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Editorial

Gonioscopy: A demanding skill and an essential part in the management of Glaucoma patients

Gonioscopy is the key to diagnosis of chronic angle closure glaucoma, revealing very narrow angle with apposition between the iris and the trabecular meshwork over most of the circumference of angl[e.1]. It is the clinical technique that allows the structures in the anterior chamber angle to be visualized.

Gonioscopy enables the glaucomas to be divided into two main groups: angle-closure glaucoma and open-angle glaucoma. Because the therapy for each type of glaucoma must be specific to be effective, it is important to determine the mechanism responsible for the restriction of aqueous out flow through the trabecular meshwork. If the correct diagnosis is to be made and successful management instituted, it is essential to be able to visualize the anterior chamber angle

A common cause of an incorrect diagnosis in a patient with glaucoma is the omission of gonioscopy by the clinician who concludes that the patient must have an open-angle mechanism because the slit-lamp examination of the anterior chamber does not suggest a narrow angle. Chronic angle-closure glaucoma and other forms of secondary glaucoma can be overlooked if gonioscopy is not undertaken.

We all agree that the majority of ophthalmologists do not perform gonioscopy in their routine practice. I would definitely salute those few who do practice it and hope this article encourage all to practice routine gonioscopy.

Very often it comes to the mind of a general ophthalmologist in out state that: "Why should I learn to do gonioscopy?" After all, if I have managed a successful practice with a torch (and slit lamp) what is the benefit in adding on one more time consuming examination in busy practice and especially uncomfortable to the patient?

The answer is simple. Just like slitlamp examination, tonometry and ophthalmoscopy, gonioscopy forms part of a complete ophthalmic examination which, we must all be able to perform. This is especially true for the diagnosis and management of angle closures which seem to form the majority of the glaucomas in our country.

Gonioscopy is performed on a patient in order answer at least two questions. The first one is to know Is the angle occludable and the second one is are there any abnormalities in the angle?. The other tests routinely performed to screen for occludable angles are the Flashlight test and the Van Herricks test. But it was found in many studies that these tests are poor predictors for our occludable angles. 2. It is mandatory to gonioscope patients with raised IOP, and glaucoma suspects (suspects for whatever reason) irrespective of the findings of the Flashlight and Van Herricks test. Gonioscopy may need to be done for other reasons like Uveitis, or suspected IOFB.

Some of the uses of gonioscopy are:

1. To make the crucial differentiation between POAG and PACG.
2. To diagnose and provide a prognosis for the congenital glaucomas.
3. To diagnose secondary glaucomas, especially subtle angle recession, uveitic glaucoma and that due to early neovascularization, and irido-corneal endothelial syndromes. The black pigment balls are quite characteristic of resolved hyphema. This sign may be the only indicator of past trauma. Inflamatory peripheral anterior synechiae in cases of uveitis are broad and usually found in the inferior angle. These should not be mistaken for the synechiae caused by angle closure.
4. Unusual causes of glaucoma are the haptic of a posterior chamber lens in the anterior chamber.
5. Other conditions like tumors of the anterior segment, ciliary body cysts, intraocular foreign body, and early detection of a Kayser Fleisher Ring.
6. Gonioscopy can also be used for treatment. A mastery of gonioscopy is necessary to perform argon laser trabeculoplasty (ALT). Gonioscopy is also necessary to follow up on patients who have undergone peripheral iridotomy (PI), trabeculectomy, etc. to shows the iris partially blocking the trabeculectomy opening. Indentation gonioscopy can be used to break an attack of acute angle closure glaucoma.

It is obvious then that each one of us should know how to do a complete ophthalmic examination. Gonioscopy is an important part of a complete ophthalmic examination and we must learn this too: initially, in all patients we see to learn what is normal and then when necessary.

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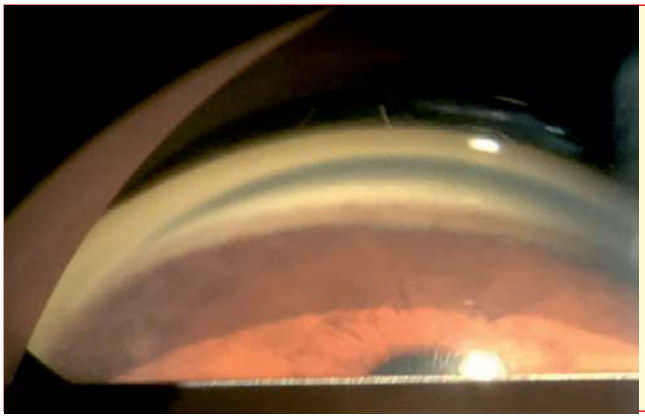
Dr. Naresh Desinayak
Editor , Odisha Journal of Ophthalmology,
JPM Rotary Eye Hospital & Research Institute, CDA, Sector- 6, Cuttack.
E mail: ndesinayak@yahoo.co.in



Cove Page Illustration
Visualisation of anterior chamber angle structures in gonioscopy

Contributed by
Dr. Naresh Desinayak, Consultant Glaucoma,
JPM Rotary Eye Hospital & Research Institute, Cuttack

Management Of Post Operative Endophthalmitis

Santosh Mahapatra, Anuja Mohanty.
JPM Rotary Eye Hospital & Research Institute, Cuttack.

The word endophthalmitis which creates a sense of shrinkage among ophthalmologists needs to be well understood and properly managed to prevent many eyes to go blind. As the origin and causative organisms for postoperative endophthalmitis are different the visual outcome is variable even with most advanced management. Every endophthalmitis case need to be diagnosed at the earliest and should be managed utilizing most recent knowledge, that's why the discussion.

Postoperative endophthalmitis is the most common (62%) type of endophthalmitis, others being Bleb associated (25%), post -traumatic (10%) & Endogenous (metastatic) (<5%) endophthalmitis1.

The incidence of postoperative endophthalmitis has decreased during the past century2. Potential

sources of infection include contaminated instruments or irrigation solutions, but the most common source is the patient's own ocular flora3. Microorganisms from the conjunctival sac can enter the eye during or after surgery through a wound. There are many risk factors underlying postoperative

endophthalmitis. Preoperative risk factors include blepharitis, lacrimal duct obstruction, the wearing of contact lenses, the existence of an ocular prosthesis in the other eye, and secondary intra ocular lens implantation. Intra operative risk factors include inadequate eyelid or conjunctival disinfection, surgery lasting more than 60 minutes, loss of vitreous, use of prolene haptic intra ocular lens, and unapparent or unplanned ocular penetration. Postoperative risk factors include wound abnormalities, inadequately buried sutures, suture removal vitreous incarceration in the surgical wound, and the presence of a filtering bleb. Furthermore, clear corneal incisions during cataract surgery impart a higher risk of infection than scleral tunnel incisions 4, perhaps because a stable, self-sealing incision is more difficult to construct in the cornea than is the sclera. The incision site to clear corneal incisions in the temporal region may also play a role.

Postoperative endophthalmitis may be acute (< 2 wks) or delayed onset (2-4 wks or more).

According to endophthalmitis vitrectomy study (EVS) 5 common causes of acute post operative

endophthalmitis are coagulates-negative Micrococcus (mostly staphylococcus epidermidis) (70%); Staphylococcus aureus (10%), Streptococcus species (9%) Enterococcus species (2%), other grampositive

bacteria (3%), and gram-negative bacteria (6%). Onset is usually within 3 days of surgery, patient usually have light perception vision with a hypopyon of more than 1.5 mm.

Chronic low grade or delayed onset endophthalmitis is usually caused by bacteria of low virulence like propinobacterium acne or by fungi like Aspergilus, Candida & Fussarium4, 6. White plaque at the junction of optic & haptic is a typical feature of propinobacterium endophthalmitis. Primary IOL

removal and total capsulectomy is indicated in

such cases.

In post operative period when the patient complaints of pain and decrease or loss of vision one should have a high index of suspicion and look for any lid edema, conjuctival or cilliary congetion, corneal edema, hypopyon, pupilary membrane / exudates, vitreous cells (in S/L) and most importantly vitreous exudates (in B-Scan when it is available) in variable combination to detect endophthalmitis at the earliest.

These features are of sudden onset and severe in nature in acute, but less severe and of gradual onset in delayed onset postoperative endophthalmitis.

B-Scan ultrasonography is always done for confirming clinical diagnosis, to know the retinal status, and to determine presence or absence of PVD. Commonly B-Scan shows low to medium amplitude echoes in vitreous cavity, a partial or complete PVD, and thickening of retinochoroidal complex in case of endophthalmitis [7].

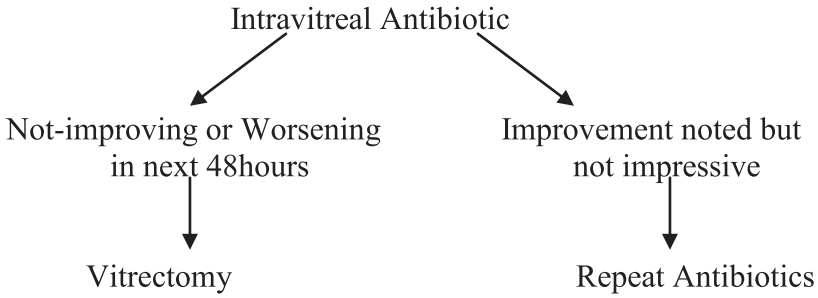
As soon as a clinical diagnosis of endophthalmitis is made a microbiological diagnosis and prompt treatment are the next steps. Microbiological diagnosis is made by taking an AC tap particularly from hypopyon (when intravitreal antibiotic alone is indicated) or a non diluted vitreous sample (when vitrectomy is indicated) [shown in management algorithm] and sending the sample for Grams, Gimsa or KOH staining as well as inoculating them into solid medias like Blood agar, Chocolate agar, Mac-conkey's agar & Sabouraud's Dextrose agar and liquid medias like Thioglycolate broth and Brain & Heart infuson medias. Diagnostic test like rapid antibiotic sensitivity test (RAST) and polymerase chain reaction (PCR) are of much value for early detection and prompt management of

pathogens 8. In rapid antibiotic sensitivity test aspirates are directly inoculated on to the agar plates with antibiotic disks showing results in a very short time. PCR has a higher sensitivity and shorter detection time than conventional staining and culture and particularly useful for detection of fungus.

AC tap is performed under topical anesthesia, after sterilizing ocular surface with 5-10 % povidone iodine entering limbus with 27-30 gauge needle attached to tuberculin syringe. 0.2 ml of sample is to be taken. Now a days vitreous tap is not done as it imparts traction on the retina. Non dilated vitreous sample at the beginning of vitrectomy is collected by connecting a 5 ml syringe to the aspiration tubing of vitreous cutter and applying manual suction while cutting the vitreous keeping the tip of the cutter just behind the center of IOL.

From management point of view post operative endophthalmitis can be divided into 3 categories depending on visual acuity and time of presentation. The following schematic diagram shows the algorithm of management of these categories:

Category I: VA-HM or Better, or Red reflex present (infection < 2 wks)



Note: Definition of Improvement.

1. Improvement of vision, however small it may appear.
2. Reduction or disappearance of Hypopyon after sitting up for 1 hour or more.
3. Clearing of AC
4. Consolidation of the fibrin exudates or shrinking of pupillary membrane.
5. Better Red reflex.
6. Reduction of pain.

Category II: VA > PL, worse than HM or No red reflex

Pars plana vitrectomy + Intravetreal Antibiotics

↓

Worsening in next 48 hours

↓

Repeat Intravetreal Antibiotics

↓

Worsening

↓

Vitrectomy

Category III: Endophthalmitis of 2-4 wks or more

Vitrectomy + Intravitreal Antibiotics + Antifungals

Table I: PREPARATION OF INTRAVITREAL ANTIBIOTICS [9,10]

Antibiotics	Vial size available	Initial diluent	Initial conc.	Volume taken	Diluent added	Final conc.	Final dose	Spectrum covered
Vancomycin	500 gm powder	5ml	100mg/ml	0.1 ml	0.9	10mg/ml	1mg/0.1ml	Gram +ve organisms
Ceftazidime	500mg powder	2.2ml	225mg/ml	01.ml	0.9ml	22.5mg/ml	2.25mg/0.1ml	Gram –ve organisms
Amikacin	100mg/2ml	-	50mg/ml	0.08ml	0.92ml	4mg/ml	0.04mg/0.1ml	Gram –ve organisms
Gentamicin	80mg/2ml	-	40mg/ml	0.05ml	0.95ml	2mg/ml	0.2mg/01.ml	Gram –ve organisms
Clindamycin	300 mg/2ml powder	3ml	100mg/ml	0.1ml	0.9ml	10mg/ml	0.1mg/0.1ml	Gram-ve org. & anaerobes
Amphoterecin-B	50mg powder	10ml(5% dextrose)	5mg/ml [9]	0.01ml	0.99ml(5% Dextrose)	50µg/ml	5µg/0.1ml	Antifungal
Dexamethasone	8mg/2ml	-	4mg/ml	-	-	4mg/ml	0.04mg/0.1ml	Steroid

Vitrectomy enables easy removal of infected materials and enhances assess of antibiotics to retina.

Principles of vitrectomy in endophthalmitis:

Long Infusion canula is usually used.

Not to open Infusion till one can visualize the tip and obtain initial samples.

Initial vitrectomy done using slow manual suction to collect samples.

As the retina is friable minimum suction with maximum cut rates used.

Not to move cutter tip without making sure it does not have vitreous in its port through direct Visualization or use only cutting mode while moving.

Not to attempt complete vitrectomy or to produce PVD.

IOL not removed routinely expect established or suspected cases of fungal endophthalmitis.

Table II: Other Recommended Modes of Therapy in Infective Post Operative Endophthalmitis9, 10

Route of Administration	Drug	Dose
Subconjunctival	Vancomycin	25 mg in 0.5 mL
	Ceftazidime	100 mg in 0.5 mL
	Amphoterecin-B	0.37mg
	Dexamethasone	4-8 mg
Topical	Vancomycin	50 mg/mL drops every hour
	Ceftazidime	50 mg/mL drops every hour
	Amikacin	20 mg/mL drops every hour
	Prednisolone acetate (1%)	1% every 1 to 2 hours
Systemic	Vancomycin	25-50 mg/kg/day 8 hourly IV
	Ceftazidime	100 mg/kg/day 8 hourly IV
	Gentamicin	6 mg/ kg/day 8 hourly IV
	Amphoterecin-B	1 mg/kg/day IV over 6 hours

Inspite of highest surgical care complications like iatrogenic retinal holes, post-op ERM, RD, RD with PVR, hypotony & phthisis bulbi may occur.

Vitrectomy should not be done when the patient has no light perception or spread of infection has caused panophthalmitis Silicon oil, a retinal tamponading agent that has antimicrobial activity, may have beneficial effect in surgical treatment of endophthlmitis associated with RD. It can also be used in some cases of endophthalmitis without RD but only after complete vitrectomy 14.

