove the bandage contact lens too soon, which may result in the entire epithelium sloughing off along with the BCL much to the horror of the attending doctor.

The author has also described the usage of alcohol delamination of the corneal epithelium as an alternative to phototherapeutic keratectomy, which may not be accessible to all.

I thank the author for his exhaustive article which has much practical importance in our daily outpatient practise.

Thank you,

Dr.Lilan Bhat,
Consultant Cornea Services, Little Flower Hospital, Angamaly.

Author's Reply

Dear Editor,

Authors thank Dr Lilan Bhat for going through our article on RCES in depth. We are extremely thankful for the encouraging words mentioned.

Regarding the use of hyperosmotic agents, as rightly pointed out by Dr Lilan, topical eye drops has got only doubtful role and is not usually used in RCES. As mentioned in our article, hyperosmotic ointment applied at night has got a definite role in reducing/alleviating the recurrent erosions in many patients and needs to be used long term.

Also Dr Lilan has rightly mentioned that the use of contact lens has to be long duration. As we mentioned in the article it needs to be continued for a minimum period of 6 weeks and can go even up to or more than 3 months.

Compared to PTK, alcohol is easily accessible to practitioners and a very simple procedure to perform, requiring no special training. In fact authors feel that this should be the definitive procedure of choice in all cases that does not respond to conservative treatment, keep other modes of intervention for cases resistant to alcohol delamination.

Once again we would like to thank Dr Lilan for her valuable comments.

Thank you.

Dr. Vinay S. Pillai,
Consultant Cornea Services, Giridhar Eye Institute, Kochi

The Kerala Journal of Ophthalmology (KJO) is a quarterly; peer reviewed one, devoted to dissemination of the latest in ophthalmology to the General Ophthalmologists as well as to specialists in the various subspecialties of this discipline. It invites submission of original work dealing with clinical and laboratory materials.

Authors submitting materials to this journal are requested to adhere STRICTLY to the norms laid down below. The matter must be typed on one side of the paper. A margin of 1" must be left all around and the material must be double spaced. A page should contain not more than 25 lines. Two copies of the text in paper and one copy in a CD must be submitted to the Editor and the corresponding author is advised to keep another copy with him. The corresponding author must give it in writing in his covering letter that the same matter will not be submitted elsewhere if accepted. He must also enclose the copyright transfer of his work to this journal. The papers sent will be subjected to peer review. The accepted manuscripts become the permanent property of this journal. The author is informed that, if his work is returned to him for correction / clarification after peer review, he should effect the same and send the manuscript back to the Editor within one month. Each manuscript component mentioned here under must begin with a new page and the pages are to be numbered at the right tip corner starting from the Title page.

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Brief reports are short communication of new instruments, new laboratory techniques or surgical techniques as well as interesting case reports with unique findings. These should not exceed 1000 words with a maximum of 2 illustrations. They should follow the format – introduction, case, and discussion. No more than 8 references should be cited. Each brief report must begin with a 75-100 word summary that highlights the significance of the articles.