In case of chronic postoperative endophthalmitis two important retrospective studies, by Aldave et at11 and Clark et at, 12 demonstrated that the injection of intravitreal antibiotics alone is associated with a very high rate of endophthalmitis recurrence. The most effective treatment was vitrectomy, total capsulectomy and the removal of exchange of the intra-ocular lens. The visual prognosis in a case of endophthalmitis depends on a number of variables the most important of which are the initial visual acuity 10 and the virulence of organisms. Other risk factors that can affect the visual outcome include older age, history of diabetes mellitus, corneal infiltration or ring

ulceration, abnormal intra-ocular pressure, rubeosis, absent red reflex, and an open posterior capsule10. Despite successful control of the infection, some patients may develop further ocularcomplications such as opacification of the capsule, retinal detachment, macular pucker, macular infection, and expulsive haemorrhage.13 Better diagnostic procedures, lab investigations and advanced surgical instrumetation along with

better understanding of pathogenesis at molecular level gives us definite edge over earlier management strategies in preventing and controlling endophthalmitis, but the proverb "Prevention is better than cure" is still best applicable for this medical condition.

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Screening and treatment of diabetic retinopathy in tier 2 and tier 3 cities of India– future perspective of a young retina specialist.

Chitaranjan Mishra
Department of Vitreo-Retina, Aravind Eye Hospital, Madurai,Tamilnadu, 625020, India

Introduction to the burden of diabetic retinopathy:

Diabetic retinopathy (DR) is a growing ophthalmic epidemic.The overall prevalence of any DR (in type 1 and type 2 diabetes) is 34.6%, with 7% vision-threatening DR1. Unlike the instantly appreciated outcome of cataract surgery, the visual outcome of DR remains mostly guarded and takes longer duration to achieve.The unawareness of the disease state till it is advanced, increased financial burden for treatment, lack of radical therapy, need for life long follow up and loss of daily man hours for hospital visits add to the concern of DR. Screening of DR in the early stage or even before it starts, helps to curtail the disease process and in better prognosis. General physicians and diabetologists play an important role in this. So, it is evident that screening and management of DR needs to be addressed multidimensionally, is a team work and as an ophthalmologist,the role of a retina specialist as a team leader of the eye care system needs to be played effectively and with responsibility.

Defining area of service:

Every eye hospital has fairly well-defined service area2. Though all the ophthalmic residents and trainees aspire to be trained in one of the tertiary eye care hospitals, not all of them will be destined to work in tier-1 cities; many has to serve in the tier-2 and tier-3 cities (in fact the later are the less explored areas in ophthalmology practice). However, these areas are having inherent barriers e.g. less populationdensity and more challenges in health care delivery. So, let's intend to discuss the points keeping the later geographicalareas in mind.

The retina team:

In a hospital set-up, it is always better to have a team of retina colleagues. However, in case of only one or two retina surgeons in the team, training of junior colleagues/fellows/ residents for lasers andinjections is crucial for effective DR management. Presence of well-trained nurses is a big help both in the medical and surgical retina procedures.

Role model:

The importance of physical exercise and good dietary habit in addition to the anti-diabetic medications will only be received if the physician himself maintains physical fitness and does regular exercise. Regular work outs, breathing exercises, healthy food and mental relaxation of the leader helps the team follow this and to influence the patients.

Hospital fee structure:

Proper surgical and medical management is the key for a happy patient and a happy doctor. However diabetic vitrectomies are challenging and lasers and injections need frequent visits. So, in addition to presence of a VR surgeon, subsidised fees for repeat surgeries, lasers and injections in selected cases decreasethe patient anxiety and grief. The free section in the hospital and the additional provision of free OPD coupon for the subsequent visits or for their friends will

increase patients' foot fall in the hospital.

Sharing the story of DR patients:

Good stories (aided by emotional videos) of the patients improving their vision with proper interventions will boost the morale and pathetic stories of non-compliant patients who lost to follow up will caution the offending patients in the clinic. This video assisted education can be done in the counsellor's office. This will increase the follow up visits and will prevent the patients from being 'lost to follow up '.

Cooperation with fellow ophthalmologists

Good professional relationship with other colleagues in the city in the form of reply to their referrals, sending back the cataract cases etc. will encourage patient referrals and increase the trust on the referring doctor.

Involvement of physicians, AYUSH doctors, paramedics and chemists:

As we all know that the first contact of the diabetic patients occurs with the general physicians, the awareness about DR among this group of medical fraternity is crucial for patient referral from them. Installation of a fundus camera in their clinics, proper care and reply to their referrals, conduction of CMEs involving them etc. are few steps to increase their involvement.

Role of tele medicine - the vision centre concept:

Since there is scarcity of ophthalmologists and retina specialists in particular, the concept of “vision centre” is a very good alternative. Interested boys or girls in particular can be chosen from the same community, trained in base hospital and can be given charge of a vision centre at a village/ panchayat level (one for 50,000 populations). In the selection process, some of the key elements to be judged are aptitude to work with others, capacity for hard work and being self-driven. One of these staff can be trained to take a fundus photo with a slit lamp mounted camera, can send to the base hospital and get a report of it which can be conveyed to the patient there. This concept is already in practice and doing well in big tertiary hospitals like Aravind eye care system and LVPEI3. The referral patients for DR along with cataract and refractive error can indirectly support in revenue generation.

DR screening camps:

Screening camps with the help of individual sponsors and NGOs can be done jointly with the physicians in targeted population to refer the sight threatening DR cases and also to educate the other diabetics about the importance of regular check-up. A separate camp section with regular meetings and feed backs by the team leader is crucial to this.

Government policy making:

In government level, there can be a rule for all the diabetics to get their retina check-up done else they cannot get the treatment of diabetes. Instalment of a non-mydriatic camera in the general medicine departmentwill help to screen the target populations effectively. There are existing health schemes like Ayushman Bharat Yojana, RSBY etc. Additionally, provision for coverage of intra-vitreal injections, laser procedures and diabetic vitrectomies under state run health schemes will benefit the public a lot. A good rapport of an influential ophthalmic leader with the administrative people will further the process of release of the funds from the sanctioning authority.

Public education:

The educational material on DR can be sent via

electronic media, print media, and social networks faster than before. Talks by the ophthalmic leader in local meetings, TV Shows, radio talks, regional IMA meetings etc. at regular intervals and on special days e.g. world diabetes day etc, will help the community aware about DR and also about the base hospital of the leading doctor where they should get their retina checked.

AIOS, YOSI, LDP, ARC collaborativework:

If the leader of the ophthalmic team is an active member of the national and state level forums, then he/she will be better accepted among the peer group and the patients. Regular presentations (paper/ poster/ talks etc.) and interaction with peer group in these forums helps a lot.

Collaboration with international funding agencies:

There are various international and national grants and awards who support DR screening and management. To name a few they are the new World Medical Project Award, World Diabetes Foundation, International Diabetic Federation, Lions Club International Foundation, Fight For Sight, The International Retina Research Foundation etc. Local corporate sectors can be approached for their support in the noble cause of battling the DR. If the agencies get proper report of the utility, there is no reason for them to step back in future times.

Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL) and Big Data:

All these interchangeably used but differently defined terms (AI, ML, DL) are taking the lead in the field of DR screening without the direct assistance of any trained medical personnel. A number of programs have been developed for the automated detection of DR, known as automated retinal image analysis systems (ARIAS)4. The collaborative work of Google along with 3 tertiary eye hospitals in India (Aravind, Sankara Nethralaya and Narayana Nethralaya) has gone a long way in this regard5.Now the patients can be diagnosed in to non-serious (mild NPDR) and serious DR (rest of the DR) with the help of AI. The future retina specialist should look forward to more developments in this.

Low Vision Aids:

Unfortunately, in spite of best possible care, some DR patients' vision deteriorates to legal blindness who can be given ambulatory vision with the help of low vision aids. So, presence of a low vision aids department, albeit small, will offer some ray of hope to these patients.

Studies and molecular research:

DRS and ETDRSconducted in the 1970s and 1980s respectively, defined the management guide lines to prevent the vision loss. Recently, after the success of anti- VEGF treatment, there is more focus on inflammatory mediators like IL-6, TNF -alfa, CRP etc. The enthusiasm of the retina specialist to conduct some of the important path breaking studies will help the diabetic retinopathy literature grow stronger.

To conclude, screening and management of DR needs a multidisciplinary and non-traditional approach. A future retina specialist has the responsibility to deliver this duty effectively and has the privilege to be credited as one who cordoned off this deadly disease.

“The significant problems we face today cannot be solved at the same level of thinking we were at when we created them.” - Albert Einstein (1879–1955), Physicist and Nobel Laureate.

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NB : The original version of this manuscript was placed among the top 10 of all the submitted manuscripts in AIOS- YOSI writing competition under the title ' How can I contribute to screening and treatment of diabetic retinopathy as a future ophthalmic leader ?' in AIOS 2019 .

Femto-Laser assisted cataract surgery in challenging cases

Sanchi Vohra1, Prof.Mahipal S. Sachdev1, Hemlata Gupta1, Raghav Malik1
Centre for Sight Eye Institute Sector 9,
Dwarka, New Delhi

Cataract surgery is the most commonly performed ophthalmic procedure worldwide with approximately 18 million cataract procedures being performed globally every year [1]. The World Health Organization estimates this number will increase to 32 million by the year 2020 [2]. Rapid advances in cataract surgery have now shifted the spectrum of cataract surgery from a purely vision restoration procedure to a "phaco-refractive" procedure. Femtosecond laser assisted cataract surgery (FLACS) has been at the forefront and rapidly gaining popularity ever since its commercial availability in the year 2010 [3]. Presently, femto laser is used to accomplish four steps in cataract surgery: Construction of corneal incisions, continuous curvilinear capsulotomy (CCC), nucleus fragmentation and creation of limbal relaxing incisions to correct astigmatism [Figure1].

The currently available femtosecond laser devices use a neodymium:glass, near infrared laser with a wavelength of about 1053nm. This highly coherent beam of laser is focused at 3 μm spot size with accuracy of within 5 μm in the anterior segment [4]. It uses pulse duration of 400–800 femtosecond; the energy range is in μJ, which is usually less than in YAG capsulotomy, in which the surgeon uses 1–3 μJ. During surgery of the crystalline lens, femto second laser energy can be increased maximally to 10–15 μJ. The photodisruption effect is achieved when the sharply focused beam of the femtosecond laser hits the tissue with ultrashort duration and generates plasma within the affected tissue. The plasma expands at high speed in a shock wave form and displaces the surrounding tissues. With time, the plasma cools down and so-called cavitation bubbles are formed. At the tissue level, photodisruption occurs within the laser's focal point without any heat development or damage to the collateral tissues. Based on the photodisruption principle, femtolasers for cataract surgery can create tissue separation and very precise cuts within the cornea, the lens capsule, and within the crystalline lens [4, 5]. FLACS with lens implantation offers potential advantages over manual phacoemulsification surgery including a controlled, precise means of creating a capsulotomy and a reduction in ultrasound power needed to complete phacoemulsification following femtosecond laser lens fragmentation [6, 7, 8].

[Figure 1: CATALYS (Optimedica)]

In routine cases, FLACS has been shown to be comparable or superior to manual phacoemulsification [6, 7, 8]. In addition, patients with non-dilating pupils, subluxated cataracts, pediatric cataracts and glaucoma were initially considered as absolute contraindication to FLACS. However, with the advances in technology as well as surgeon experience, a number of these challenging cases can now be successfully managed with FLACS. Active uveitis, thick scarred cornea, patients with active movement disorders like Parkinson's disease, older patients with significant kyphosis or scoliosis are still regarded as contraindication for this technology as complete laser penetration and docking are not possible in these cases. The literature on application of FLACS in complicated cases is sparse. In this review article we emphasize on the role of FLACS in certain challenging cases.

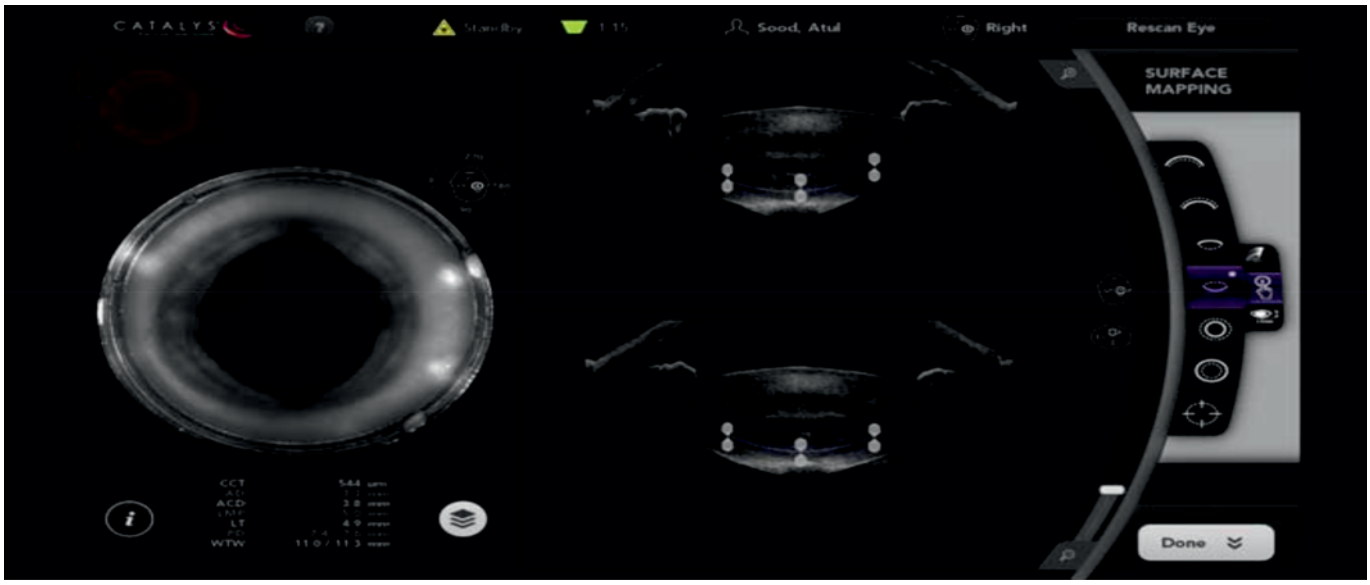
1.1 Posterior polar cataract

Posterior polar cataracts often pose a challenge to surgeons as these have a propensity for posterior capsule dehiscence and weakness. Therefore, hydro-dissection is usually avoided in these eyes because a rapid fluid wave can lead to sudden build-up of hydraulic pressure in the capsular bag, thereby rupturing the already weakened posterior capsule. Femtosecond laser can also be performed in the presence of posterior polar cataracts. The important caveat to remember is to align the posterior most plane of femtosecond dissection 800 -1000 microns above the plane of the posterior capsule [Figure 2]. This helps reduce the energy delivered close to the posterior polar plaque and subsequent splitting of the capsule.

Vasavada et al have described a technique of femto-delineation in such cases, which involves creation of multiple nuclear layers or zones that act as shock absorbers during surgery. Because no hydro procedure is performed, the risk for build-up of hydraulic pressure within the bag is eliminated. The procedure described involves the creation of three cylinders within the nucleus which creates three distinct layers of demarcation from the centre of the nucleus towards the periphery, shielded by a fourth

peripheral epinuclear layer. The width of the cylinders can be modified manually, and an offset of at least 500 mm from the posterior capsule is preset based on the OCT view. This further helps to safeguard the potentially fragile posterior capsule from injury. Femto-delineation in posterior polar cataracts creates multiple layers of delineation and provides greater protection to fragile posterior capsule in these cases [9, 10]

[Figure 2: POSTERIOR POLAR CATARACT]

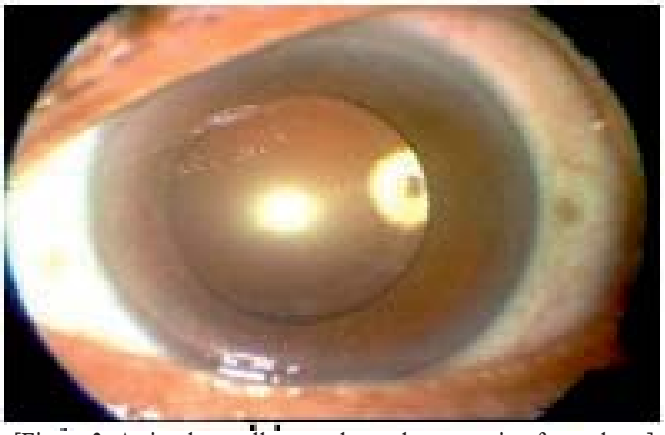


1.2 White cataract

White cataracts often present a challenge in creating an adequately sized continuous curvilinear capsulorrhexis. The increased incidence of capsulorhexis-related complications in white cataracts is often associated with posterior capsular rent, vitreous loss, and nucleus drop. FLACS may be especially advantageous in such cases as it allows the speedy creation of a precise and intact capsulotomy and effective cut through tenacious fibres in anterior capsule fibrosis, all of which helped minimise the risk of capsulotomy run-out (Figure 3). Some white cataracts harbour a thick brunescent nucleus beneath a thin rim of white cortex which can be challenging especially when the CCC is also small or the zonules are weak. In contrast, having the femtosecond laser cut the capsule spares the zonules and readily achieves a good-sized capsulotomy.

However, microadhesions /incomplete capsulotomies have been reported. It results from the explosive egress of white milky fluid on initiation of the capsulotomy, which obscures the visual field and hampers the subsequent delivery of the laser at the same plane. The release of the intralenticular pressure after initiation of the capsulotomy causes a slight change in the position of the anterior capsular plane and hence may result in the occurrence of incomplete capsulotomy. During the lifting of the capsulotomy flap with the microcapsulorhexis forceps, the areas obscured by the white milky fluid during femtosecond laser application should be carefully assessed, as they are likely to have microadhesions [Figure 4]. It is imperative to use trypan blue dye to stain the anterior capsule in all cases to delineate the area of

microadhesions or incomplete treatment pattern. In such cases, the free edge of the capsulotomy should be grasped with the help of microcapsulorhexis forceps and a circumferential motion tracing the capsulotomy margins can be performed. This crucial step ensures the effective release of the underlying residual adhesions in femtosecond laser-assistedcapsulotomies. Titiyal et al reported the continuity and circularity of the capsulotomies in 97.5% (39/40) cases of white cataract undergoing FLACS [11]. Furthermore, the nucleus fragmentation in hypermature cataracts is often suboptimal due to inability of the laser to penetrate through the cortical fluid. Nevertheless, in most occasions it provides sufficient grooves that aid in the subsequent chopping and emulsification of the nucleus. Various studies too have reported FLACS to be a safe option in such cases [12, 13].



[Figure 3: A circular, well-centredcapsulotomy using femto-laser].

[FIGURE 4: Egress of white milky fluid]

1.3 Pediatric cataract surgery

Due to increased capsular elasticity, a more anterior lens position, and a smaller anterior chamber (AC), creation of a curvilinear anterior capsular opening can be challenging and runaway capsulorhexis are frequently encountered during pediatric cataract surgery (14, 15). Pediatric cataract may therefore be an important field of application for FLACS. It has proven to be a useful tool for achieving a centered, continuous, and adequately sized anterior capsulotomy [16]. However, there are two problems often encountered. Firstly, interface docking procedure may prove to be difficult in children because of small eye size and poor cooperation. However, in a recent study, docking was successful in children at least 6 years of age under topical anesthesia [17].

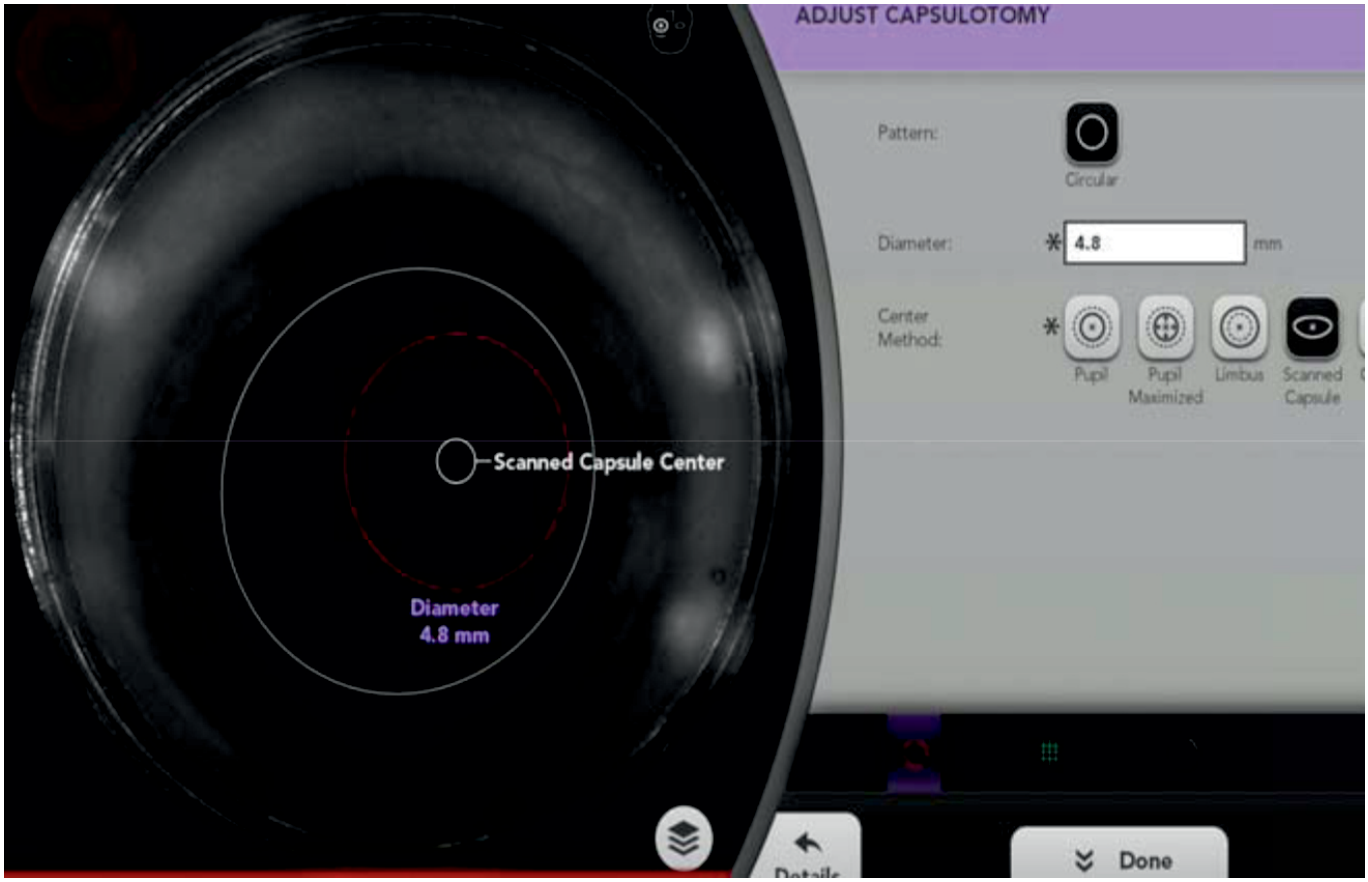
Secondly, it has been reported that due to higher elasticity, the size of the capsulotomy may considerably widen immediately after laser treatment [16]. In order to address this, the Bochum laser formula has been reported for pediatric cataract. It has the potential to become a valuable tool in achieving safe anterior and posterior capsulotomies of an exact pre-calculated diameter [18].

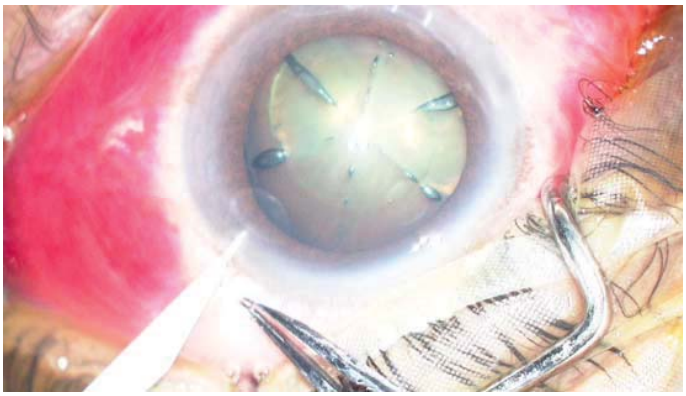
1.4 Traumatic and subluxated cataract

Traumatic cataracts are often associated with subluxation as well as accompanying zonular damage. In such cases the risk for further zonular damage and lack of adequate counter-traction makes it difficult to perform a manual capsulorhexis. FLACS may have a potential advantage in such cases as it is not dependent on zonular counter- traction for capsulotomy

creation. In addition, its ability to create a capsulotomy and fragment the lens in a closed chamber without creating corneal incisions, further minimizes intraocular manipulation and zonular stress.

The size of the capsulotomy has to be determined by the size of the pupil as well as the extent of decentration of nucleus. Previously, the capsulotomy treatment band had to be manually adjusted to accommodate any lens tilt. However with subsequent improvement in the software, the femtosecond laser is able to automatically detect and treat a tilted lens, thereby, circumventing this problem. In addition, the Catalys' scan capsule mode through the use of x- and y-axis sectional scanned images provides an imaginary line of the crystalline lens seen from the anterior and posterior capsule and the midpoint of scanned capsule is used for capsulotomy centration. Also, it creates safety margins when performing anterior and posterior lens capsule lens fragmentation [Figure 5]. Nagy et al have reported successful femtolaser application in cases of ocular trauma with anterior capsular rupture [19]. Similarly, Chee et al. demonstrated successful application of FLACS in cases with more than 6 clock hours of zonular weakness associated with subluxated cataract [20]. Femtolasercapsulotomy helps to create a central and round-shaped capsulotomy without extending the traumatic capsular rupture to the posterior capsule.



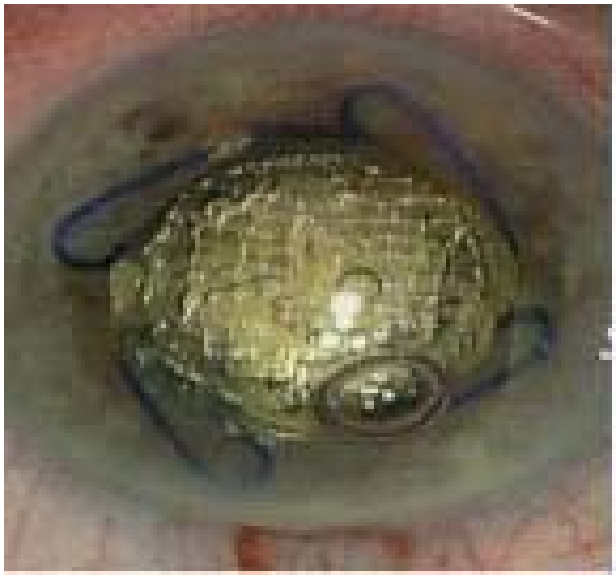


1.3 [FIGURE 5: Scanned capsule mode]

1.4 Small pupil

Suboptimal pupillary dilatation can be associated with ageing, pseudoexfoliation and floppy iris syndrome. Also, during FLACS, photochemical photo disruptive process results in aqueous humor prostaglandins elevation [21]. Subsequently, in some patients, prostaglandin-mediated intraoperative miosis occurs. However, NSAIDs administered topically 1–3 days before FLACS significantly reduced the chances of pupil constriction following femtosecond laser delivery into the eye [22]. Cases with small pupil present a challenge in FLACS, since the pupil must be able to dilate sufficiently to make an adequately sized capsulorhexis. The default diameter for the capsulorhexis is generally 5.0 mm; however, the diameter can be reduced to compensate for the smaller pupil. Capsulotomy is possible in the case of a 5.0 mm diameter central pupillary area, but because the edge of the iris is within 1.0 mm, the chance of hitting the pupillary edge is high. In moderately dilating pupils, manually adjusting the rhexis size on the OCT console helps achieve a capsulotomy and nuclear fragmentation within the confines of the rhexis diameter.

For non-dilating pupils, Malyugin rings offer a good solution [figure 6] [23]The ring should be placed into the anterior chamber, the viscoelastics removed, and the wound temporarily sutured with a 10/0 nylon. After performing capsulorhexis and fragmentation, surgery is similar to normal dilated cases. If pupil expansion ring is used before FLACS, the surgeon should pay special attention to fill anterior chamber completely with OVD without bubbles in the anterior chamber that may block laser energy.



[Figure 6: Femtosecond assisted capsulorhexis and nucleus fractis following Malyugin ring insertion]

1.5 Post retinal surgery

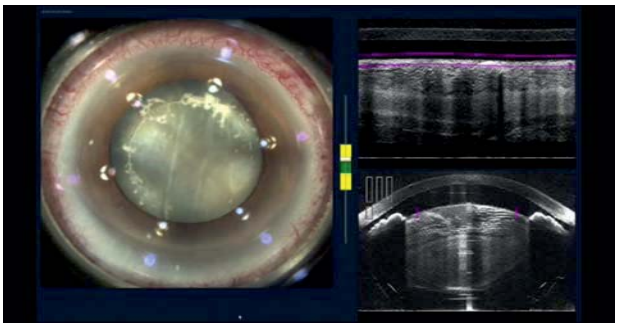
In cases of vitrectomized eyes FLACS offers a theoretical advantage by ensuring efficient and precise laser corneal incisions, anterior capsulotomy and lens fragmentation. This especially holds true for cases with high axial length which may often be associated with zonular deficiency and capsular bag instability. In addition, vitrectomized eyes are known to be predisposed to anterior capsular contraction in the long run [24]. By ensuring the creation of an adequately sized CCC with femto-laser, this

complication is likely to reduce. However, performing femto-laser in cases with silicone oil may be tricky. Recenty two cases of FLACS were reported following previous retinal-detachment repair using silicone oil that was subsequently removed. The presence of silicone oil in the anterior chamber prevented delivery of the femtosecond laser treatment through the affected area, resulting in incomplete capsulotomy and lens fragmentation in both cases. If diagnosed preoperatively with gonioscopy or anterior segment OCT, it is a relative contraindication to FLACS because of the likelihood of resultant capsular tags and/or incomplete capsulotomy [25,26].