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Presentation: Ranibizumab. Each vial contains 2.3 mg of ranibizumab in 0.23 mL solution. **Indications:** Treatment of neovascular (wet) age-related macular degeneration (AMD). Treatment of visual impairment due to diabetic macular edema (DME). Treatment of visual impairment due to macular edema secondary to retinal vein occlusion (branch RVO or central RVO).
Dosage: The recommended dose is 0.5 mg (0.05 mL) given as a single intravitreal injection. The interval between two doses should not be shorter than 1 month. Patients should be monitored monthly for visual acuity. Treatment is given monthly and continued until maximum visual acuity is achieved, confirmed by stable visual acuity for three consecutive monthly assessments performed while on Lucentis® treatment. Treatment is resumed with monthly injections when monitoring indicates a loss of visual acuity due to wet AMD, DME or macular edema secondary to RVO and continued until stable visual acuity is reached again for three consecutive monthly assessments. Lucentis and laser photocoagulation in DME or in branch RVO: Lucentis has been used concomitantly with laser photocoagulation in clinical studies. When given on the same day, Lucentis should be administered at least 30 minutes after laser photocoagulation. Lucentis can be administered in patients who have received previous laser photocoagulation. Lucentis must be administered by a qualified ophthalmologist using aseptic techniques. Broad-spectrum topical microbicide and anaesthetic should be administered prior to the injection. The patient should be instructed to self-administer antimicrobial drops four times daily for 3 days before and after each injection. Not recommended in children and adolescents. **Contraindications:** Hypersensitivity to ranibizumab or to any of the excipients, patients with active or suspected ocular or periocular infections, patients with active intraocular inflammation. **Precautions/Warnings:** Intravitreous injections have been associated with endophthalmitis, intraocular inflammation, rhegmatogenous retinal detachment, retinal tear and iatrogenic traumatic cataract. Therefore proper aseptic injection techniques must be used. Patients should be monitored during the week following the injection to permit early treatment if an infection occurs. Transient increases in intraocular pressure (IOP) have been seen within 60 minutes of injection of Lucentis. Sustained IOP increases have also been reported. Intraocular pressure and the perfusion of the optic nerve head must be monitored and managed appropriately. There is a potential risk of arterial thromboembolic events following intravitreal use of VEGF inhibitors. A numerically higher stroke rate was observed in patients treated with ranibizumab 0.5 mg compared to ranibizumab 0.3 mg or control, however, the differences were not statistically significant. Patients with known risk factors for stroke, including history of prior stroke or transient ischemic attack should be carefully evaluated by their physicians as to whether Lucentis treatment is appropriate and the benefit outweighs the potential risk. As with all therapeutic proteins, there is a potential for immunogenicity with Lucentis. Lucentis has not been studied in patients with active systemic infections or in patients with concurrent eye conditions such as retinal detachment or macular hole. There is limited experience with treatment of patients with prior episodes of RVO and of patients with ischemic branch RVO (BRVO) and central RVO (CRVO). In patients with RVO presenting with clinical signs of irreversible ischemic visual function loss, treatment is not recommended. Should not be used during pregnancy unless the expected benefit outweighs the potential risk to the fetus. For women who wish to become pregnant and have been treated with ranibizumab, it is recommended to wait at least 3 months after the last dose of ranibizumab before conceiving a child; use of effective contraception recommended for women of child-bearing potential; breast-feeding not recommended. Following treatment patients may develop transient visual disturbances that may interfere with their ability to drive or use machines. Patients should not drive or use machines as long as these symptoms persist. **Interactions:** No formal interaction studies have been performed. **Adverse reactions: Very common adverse reactions are:** intraocular inflammation, vitritis, vitreous detachment, retinal hemorrhage, visual disturbance, eye pain, vitreous floaters, conjunctival hemorrhage, eye irritation, foreign body sensation in eyes, lacrimation increased, blepharitis, dry eye, ocular hyperemia, eye pruritus, intraocular pressure increased, nasopharyngitis, headache, arthralgia. **Common adverse reactions are:** retinal degeneration, retinal disorder, retinal detachment, retinal tear, detachment of the retinal pigment epithelium, retinal pigment epithelium tear, visual acuity reduced, vitreous hemorrhage, vitreous disorder, uveitis, iritis, iridocyclitis, cataract, cataract subcapsular, posterior capsule opacification, punctuate keratitis, corneal abrasion, anterior chamber flare, vision blurred, injection site hemorrhage, eye hemorrhage, conjunctivitis, conjunctivitis allergic, eye discharge, photopsia, photophobia, ocular discomfort, eyelid edema, eyelid pain, conjunctival hyperemia, stroke, influenza, urinary tract infection*, anemia, anxiety, cough, nausea, allergic reactions (rash, pruritus, urticaria, erythema). **Uncommon adverse reactions are:** blindness, endophthalmitis, hypopyon, hyphema, keratopathy, iris adhesions, corneal deposits, corneal edema, corneal striae, injection site pain, injection site irritation, abnormal sensation in eye, eyelid irritation. **Serious adverse events:** related to intravitreal injections included endophthalmitis, rhegmatogenous retinal detachment, retinal tear and iatrogenic traumatic cataract. * observed only in the DME population **Packs:** Pack of 1 vial Before prescribing, please consult full prescribing information available from Novartis Healthcare Private Limited, Sandoz House, Dr. Annie Besant Road, Worli, Mumbai- 400 018, Tel: 022 2495 8888 For the use only of a registered medical practitioner or a hospital or a laboratory only India BSS dated 21 July 2011 based on international BSS dtd 10 June 2011

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