1.6 Glaucoma and shallow anterior chambers

FLACS requires the application of a suction device to stabilize the laser head and focus the laser beam accurately. Further- more, femtosecond laser pretreatment leads to the production of plasma in the anterior chamber resulting in expansile cavitation bubbles. These factors may result in a significant transient elevation in intra-ocular pressure (IOP), which poses potential risks for patients with pre-existing glaucoma. During FLACS, human studies have demonstrated that the IOP at the stage of suction docking were less than 30 mmHg with liquid interface systems such as Catalys[27] and over 40 mmHg with the Victus platform[28]. Although large scale studies analyzing the long term impact of this transient IOP rise in patients undergoing FLACS are lacking.

Cataract surgery in a shallow anterior chamber (AC) could lead to intra- operative difficulties and might cause greater damage to the AC structures, including the corneal endothelium and the blood–aqueous barrier. A recent study compared FLACS and conventional phacoemulsification with regards to corneal endothelial injury and AC inflammation in eyes with shallow ACs. It concluded that in eyes with shallow ACs (AC Depth < 2.5), performing FLACS led to a reduced cumulative dissipated energy intra-operatively. Postoperatively, in the first week, the FLACS group maintained clearer corneas in a higher number of eyes as well as lower increase in central corneal thickness, lower AC inflammation and better visual acuity. However, both groups were comparable in all parameters by the end of the first postoperative month [29]. Successful use of FLACS in a case of phacomorphic glaucoma with shallow anterior chamber has also been reported [30] [figure 7].



[Figure 7: Phacomorphic glaucoma]

1.7 Low endothelial count

Corneal endothelial cell loss has been reported to be significantly lower in FLACS compared to phacoemulsification [7]. This makes FLACS more suitable for fragile corneas such as post corneal transplant cases, endothelial dystrophies, or patients with low endothelial cell count.

Similarly, cataract surgery after penetrating keratoplasty (PKP) poses certain challenges in terms of corneal endothelial cell loss and corneal edema commonly encountered after traditional phacoemulsification cataract surgery. Cao Det al reported the use of FLACS in a case of hard cataract post PKP. They concluded that the use of

femtosecond laser allows precise incisions, controlled capsulorhexis and reduced the amount of ultrasound energy required for lens removal. It reduced potential complications in cataract surgery after PKP and improved visual recovery and refractive results [31].

Conclusion

Femtosecond laser assisted cataract surgery offers certain advantages over manual phacoemulsification in terms of precision and efficacy and at the same time reduction of intra-operative as well as post-operative complications in the management of a variety of complex cases.

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MANAGEMENT OF LID LACERATIONS

Pushpakumari
Senior Deputy Director, Ispat General Hospital, Rourkela, Odisha.

Introduction:

Eyes have been the most precious sensory organ for the function of vision expression and beauty. Eyelids are not only protective curtains in front of eyebut it also gives shape and beauty to the face. Beautyof eyes lies in the perfectly contoured and aligned lids. Purpose of lid repair is not only anatomical alignment but also to have functional and cosmetic outcome. So every lid injury should be meticulously repaired at proper time.

Cardinal rules to manage lid trauma

First we have to stabilize patient by caring ABC (air, Breathing and Circulation). Once patient is stabilized we will take a careful history regarding time, courseand circumstances of injury. Record the best visual acuity of each eye . Detailed wound examination like depth and extent of lid injury, globe involvement and orbital fracturesshould be done. Appropriate radiological studies like CT for FB and fracture, MRI for soft tissue involvement should be requested. Preoperative and post operative Clinical photograph for documentation and medico legal purpose is a must. Best possible primary repair is to be ensured. Before going for lid repair brief knowledge of classification is essential for better management.

Classification of Lid injury

1. Blunt trauma- Ecchymosis

2.Laceration- a) partial thickness b) full thickness c) with or without tissue loss d) cannalicular injury

3. Penetrating injury- a) Lid margin involvement b) with or without tissue loss

c) cannalicular injury d) intra ocular and orbital injury

Goals of Lid trauma management

a) Good anatomical and functional integrity of lid b)Adequate coverage of eye and no lagophthalmos c) Cosmesis with regard to color and symmetry.

Basic principle of plastic Repair

a) Conservative debridement of the wound b) Use of small caliber suture and placement of suture 1mm on either side of incision at interval of 3mm .c) Eversion of wound edges and early suture removal to prevent scar mark

Points to be taken care during Lid repair

Presence of orbital fat indicates violation of orbital septum Lacerated orbital septum never to be sutured to prevent retraction of lid Injured orbital septum warrants Levator Palpebral Superioris (LPS) exploration. According to history superficial and deep foreign body should be searched meticulously before repair of deep layer.

Who can Repair

1. Any General ophthalmologist having good knowledge of lid anatomy and experience.
2. If margin, tissue loss, lacrimal drainage and canthal ligament involvement – Oculoplastic surgeon

Timing of Repair

Every effort must be made to reconstruct the injuredt issues as soon as possible. However management of life threatening injuries takes precedence. Primary repair can be done even after 24 -48 hrs after the patient is stabilized.

Excellent blood supply in the eyelid region allows tissue to survive.

Anaesthesia

Majority of lid lacerations can be repaired under localana esthesia. Facial block can be supplemented. How ever extensive injuries which need considerable time for reconstruction should preferably be under taken under general anaesthesia.

Techniques of Lid Repair

Anterior lamellar defects not involving lid margin.

Primary closure with undermining can be performed if redundant skin exists

adjacent to the defect. Meticulous closure without tension is attempted. If required undermining of the surround ingskin done to mobilize skin for adequate closure. As eyelid skin has extensive blood supply, even apparently

necrotic eyelid skin survives after repair. Preservation of tissue done by avoiding unnecessary excision.

Myocutaneous flapsin the periocular area are formed of skin and orbicularis muscle that is dissected off the underlying orbital septum and stretched into position over the anterior lamellar defect. Because myocutaneous flap uses tissue adjacent to defect, the match for colour and texture is good. Since this flap brings its own blood supply, bare bones or free grafts can be covered.

Free skin grafts are harvested from a donor site and transferred to fill an anterior lamellar defect. Vascular supply to the free graft must be provided by rec ipient sitefor the graft to survive.

Full thickness skin graft (FTSG) employs entire thickness of epidermis and dermis harvested from donor site. Uppere yelid skin is the best choice for reconstruction of eyelid defects. Other sites for harvesting FTSG include

retroauricular or pre auricular skin, supraclavicular skinand upper inner arm skin. **Split thickness skin graft (STSG)** is seldom used in eyelidreconstruction. Itis useful when a large area of skin needsto be covered and no myocutaneous flap can be mobilized. With STSG, the colour, texture and thickness are often a poor match for eyelid skin.

Eye lid margin repair

Eyelid laceration involving lid margin requires meticulous approximation to avoid notching which cause functional and cosmetic problem. The wound should be carefully inspected to identify tarsus and lid margin landmarks like

gray line, anterior lash line and posterior margin. If wound is ragged, freshening the edges with a scalpel blade may aid in structure recognition and apposition. Repair should be carried out preferably under operating microscope. Repair of lid margin is done with three vertical mattress suturesusing a non-absorbable 6-0 silk on a cutting needle. The first bite is taken in the plane of meibomian glands approximately 3 mm from wound edge and 3 mm deep. The superficial bites are placed 1.5 mm behind and below the lid margin. The suture is pulled to determine whether a satisfactory approximation of the margin edges has occurred. A good apposition

with slight margin eversionshould be the goal. Two more sutures are passed in frontand behind to approximate anterior and posterior lidmargin. These sutures are tied and left long. The tarsus isnext closed with fine, interrupted, partial-thickness sutures,

such as 6-0 Vicryl. The anterior lamella of the eyelid isclosed next, with interrupted sutures using 6-0 silk. Thelong margin sutures are tied through these skin sutures toprevent the suture ends from abrading the cornea. Sutures are removed after approximately 2 weeks.All tarsal irregularities at the wound edges should betrimmed to allow good tarsal-to-tarsal approximation alongthe entire vertical height of the tarsus to prevent tarsal

buckling. This converts the lid defect into a 'pentagon'which is sutured as described above. Failure to achieveproper alignment leads to post-operative notching of lidmargin.

Eyelid injuries with tissue loss.

Full thickness eyelid defects with tissue loss is classifieddepending onhorizontal extent of defect into -

Small defects (< 1/3)

Medium defects (1/3 to 1/2)

Large defects (>1/2)

Repair of small defects(< 1/3 of horizontal length)

Direct closure(figure-7)

If either the upper or lower eyelid has sustained a fullthickness injury that results in less than 1/3 loss of tissueincluding the eyelid margin, the repair can generally beclosed primarily. In older patients, because of increasedeyelidlaxity, primary closure of both the upper and lowereyelid may be accomplished for injuries that have up to40% tissue loss. However, it is often necessary to "freshenup" the eyelid margins prior to reconstruction. Direct

closure carried out as described for eyelid margin repairabove.

Lateral canthotomy and cantholysis

When direct closure is attempted, additional horizontallengthening is provided by lateral canthoto my andcantholysis. In lateral canthotomy, horizontal limb of Yshaped lateral canthal ligament is incised. For cantholysis, inferior or superior crus of lateral canthal tendon is incised and separated from the bony attachment and lid mobilized.Technique is particularly useful to prevent suturing undertension where laxity of tissue is less.

Repair of moderate defect (upto 1/2 of horizontal length)

In old patients or patients with lax skin, mobilization ofeyelid with lateral canthotomy and cantholysis as described above can be done to cover defects upto 50% of lid length. Tenzel semicircular flap(figure-8) is useful for reconstruction of upto 50% lid defects. It can be used for both upper lid and lower lid defects wheresome tarsus remains on either side of the defect.A high archedsemicircular flap of skin and orbicularismuscle is rotated from lateral canthus after lateralcantholysis. The flap has vertical diameter (approximately22 mm) more than horizontal diameter (approximately 18mm). For upper lid defects the semicircle extends inferiorlyand for lower lid the semicircle extendssuperiorly. Afterundermining of the tissue the lid is pulled medially anddirect closure of wound margins carried out. New lateralcanthus created by suturing part of the new lid with intactlimb of lateral canthal tendon.

Repair of large defects (> ½ of horizontal length) Cutler Beard Bridge technique (figure-10) is originally described for reconstruction of the upper lid; thistechnique can be used for reconstruction of the lower liddefect also, a procedure known as reverse Cutler- Beard.Cutler Beard procedure is done in two stages. In first stage,after measuring the upper eyelid defect, a three-sidedinverted U shaped incision is marked on the lower eyelid,about 5 mm below lid margin. After giving full thicknessincision, the lower lid flap is pulled under the bridge oflower lid and sutured in layers to the upper lid defect. Sincethis flap is devoid of tarsus, autogenous cartilage from ear

can be used. Separation of the flap is done 6 weeks to 3months later as second stage surgery. After cutting the flap, lid margin of newly formed upper eyelid is sutured withconjunctiva covering the free margin.

Hughes tarsoconjunctival flap technique (figure-9)

It is partial thickness posterior lamellar flap harvested fromupper lid to cover lower lid defects. After everting upperlid, incision is made through tarsus 4 mm above lid marginand flap is mobilized. Flap is sutured with lower lid tarsus tocreate posterior lamella. Sufficient skin to cover the anteriorsurface of theflap can be obtained either by harvesting afull-thickness skin graft or by advancing a myocutaneousflap from surrounding skin .

Mustarde cheek rotation flap

It is reserved for the reconstruction of very extensivelower eyelid defects usually involving more than 75% ofthe eyelid. A large myocutaneous cheek flap is dissectedand used in conjunction with an adequate mucosal lining

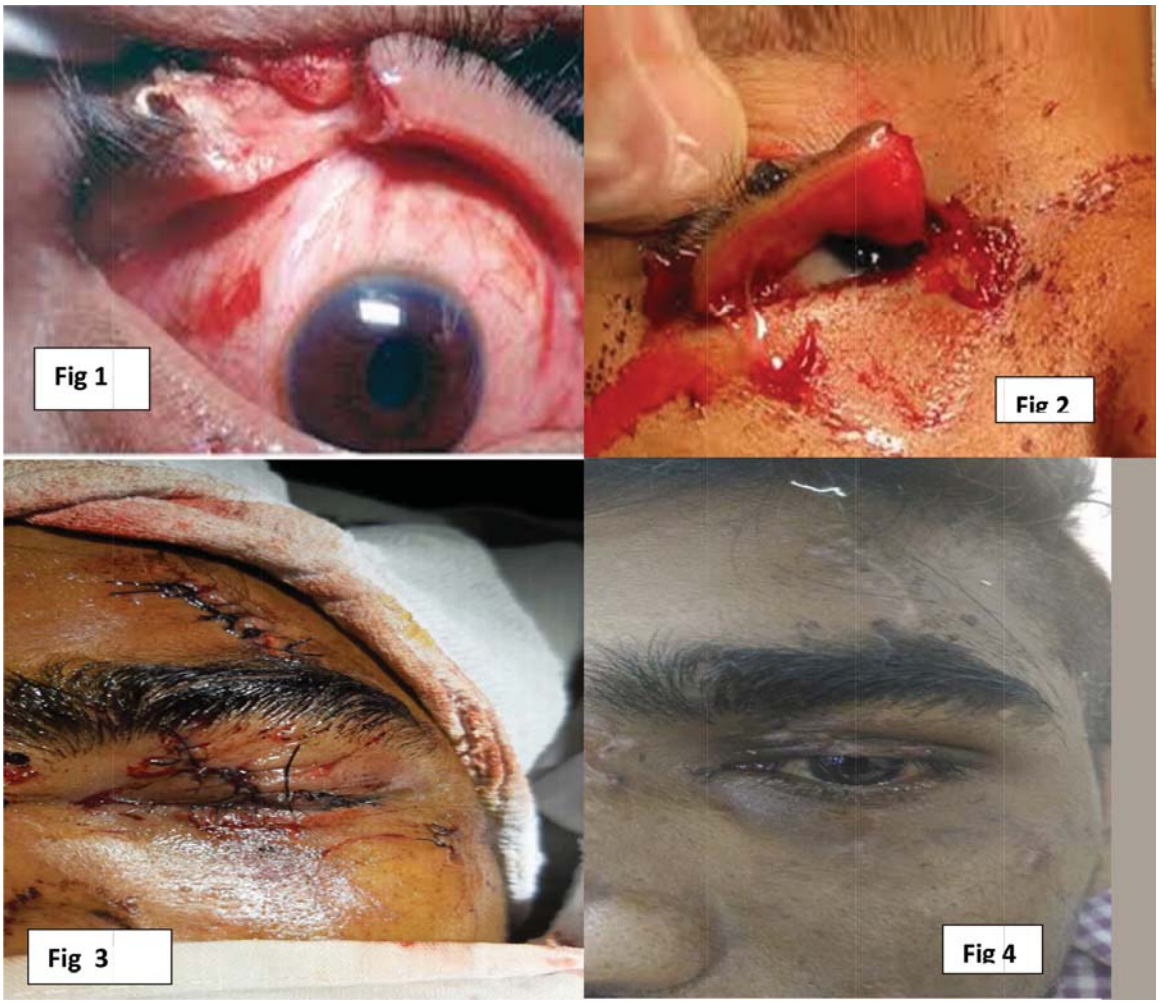
posteriorly. A deep inverted triangle must be excised belowthe defect to allowadequate rotation of the flap. The side ofthe triangle nearest the nose should be practically vertical.The advantage of this procedure is that it is a one-stage, completelower lid reconstruction.

Repair of Canalicular laceration

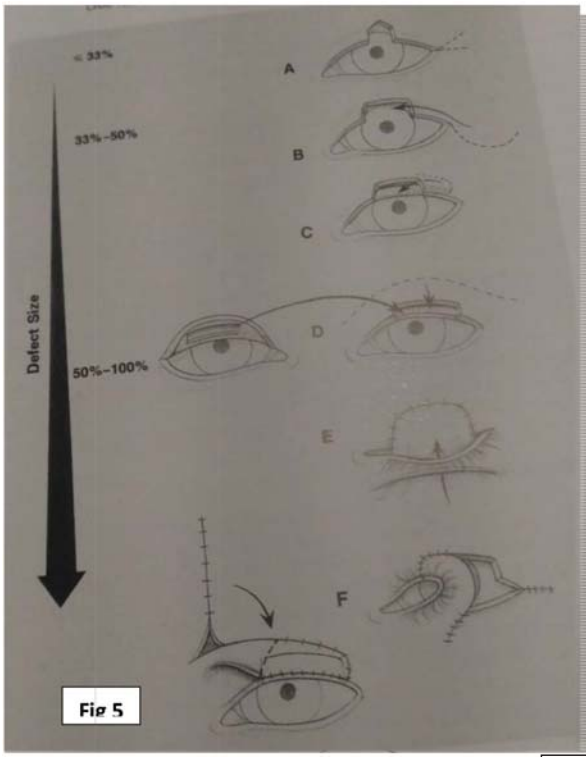
Eyelid injuries involving medial canthal region can lead tocanalicular injury. All canalicular lacerationsneed to be repaired whether upper or lower. Repair has tobe undertaken under operating microscope.Identification and retrieval of proximal end of canaliculus ismost difficult step. Gentle traction at edges of wound withcotton applicator stick under high magnification will help.If it is difficult to identify, gentle irrigation of fluid or airinjection through uninjured

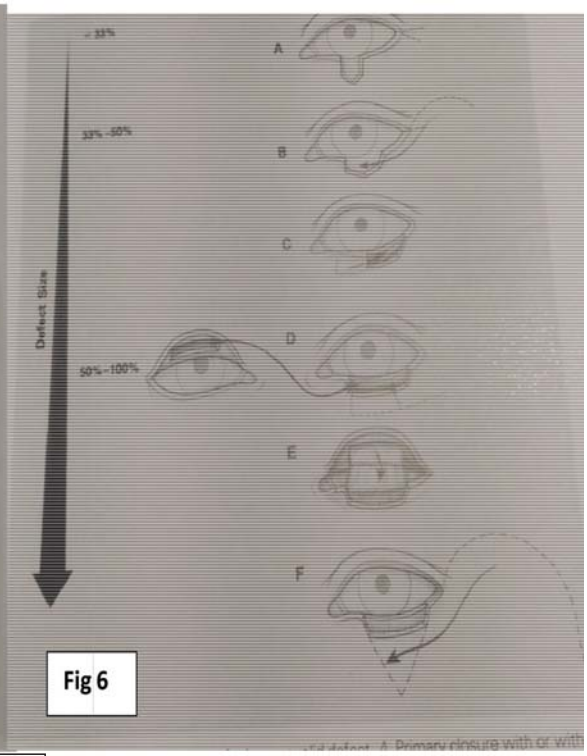
canalicular system can help in identification of the cut end. Dyes like methylene blue ordiluted fluorescein can also be used. Use of pigtail probe has a high incidence of damage to uninvolved canalicularsystem especially in inexperienced hands. If proximalend cannot be retrieved, eyelid should be closed without further manipulation. After identification of cut ends, canaliculus has to be stented using either monocanalicular (Minimonaka) or bicanalicular(Crawford) stents. Minimo nokamon ocanalicular stents arenow available with excellent post-operative results. It hasself retaining cap which sits at punctum giving it excellentstability and avoids extrusion or displacement of stent. It also has advantage of not disturbing uninjured can aliculus.Only disadvantage is the high cost of stent. If nothing isavailable,Angiocath I/V cannula 22 gauze can be used tostent canaliculus.

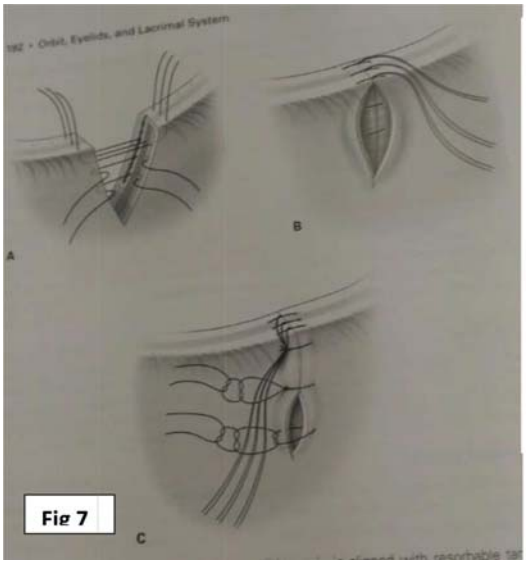
Photograph showing lid injury involving margin (fig 1 &2) Good functional and cosmetic recovery after stitch removal(fig 3 &4)

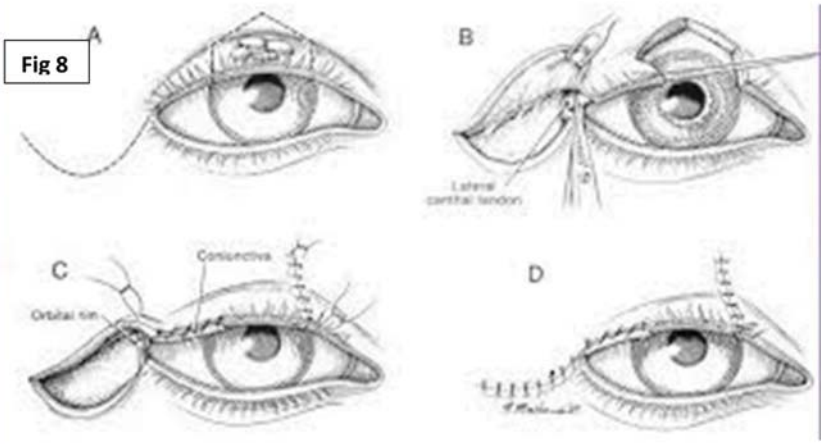


Reconstruction ladder for Upper lidand lower lig(fig 5& 6)

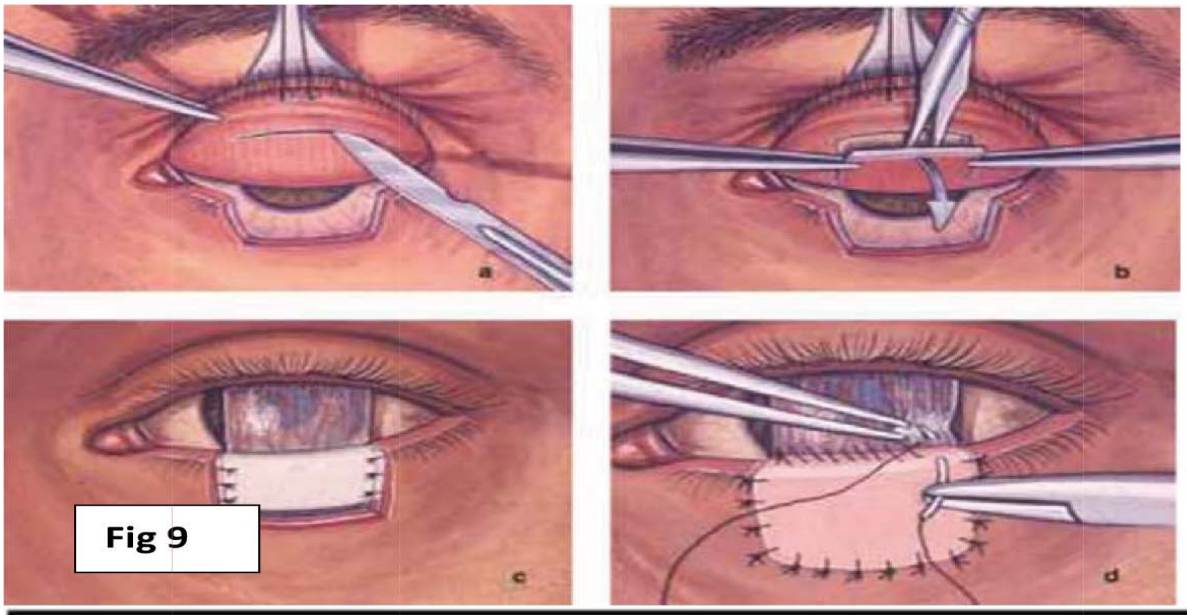


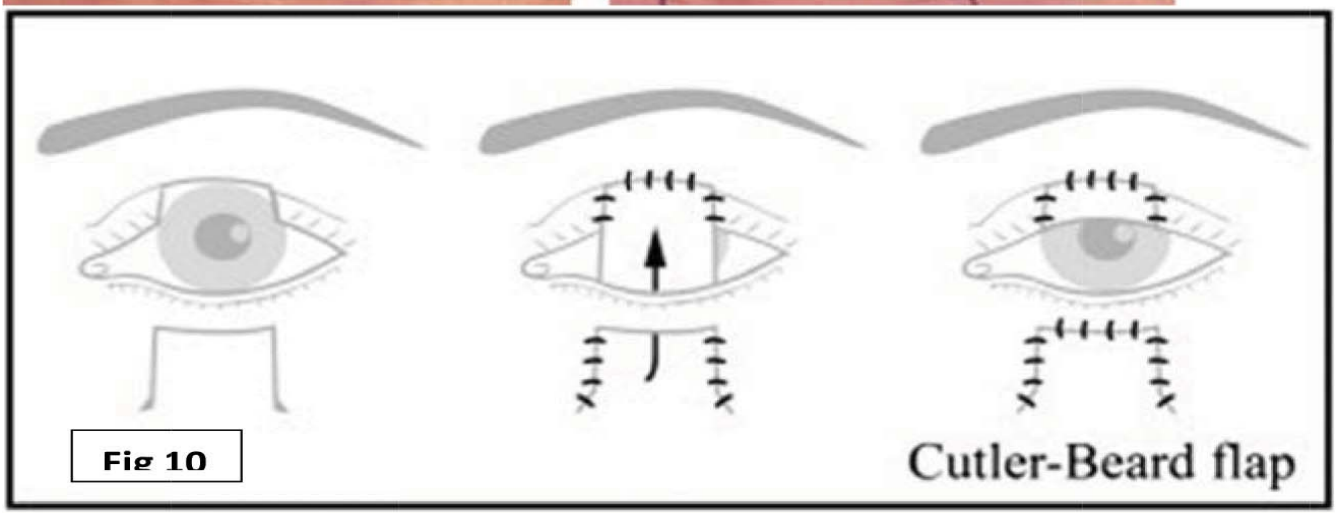






Modified Hughes procedure (fig 9) andCutler Beard flap(fig 10)





Management of Dog bite Lid injury

Tetanus and anti rabies prophylaxis is must. Systemic antibiotics to prevent infection should be prescribed. Good cleaning with povidone iodine and Infiltration of Human immunoglobulin around wound. Decision to close depends on the type of biting animal, size and location of bite, time elapsed and general health of person. Delayed primary or secondary wound closure can be possible due to high vascularity of lid.Lid injury can be stitched if wound Size >2cm and >0.5cm depth,continue to bleed after 15minute of direct pressure andfor functional and cosmetic reason.If suture required , can be sutured with interrupted suture.

Summary

Repairing of eyelid injuries requires knowledge andmeticulous approach. Gentle tissue handling and properalignment should be done preferably under microscope. Aim should be to achieve bestpossible functional and cosmetic outcome

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Recent Advances In Paediatric Ophthalmology- A Review

Chandra sekhar sahoo, M.S
Kalinga Eye Hospital, Dhenkanal

Paediatric ophthalmology is now universally recognised as a specific sub-speciality and Ophthalmic care of children in 2019 is no longer something that general ophthalmologists do as an adjunct to their predominantly adult clinical practice. The care of children with eye conditions has been transformed exponentially over the last 25 years.

HISTORICAL PERSPECTIVE

Going back to the past, the evolution of this branch is to be seen close to its associated branch, Pediatrics. At the end of the eighteenth century a movement that considered children to be a special national treasure swept across Europe. This movement marked the inception of recognizing the need for special care for children. Within a few years, hospitals dedicated to the care of children thrived in every nation in Europe and United States. Frank D.Costenbader was an American physician, frequently credited as the world's first pediatricophthalmologist. In 1943, Dr. Costenbader limited his practice to children and became the first pediatric ophthalmologist. Dr. Costenbader took his first trainee, Marshall M. Parks, in 1947. Costenbader and Marshall M. Parks (his mentee who would later be known to many as 'the father of pediatric ophthalmology') began the first Ophthalmology Fellowship Training Program of any subspecialty at the Children's Hospital in Washington, D.C., now known as the Children's National Medical Center. Sincethe there has been a sea change in the subspeciality and we are marching ahead with numerous innovations and developments. New technologies and surgical techniques have always stepped timidly into pediatric ophthalmology. Advances in pediatric ophthalmology have in the past 5 years encompassed genetic, surgical and diagnostic.

LEAPS AND BOUNDS IN IMAGING AND DIAGNOSTICS

The availability of i-Care rebound tonometry, which can be used swiftly, without eye drops, on a child with minimal cooperation, has greatly reduced the number of EUAs carried out.OCT has also made a huge impact on diagnosis and assessment in paediatric ophthalmology. An experienced imaging technician can successfully obtain useful OCT images in a cooperative child from the age of three upwards. Advances in digital fundal imaging in children have transformed diagnosis and monitoring of a wide range of children's eye diseases. RetCam and newer more portable digital fundal imaging devices are now routinely used in infants and young children for the documentation of retinal disease, particularly important for the diagnosis, monitoring and documentation of retinopathy of prematurity (ROP). Digital imaging equipment for documenting eye movements using 'eye tracking' software has become more widely available. These instruments provide detailed information for both the assessment of nystagmus and other neuro-ophthalmic abnormalities affecting saccades and smooth pursuit eye movements. Some softwares like BYNOCS aid in the evaluation of amblyopia, fusion parameters, nystagmus, binocular

functions and also help in treatment also.

The advent of high-resolution magnetic resonance imaging (MRI) has led to the discovery of extraocular muscle pulleys. These help in maintaining the paths of the extraocular muscles. Pulley heterotropia or abnormalities can lead to the development of strabismus. Instability of the rectus pulleys has been shown to be associated with incomitant strabismus. A recent study has shown that rectus pulley displacements can create the clinical picture of superior oblique palsy. Anterior Segment optical coherence tomography has been shown to be effective in detecting muscle insertions in previously operated as well as new strabismus cases. Ultrasonic biomicroscopy has been used for the same purpose. Dynamic MRI is yet another imaging modality that can help in surgical planning as it can pick up functional muscle contractility.

INNOVATIONS IN OCULAR SCREENING OF CHILDREN

Screening for childhood vision impairment is the first step towards early detection and treatment and prevention. In the rural areas, screening is done by Anganwadi workers, while there has been a steady increase in school vision screening and training of teachers. The Government too has pitched in through its Sarva Sikshabhyan Programmes. In recent times a very popular modality of screening is the photoscreening technique. Several models of photoscreeners are available like the Welch allyn spot vision screener and Plusoptix. These vision screeners have made school screenings very fast and effective and can be used in infants as young as 6 months age.

DEVELOPMENTS IN PAEDIATRIC CATARACT

Genetic studies have opened up the entire spectrum of varied etiologies of congenital cataracts like Mutations in genes encoding enzymes (GALK1), Mutations in genes encoding structural proteins{ β-/ϒ-crystallin genes (CRYGA to CRYGF/), α-crystallin genes (CRYAA and CRYAB)}, Mutations in genes encoding cytoskeletal proteins(BFSP1, NHS gene and CP49), Mutations in genes encoding membrane associated proteins {(Connexins (Cx43), (Cx46) and(Cx50), (Aquaporin0 or MIP)}, Mutations in genes coding cell signallingProteins (PAX6, PITX3, FOXE3, FOXC1, Gpr161, MAF, HSF4, Crygs,Bfsp1 and Bfsp2).

Advances in surgical instruments and techniques used in paediatric intraocular surgery have reduced complications and improved surgical outcomes. In particular, new-generation viscoelastics provide increased protection for the corneal endothelium and allow easier intra-operative manipulation of ocular tissues, most notably during capsulorhexis. In paediatric cataract surgery, performance of a posterior capsulotomy and anterior vitrectomy at the time of lensectomy has reduced visual axis re-opacification rates. The use of smaller incisions (23 and 25 gauge), atraumatic surgical technique and rigorous peri and postoperative anti inflammatory regimes have reduced postoperative inflammation. It is likely that, as in adults, the use of intraocular antibiotics at surgery has reduced the rate of postoperative endophthalmitis.

Newer IOLs with acrylic material and square edges deacreases the chances of PCO and Multifocal and Toric IOLs help in correction of large degrees of anisometropia. Newer IOL formulas help in determining the correct IOL

power though the consensus regarding this varies a lot.

ADVANCES IN AMBLYOPIA MANAGEMENT

Despite the widespread use of refractive correction ,occlusion and atropine to treat amblyopia, a systematic review published in the late 1990s highlighted the lack of evidence-based practice surrounding its treatment with a paucity of high-quality scientific evidence demonstrating the natural history, efficacy, relative efficacy with alternative treatments and value or need for the treatment (Snowdon and Stewart-Brown 1997).PEDIG studies has made new recommendations for management of amblyopia.Part time patching 2hr/day effective for Mild and moderate amblyopia (>6/60 vision),Part time patching 6hr/day for severe amblyopia (≤ 6/60 vision) is effective.Older amblyopes (7-17 years) patching works but < 50% are responders . Atropine eye drops on weekend is as effective as daily atropine and Atropine eye drops on weekend is as effective as part time patching. Oral levodopa is of no additional advantage. Oral Citicholine has shown effectiveness in meridional amblyopia. AMBLYZ glasses are electronic glasses which combine vision correction and occlusion and can be used in place of eye patch.

DICHOPTIC treatment with home based and officed based devices are the upcoming and promising treatment modalities for amblyopia especially in patients who are non compliant with treatment, reccurence of amblyopia and adult amblyopia. They can be home based like dichoptic games which are both androidand Ios based.Dichoptic movies are also available .Office based softwares are Sanet vision integrator and vision therapy system. Recently BYNOCS which can be used both as office based and home based treatment is showing great results.

ADVANCES IN REFRACTIVE ERROR MANAGEMENT

Control of progressive myopia is an area of intense research and speculation for clinicians and researchers alike. The ATOM study which used Atropine for control of myopia showed a clear benefit with a good safety profile long term. High-dose atropine (1% and 0.5%), moderate-dose atropine (0.1%) and low-dose atropine (0.01%) showed clear effects in myopia control (all with statistically significant effect).5–7 With that the preliminary results of ongoing studies regarding the efficacy of pirenzepine, increased light exposure (e.g., using the Kurango study lamp) and 7-methylxantine are promising. Recent studies suggest increasing outdoor activities and reducing near work as promising interventions for myopia control. Contact lenses have revolutionised the management of refractive errors in children. Standard soft and rigid contact lenses have minimal or no effect on myopia control. Orthokeratology and soft multifocal CLs have shown promising results in control of myopia. Recently a single use daily disposable Cls has been approved by US-FDA for treatment and control of myopia.

Paediatric refractive surgery should never be considered as first-line treatment, but rather as an alternative option after other methods of optical correction have failed. Photoablation poses the challenge of maintaining corneal transparency and biomechanics, as well as the problem of regression and stability of results. Phakic implants raise the issue of potential damage to the corneal endothelium, the iris and crystalline

lens. Finally, multifocal IOLs can nowadays be considered in cases of congenital cataract, but power calculation, stability, and the inflammatory and fibrotic responses pose even greater problems in an infant's eye. Caution is mandatory with any of these surgical options, since we know from adult surgery that LASIK carries the risk of secondary ectasia and PRK the risk of central haze.We are aware of the potentially poor long-term outcomes of phakic implants in case of inaccurate sizing, and of how difficult it is to predict the success in terms of neuroadaptation and vision quality of multifocal IOLs. However, we cannot fail to acknowledge the great potential of these surgical techniques in preventing amblyopia, minimizing aniseikonia and rehabilitating binocular vision. For extreme refractive errors (>−15.0 D) or instances of shallow anterior chambers (<3.2 mm), CLE or refractive lens exchange is a suitable solution.Posterior chamber phakic implants are generally preferred, as they involve no risk for the corneal endothelium. Correct sizing is now more easily achieved with the aid of anterior segment optical coherence tomography technology. In case of cataract, and in presence of a healthy retina, normal pupil reactivity and capsular bag integrity, the multifocal option can now legitimately be considered. Piggy-back implants, toric and multifocal, are a further tool that has recently come into our armamentarium, offering the advantages of a secondary, adjustable technique.

STRIDES IN STRABISMUS

Genetic basis of strabismus is also being explored.A recent study by Altick et al has shown through microarray analysis that the gene expression in the extraocular muscles of the strabismic and the nonstrabismic individuals. They found that 25% of the muscle-specific genes were downregulated in the extraocular muscles of strabismic patients. Another study from Japan has been done to localize the chromosomal susceptibility loci for comitant strabismus.They found multiple susceptibility loci for comitant strabismus.Chromosome 8q has been shown to be associated with DRS.Chan et al found CHN1 mutations in two families with this disease.

In regards to surgical approaches For infantile esotropia a group from Turkey found that botulinum toxin injection into the medial recti as effective as incisional surgery, while Lueder et al. found that botulinum toxin augmented bimedial recessions were good for large angles.

Approach to intermittent exotropia has always been a hot topic and a study fromthe United Kingdom (UK) looked at the question whether children with intermittent exotropia really deteriorate with time and found that this rare. Cases with near-distance disparity are being tackled more effectively by the resection recession procedures on the same rectus muscle. This was found to be effectively correcting a persistent cyclic esotropia. To avoid anterior segment ischemia, partial VRT (vertical rectus transposition) is being preferred rather than using the full muscle tendon. VRT is used for the management of sixth nerve palsy as well as DRS. VRT surgery with posterior fixation sutures has been shown to be effective in the management of complete sixth nerve palsy and patients of esotropic DRS. Partial VRT has been shown to improve abduction and binocular single visual field in cases of exotropic Duane syndrome.

Adjustable suture strabismus surgery in adults is well described in literature and the same principles have been extended to children with

groups describing excellent results with Children as young as 6 months underwent this technique. The adjustable procedure has now been incorporated even in the partial vertical rectus transpositioning to improve the outcomes in exotropic DRS and abducens palsy. Alternative treatment options such as 'chemodenervation' of extraocular muscles via botulinum toxin (Botox) have been introduced over the last 30 years for the management of paediatric squint with comparable results to surgery for management of infantile esotropia.

Minimal invasive approach for strabismus surgery is being explored to decrease tissue trauma and patient discomfort. Fornix-based approach introduced by Parks markedly decreased the postoperative discomfort but this technique does not reduce the area of tissue disruption. Gobin developed a novel procedure to access the rectus muscle using two small openings. The principles of his surgery have become the cornerstone for the minimally invasive strabismus surgery. Mini-plication has been described as a new rectus tightening procedure for treatment of small-angle strabismus and it can be done under topical anesthesia and is useful in adult patients with diplopia. Mini-tenotomy is a similar procedure which can be used as a weakening procedure for similar indications under topical anesthesia.

ADVANCES IN PAEDIATRIC GLAUCOMA

In pediatric glaucoma, medications often play a supportive role, temporarily reducing IOP prior to surgical intervention. Long-term medical therapy can be used in secondary glaucomas or more severe disease not controlled with surgery.

Angle surgery (goniotomy ab interno or trabeculotomy ab externo) has traditionally been the surgical procedure of choice for the treatment of primary congenital glaucoma (PCG). Success rates for goniotomy range from 70 to 90 percent in eyes after birth and before age two. Retreatment is necessary in 25 to 30 percent of cases. Success rates are much lower for eyes presenting with PCG at birth or after 24 months of age.

Recently, endoscopic goniotomy has been described for use in eyes with opaque corneas. trabeculotomy ab externo can be performed for the treatment of PCG and childhood glaucomas, especially when corneal clouding prevents an adequate gonioscopic view. Recently, a technique using a 6-0 polypropylene (Prolene) suture to treat 360 degrees of the angle from one incision site was described, with a reported success rate exceeding 90 percent in eyes with PCG.

Success rates for trabeculectomy in children generally are lower than those reported for adults, ranging from 35 to 50 percent after one year. use of intraoperative antimetabolites, such as mitomycin C (MMC), may improve the chances of a successful filtration bleb but also increases the risk of postoperative complications, such as endophthalmitis. Combined trabeculotomy-trabeculectomy can be used as a primary procedure in eyes with a poor prognosis for angle surgery alone.

Reported success rates for GDDs can be 95 percent, however, these rates fell to 42 and 55 percent, respectively, by 10 years. In recent years, laser-based techniques have largely replaced cryotherapy for ciliary body destruction. One study using transscleral diode laser reported a success rate of 50 percent at six months. Early reports of endoscopic cyclophotocoagulation show similar rates of

success with less need for retreatment.

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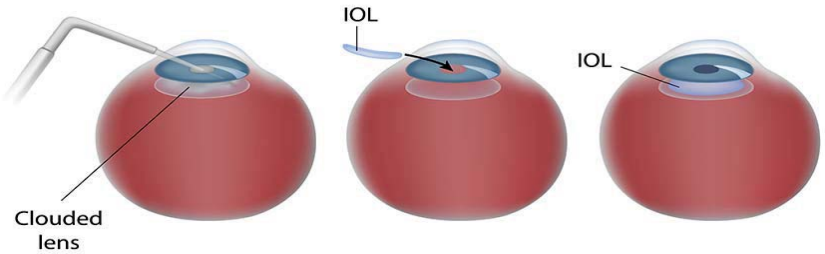
Reverse training for surgical steps in SICS

Sushil Kumar Kar
Sunayan Eye care, Bargarh

Cataract is the most common ,curable cause of blindness worldwide, which accounts for 51%.The only effective treatment is surgery, which involves removal of cataractous lens and implantation of IOL.



The WHO goal in 2011 was to reduce avoidable causes of blindness by 25% by 2019, among which cataract is the main curable cause.1In well-organised and well-equipped facilities, a single surgeon can perform 1000–2000 surgeries yearly2

So the training of new surgeons in this technique is essential.

Phacoemulsification is the preferred technique for cataract surgery in developed countries, but large-scale implementation in developing countries may prove to be a challenge. But SICS is still the most commonly used method in developing countries because3:

- It is less expensive
- Require less technology.

It is being used as a method where phacoemulsi fication is expected to be difficult in cases like4:

- Mature or brunescent cataracts
- Traumatic cataracts
- Pseudoexfoliation syndrome
- Other causes of zonular weakness

There was a Meta-analysis where safety and efficacy of MSICS and Phacoemulsification is compared and the inference was Post & intra-operative complications has got no statistical difference5.Duration of surgery was much lower average time for SICS than phaco. Cost is too significantly less in SICS.

There was also a study by Haripriya et al, done at Aravind Eye Hospital, Madurai where they have concluded that for trainee surgeons the complications rate was significantly higer with phacoemulsification, suggesting that manual SICS may be a safer initial procedure to learn for inexperienced cataract surgeons in the developing world6.

So, training for SICS is 'step-dependent'. Acquiring surgical skill depends on the mastery of previous steps. There are no inconsequential steps in SICS and each step relies on the successful completion of the steps preceding it.Successful Intraocular Surgery demands:

1. Fine manual dexterity

2. In depth knowledge of ocular anatomy
3. Thorough understanding of surgical principle

There is an article published in Community Eye Health Journal7 in the year 2014 where tips for both the trainee and trainer has been properly elicited, and they demonstrated Reverse training' is a method of learning a procedure from the end backwards.For example:

A trainee would start by tying the sutures for an ECCE operation. If this has been done satisfactorily, they would progress the next time to putting stitches in and then tying them. Following this, they would carry out the other steps.

The principle behind reverse training is that,the trainee should be operating with the eye in a good condition each time, as the training surgeon will have carried out each of the previous stages.This new method features order to that of actual surgery such that residents learn the easiest step first.

Conventional training: Teaching based on the order of steps performed during surgery (first to last step).

Reverse training: Teaching based on the difficulty of steps.Starting with the easiest step and other steps are subsequently taught in reverse order until the resident has learnt and can perform the entire surgery

Steps of SICS (Conventional)

1. Bridle suture (superior rectus)
2. Side port incisions
3. Staining of capsule, viscoelastic injection, capsulotomy
4. Conjunctival peritomy & cauterization of bleeders
5. Incision, sclero-corneal tunnel, entry with keratome
6. Hydro-dissection, nucleus prolapse & delivery
7. Irrigation & aspiration
8. Visco-injection & IOL insertion
9. Visco wash & Conjunctival cautery

Steps of SICS (Reverse method)

1. Bridle suture (superior rectus)
2. Side port incisions, Staining of capsule, viscoelastic injection
3. Conjunctival peritomy & cauterization of bleeders
4. Visco-injection & IOL insertion
5. Visco wash & Conjunctival cautery
6. Incision, sclero-corneal tunnel, entry with keratome
7. Hydro-dissection, nucleus prolapse & delivery
8. Capsulotomy
9. Irrigation & aspiration

**As there are no studies about reverse training in SICS so I have formulated the steps according to ease remembering my training days. **

So to look for advantages of reverse training unfortunately there are no studies on reverse method of training for SICS (result for search in PubMed using words i.e. SICS, reverse). But there are few studies on reverse training in Phacoemulsification.

Suryawanshi et al8 in their article concluded that the incidence of PCR was 6.2% with the conventional method and 4.6% with the reverse method.

Similarly,Gustavo et al9 concluded that teaching residents to perform the steps of phacoemulsi fication in a standardized reverse order resulted in lower rates of complication.

So, Reverse method is a standardised method of training to residents. Starting from easiest

stepwith low complication rates. Young Ophthalmologists who are seeking for special training after completion of their residency, this reverse method may offer a new, safer method of mastering surgery.

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BLIND SCHOOL SURVEY OF GANJAM DISTRICT

Deepika Priyadarshini , Dr.Sachala Bhoi , B.N.R.Subudhi
Department of Ophthalmology, MKCG Medical College, Berhampur

INTRODUCTION :

Childhood Blindness is one of the priorities in vision 2020 "The right to sight"1. UNICEF defines childhood as 0-16 years both ages inclusive. WHO defines blindness as best corrected visual acuity < 3/60 in better eye2 or central visual field of each eye restricted to <10 degrees. New definition of blindness by NPCBVI is "inability to count fingers from a distance of 3metres (<3/60)" 3. There are around 1.4 million blind children in the world4, 2/3rd of it in developing countries. As per a 2001 survey, the prevalence of childhood blindness in India is 0.8/10005. The cause of blindness varies according to region and socioeconomic development. In developed countries, lesions of the optic nerve predominate as the cause of blindness, whereas corneal scarring is the major cause in low income countries6. The most frequently affected parts are the whole globe, cornea, retina, optic nerve, and lens7.Population based data on the prevalence are needed to set priorities & plan strategies to reduce childhood blindness8 but they are limited worldwide including India.

There are various survey methods to obtain data on prevalence and incidence of childhood blindness, which are as follows:

· **Population based survey:** Population based survey data are neither available nor is there any detailed reliable information regarding the incidence of blindness & low vision in childhood. But this is one of the most accurate method of assessing prevalence of childhood blindness.

· **Register of the blind:** It is another source but lacks reliability.

· **Key informant methods:** This is a reliable method adopted in developing countries to collect information on childhood blindness. Its disadvantage is that it needs a large number of motivated workers.

· **Community based rehabilitation programme:** This is an alternative method which gives a rough estimate of prevalence of blindness in developing countries.

· **Survey of school for the blind:** Examination of children in school for the blind is carried out to obtain data on causes of blindness in children. The advantage of this type of survey is that large number of children are examined in a short time by a single researcher.

The present study conducted through the survey of four schools for the blind aimed at determining the site and causes of blindness & assessing needs of the blind school children for optical, medical & surgical modalities of treatment.

MATERIALAND METHOD:-

Study design – Cross sectional study

Study area –

1) Red Cross School for the blind, Ambapua,
2) Odisha service centre for the blind, Andhapasara
3) School for the blind, deaf and MR, Konkorda
4) Kabi Narasingha Matha blind deaf and MR school, balikana Study period – January to April 2017

Inclusion Criteria - All the blind & severe visual impairment of the four schools

Data collection method:

1) Consent was taken from the principal / head master of the school
2) Demographic details, medical and family history of participant were recorded
3) Snellen's chart for measuring visual acuity
4) Refraction performed as indicated using trial set & frame
5) Anterior segment examination by torch & binocular corneal loupe
6) IOP measurememt when required by Schiotz tonometer
7) Posterior segment examination by direct & indirect opthalmoscopy
8) Children in need for medical/surgical services were refered to tertiary care centre.

RESULTS:-

A total of 183 students of age group 6-20years were examined. Among these 70(38.3%) were male & 113(61.7%) were female. All students of odisha service centre for the blind were female.

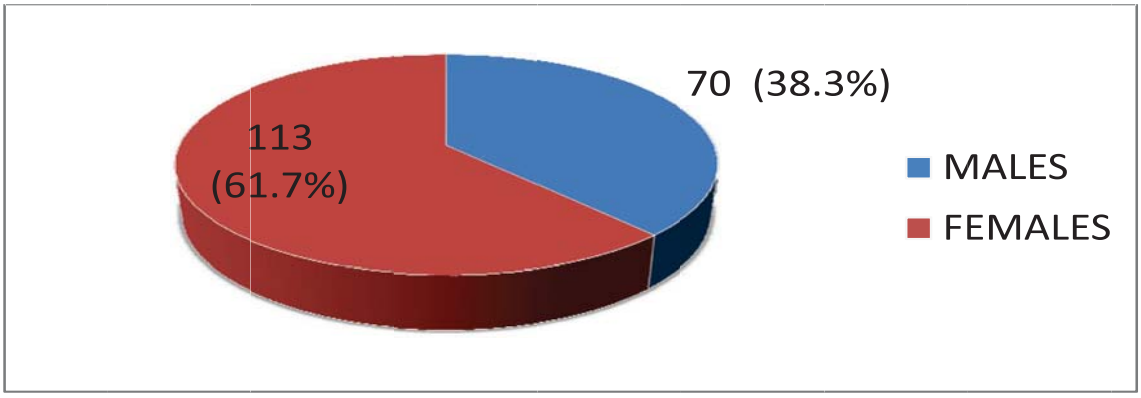

Figure 1:Distribution of patients according to sex

Among the 183 students examined 6(3.3%) were Severely visually impaired & 177(96.7%) were blind.

WHO Categories of SVI and Blindness in 183 patients			
WHO Category	VA of better eye at presentation	No	%
SVI	<6/60 - 3/60	6	3.3%
Blindness	<3/60 - No PL	177	96.7%
Total		183	100

Table 1: Distribution of patients according to WHO categories of SVI and Blindness.

Among the 183 students most of them were having multiple & different anatomical site of involvement in both eyes. Whole globe involvement was seen in 174 eyes(47.53%), corneal involvement was seen in 50 eyes(13.66%), lens was involved in 45 eyes(12.29%), uvea was involved in 10 eyes(2.73%), retina was involved in 50 eyes(13.66%), optic nerve was involved in 12 eyes(3.27%) and others included 25 eyes(7.2%).

Anatomical site of abnormality		
Anatomical site	**No of eyes**	**%**
Whole Globe	174	47.53
Cornea	50	13.66
Lens	45	12.29
Uvea	10	2.73
Retina	50	13.66
Optic nerve	12	3.27
Others	25	7.2

Table : Anatomic site of involvement in both eyes.

Whole globe involvement was seen in 174 eyes of which 44 eyes(12.02%) anopnthalmus, 109 eyes(29.7%) micropnthalmos & 21 eyes(5.7%) staphyloma

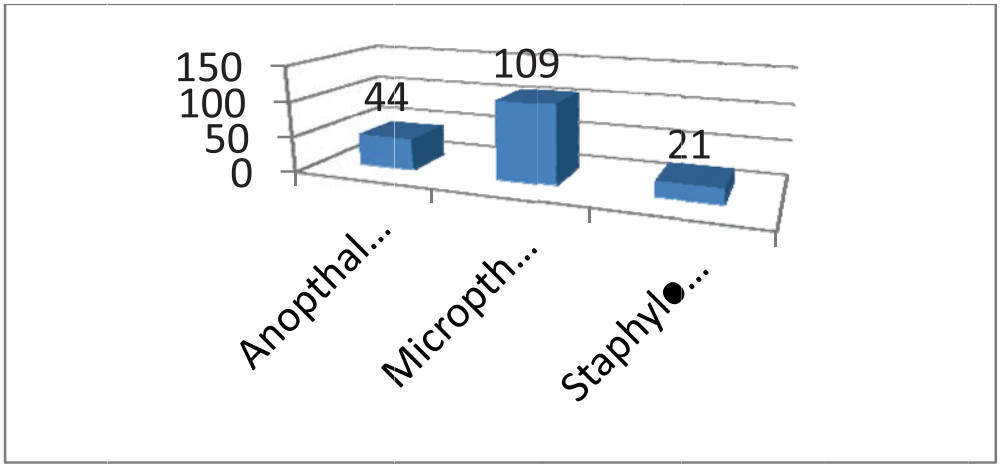

Figure 2:Whole globe involvement

Corneal involvement included corneal opacity with vascularisation in 23 eyes(6.2%), adherent leucomas in 10 eyes(2.7%), dystrophies in 11 eyes(3%), phthisis bulbi following perforated corneal ulcer in 6 eyes(1.6%)

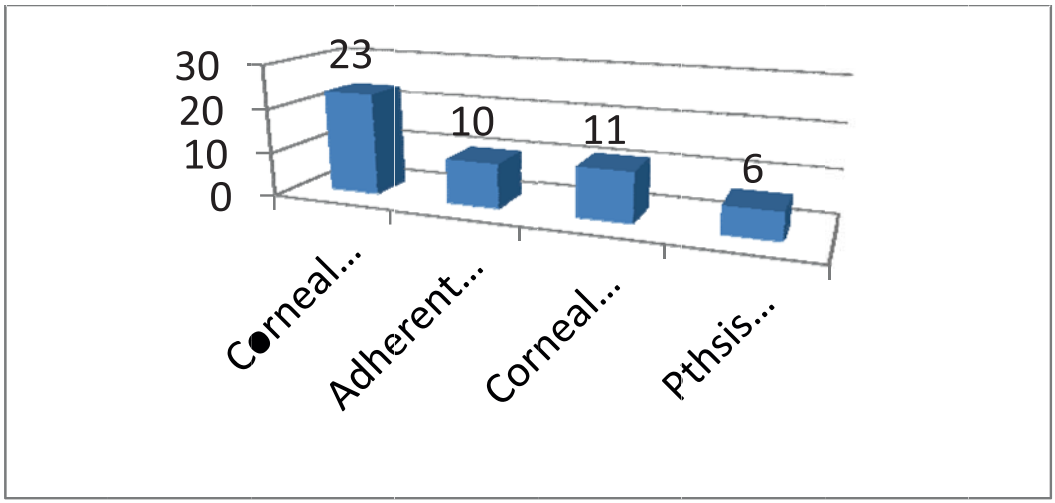

Figure 3:Corneal involvement

Congenital/ developmental cataract in 19 eyes(5.1%). Aphakia/pseudophakia was seen in 26 eyes (7.1%).

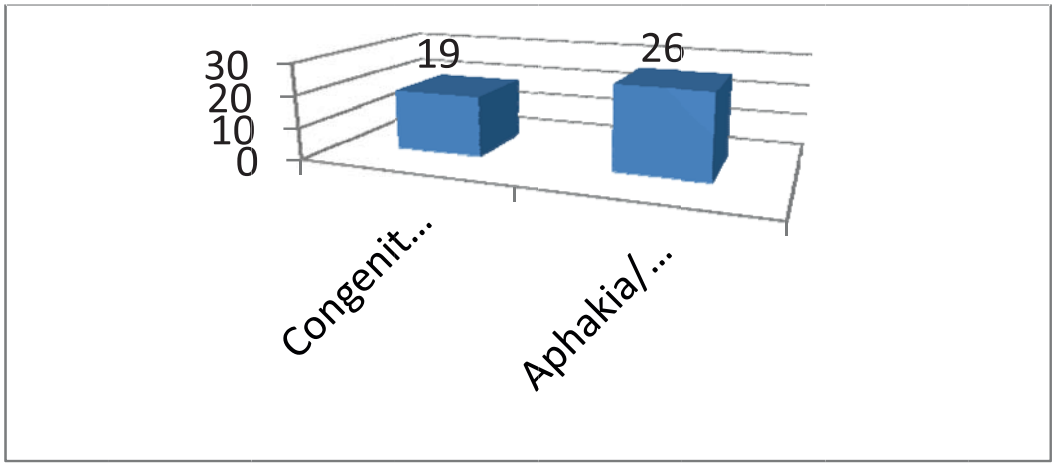

Figure 4: Lens involvement

Retinal causes included retinitis pigmentosa in 23 eyes(6.2%), fundal coloboma in 7eyes(1.9%), retinal dystrophies in 17 eyes(4.6%) & albinism in 3 eyes(1.6%).

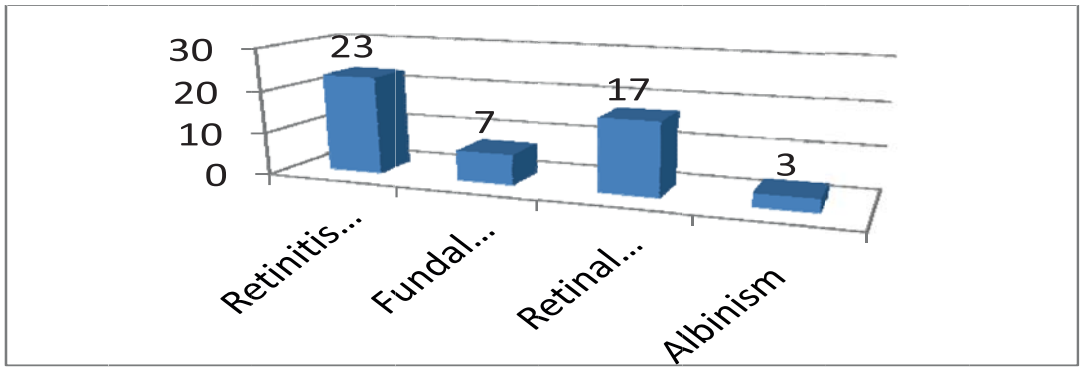

Figure 5: Retinal involvement

Chronic uveitis, exudates in anterior chamber in 10eyes(2.7%). Primary optic atrophy was the cause of blindness in 12 eyes(3.2%).The cause of blindness in rest 25 eyes(7.2%) were congenital glaucoma, congenital strabismus with amblyopia,cortical blindness & Steven's Johnsons syndrome with severe dry eye.

DISCUSSION:

With a population of 3.52 million of the district, 420056 are in the age group 0 – 16 years9. But no data regarding prevalence of blindness is available. No population based survey or blind school survey has been undertaken previously. There are regional variations in the data collected from across the country. In previous studies, corneal scarring due to Vitamin A deficiency and measles were the most common causes of blindness10. However, later studies have demonstrated a change in trend with globe anomalies and retinal causes becoming more common11,12,13. This change may be due to successful implementation of immunization programs in the country. The results of the present study gives an idea of relative importance of different causes of blindness in this particular region. Among the students attending the blind schools, whole globe involvement was the most common site of involvement and was seen in 174 eyes (47.53%). This is similar to studies conducted across our country12,13. Coming to causes majority are blind due to congenital maldevelopment. 29 eyes (7.9%) were blind due to preventable causes like VAD and infectious causes like measles or chickenpox which is comparable to previous studies conducted elsewhere14. 5 eyes(1.3%) were lost to trauma which were preventable. Treatable blindness like cataract, pseudophakia with dense posterior capsular opacity, aphakia were referred to to MKCG Medical College and Hospital for evaluation & further management. Low vision aids were recommended for 6(3.3%) with SVI.

CONCLUSION:

Childhood blindness has been a special priority area in VISION 2020. The aim is to decrease the global level of childhood blindness from 7.5/10,000 children in 1997 to 4/10,000 children in 2020. Avoidable causes of blindness include corneal scarring due to Vitamin A deficiency, cataracts, glaucoma, and ROP, which have to be dealt with effectively. Screening and rehabilitation of
children with nonavoidable blindness should also be done. This can be done by
providing rehabilitation and vocational training.

The present study highlights the relative prevalence of childhood blindness in Ganjam district. The students residing in the school are incurably blind. So it is important for the opnthalmologist to be aware of the potential importance of low vision devices for the SVI students. The quality of life should be improved by training for daily living like independently handling of personal hygiene, cleaning house, shopping, imparting skills to locate oneself and move from one place to another. Along with their Braille Classes there should be provision of economic rehabilitation which can be learnt from activities like making baskets, brooms, chairs etc. Provision of outdoor activities like agriculture training, animal rearing etc. will enable them in economic rehabilitation which can be supported by the local community, different NGO's & government organizations.

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IOP rise after vitreo-retinal surgery- Out of the frying pan in to the fire.

Santosh Kumar Mahapatra, Jhansi Rani Cherukuri, Naresh Desinayak, Sonali Sarangi
JPM Rotary Club of Cuttack Eye Hospital and Research Institute, Cuttack, Odisha.

INTRODUCTION:

Secondary glaucoma can occur after various vitreoretinal procedures1, 2. The elevation of Intra Ocular Pressure (IOP) can be transient or sustained. This may occur in the immediate, early and late post operative phase.

Various vitreoretinal procedures leading to the rise in IOP are external procedures like Scleral Buckling (SB) and internal procedures like Pars Plana Vitrectomy (PPV), Intravitreal injections like Anti Vascular Endthelial Growth Factors (Anti VEGFs) and Triamcinolone Acetonide (TA), Intravitreal gas or Silicone Oil Injection (SOI).

The pathophysiology can be either due to open-angle1, 3, closed-angle mechanisms1, 3, 4 or both1, 3.

Elevated IOP is a common complication following pars plana vitrectomy3. Fibrin formation after PPV increases the risk of secondary glaucoma3. Angle closure mechanisms include pupillary block mediated by intraocular gas, silicone oil, fibrin or intraocular lens as well as ciliary body edema and iridocorneal apposition3. The mechanisms of early IOP rise may be due to pupillary block, inflammation, pre-existing glaucoma, and/or migration of silicone oil into the anterior chamber with resulting mechanical impediment to filtration. Possible mechanisms of late-onset glaucoma are infiltration of the trabecular meshwork by silicone bubbles, chronic inflammation, synechial angle closure, rubeosis iridis, migration of emulsified and nonemulsified silicone oil into the anterior chamber, and/or idiopathic open angle glaucoma.4

Anti VEGF injections cause immediate rise in IOP which may be related to the volume of fluid introduced into the vitreous cavity via intravitreal injection.

Predisposing factors for angle closure glaucoma following scleral buckling procedures include pre-existing narrow angles, use of an encircling band, placement of encircling band anterior to the equator, high myopia, older patient age, and postoperative ciliochoroidal detachment2. Placement of scleral buckle causes impaired venous drainage from the vortex veins, leading to congestion and swelling of the ciliary body2. The edematous ciliary body is displaced anteriorly about the sclera spur, and shifts the lens-iris diaphragm forward resulting in angle closure2. Secondary angle-closure glaucoma resolves spontaneously within several weeks.

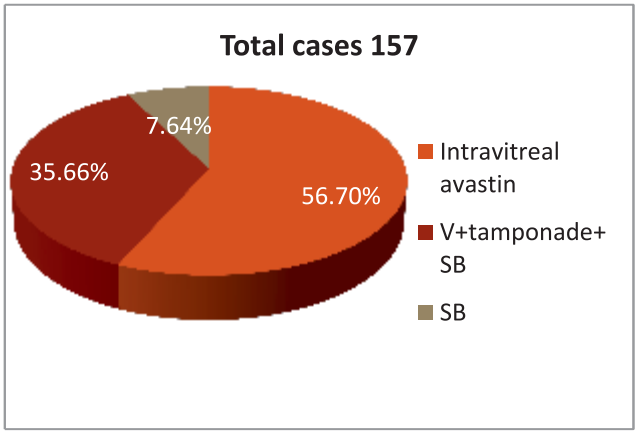
PURPOSE: To find the incidence and etiology of Intra Ocular Pressure (IOP) rise after vitreo retinal (VR) surgeries at a tertiary eye care centre in Eastern India.

MATERIALS AND METHODS: A pilot study was conducted at our hospital. A total of 157 cases who attended the retina & glaucoma outpatient department during the past 3 months were included in the study. The case with known history of glaucoma were excluded from our study. The intraocular pressures were calculated both pre and post operatively. A comprehensive eye examination was done. Central Corneal Thickness (CCT) corrected IOP measurement

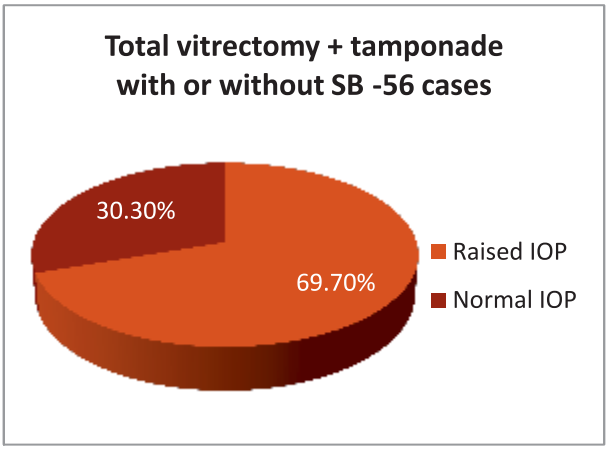
(using Goldmann Applanation Tonometry and pachymetry), gonioscopy using Zeiss 4 mirror goniolens, slit lamp biomicroscopy with 90 Dioptre lens and automated perimetry were carried out as a routine for all the cases. This has helped to detect any ocular pathology other than the surgery leading to IOP rise. The type of the surgery undergone by the patients were noted. The type of treatment given for the elevated IOP post VR surgery was noted.

RESULTS:

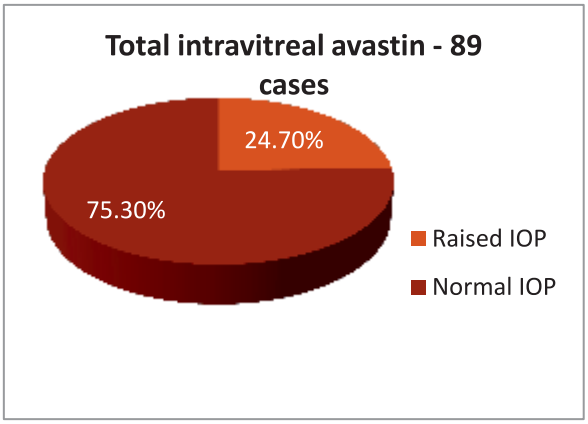
Out of a total of 157 cases studied, 56 (35.6%) underwent vitrectomy and tamponade (airor silicon oil injection) with or without sclera buckling, intravitreal avastin injection was given to 89 (56.7%) and 12 (7.64%) of cases underwent sclera buckling alone.



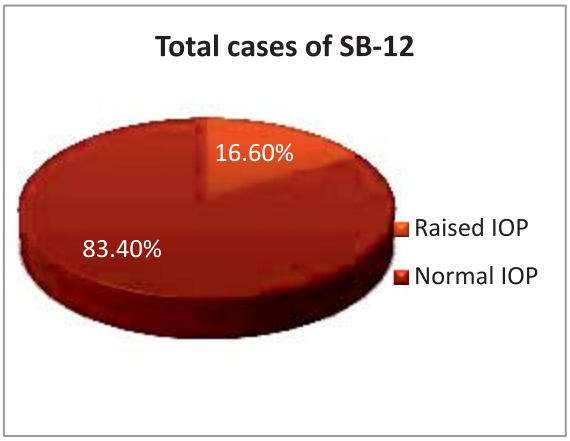
Among 56 cases who underwent vitrectomy and tamponade with or without scleral buckling, 39 (69.7%) had raised IOP.



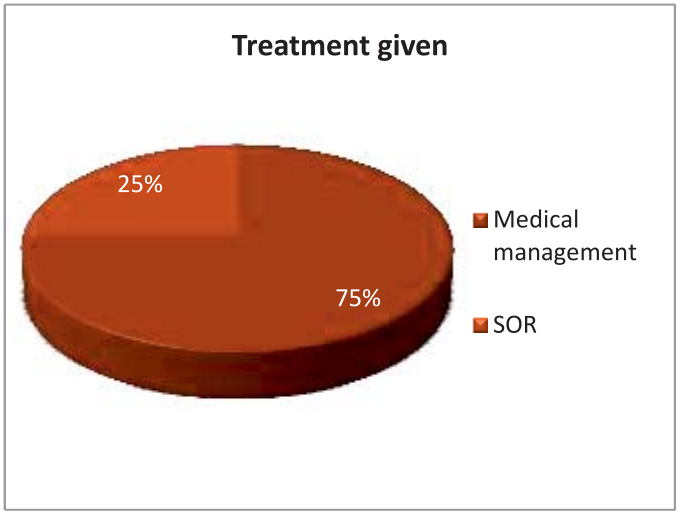
Among 89 cases who had taken intravitreal Avastin injection, 22 (24.7%) had raised IOP.



Among 12 cases who underwent sclera buckling alone, 2 (16.6%) had raised IOP.



The treatment given to them for raised IOP was either medical or removal of silicon oil if silicon oil injection was given. The IOP was controlled in 47 (75%) of cases by medical management. The remaining 16 (25%) were managed with silicon oil removal (SOR).



DISCUSSION:

The reported frequency of post-vitrectomy glaucoma from studies done in 1970 and 1980s ranges from 20-60%3, 6-8. A prospective study by Han et al.9 in 1989 reported that approximately 60% of patients had an acute elevation of IOP within 48 hours of PPV. Riedel KG et al.10 in 1990 found a 6% incidence of glaucoma among 415 patients who underwent intravitreal silicone injection. Desai UR et al.11 in 1997 reported that Pars plana vitrectomy can induce raised intraocular pressure within 2 hours, whether on its own or combined with lensectomy, scleral buckling and endolaser due to fibrin formation. A recent retrospective cohort study by Lalezary M et al.12 in 2011 in 111 eyes with a mean follow up of 49 months, showed that there was no longterm increase in IOP following pars plana vitrectomy.

Our study found raised IOP in 39 (69.7%) cases among a total of 56 who underwent combined vitrectomy and intravitreal tamponade with or without sclera buckling. This result is almost the same as the previous studies when an acute raise in IOP is considered. But this is a combined effect of vitrectomy along with intravitreal tamponade. There was no long term follow up in our study which would explain the sustained IOP raise in PPV.

Use of intravitreal anti-vascular endothelial growth factor (anti-VEGF) agents such as ranibizumab (Lucentis) and bevacizumab (Avastin) can lead to acute and/or chronic elevation of IOP. According to Tseng et al.13 the IOP continued to rise during continued anti-VEGF therapy and as the half life of intravitreal ranibizumab is approximately 3 days, the elevated IOP seen following intravitreal injection is usually transient. The incidence of sustained IOP elevations has been reported to range from 3.45% to 6% and appears to be related to the frequency of intravitreal anti-VEGF injections13, 14, 15. Good et al.15 has found a higher prevalence of eyes with IOP elevations after receiving only bevacizumab (9.9%) as compared to those receiving only ranibizumab (3.1%).

Our study found raised IOP in 24.7% cases among a total of 89 who received intravitreal avastin injection. This was very high which could be a transient elevation which usually occurs in the first 3 days. We used intravitreal bevacizumab which was reported to have more incidence of IOP elevation. The sustained IOP elevation can be studied by prospective long duration studies.

Scleral buckle is another cause of elevated IOP. Studies done by Kreiger et al.16 in 1971 and Perez et al.17 in 1976 found that 1.4 - 4% of cases patients had angle closure glaucoma.

Angle narrowing has been detected in 50% of cases of non vitrectomized eyes in the first post op week by Hartley & Marsh18 in 1973. However, in most cases these resolved spontaneously over several weeks. Hayreh 19 in 1973 reported that glaucoma may also occur with anterior segment ischemia where the posterior ciliary arteries are compromised or obstruction of the venous drainage from the ciliary body by the encircling band.

Our study found that 2 (16.6%) cases out of 12 had elevated IOP following sclera buckling which was a slightly high incidence and could be a transient raise. The study of sustained elevation of IOP should be done by prospective long term follow up studies. The true incidence would be known if a larger study group is included.

Most of the cases can be managed medically with

antiglaucoma medications according to Costarides AP et al.1. Nguyen et al.21 reported that the intraocular pressure was controlled successfully in 8 out of 14 eyes with silicone oil removal alone. Early removal of silicone oil (6/12) has been noted to have reduced risk of secondary glaucoma and similar redetachment rates by Han et al.9 in 1998.

According to Gedde SJ et al.2, secondary angle-closure glaucoma following sclera buckle resolves spontaneously within several weeks. According to Skalicky SE et al.22 a sustained in elevation in IOP rarely requires glaucoma filtering surgery.

In our study 47 (75%) of the cases were well managed with medical treatment and 16 (25%) were managed with silicone oil removal. There was no need of any surgical intervention. This correlates with the other studies reporting that most of the cases can be medically managed and that silicone oil removal along with medications reduces the IOP.

CONCLUSION:

IOP rise is a known complication of vitreoretinal surgeries. This rise in IOP can be either transient or sustained. In our study 63 (40.76%) out of 157 cases had raised IOP which could be a transient rise as the patients were not followed up for longer duration. Among them 75% cases were well managed with medical management and only 25% of them required silicon oil removal. The titration of buckle tightening and the amount of intra-vitreal infusion is essential to decrease the incidence of IOP raise.

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OCULAR MORBIDITY AMONG PAEDIATRIC POPULATION AT A TERTIARY EYE CARE HOSPITAL IN SOUTHERN ODISHA.

Rutyani Dash, Shagufa Jamal, Radhakant Bhoi, Sameer Dash, Suchitra Dash

Department of Ophthalmology, MKCG Medical College and Hospital, Berhampur, Odisha

INTRODUCTION:

Ocular morbidity is defined as the spectrum of eye disease which include both visually impairing and non – visually impairing conditions experienced by a population. Study of ocular morbidity in paediatric population is important because some conditions like refractive error, congenital cataract and retinoblastoma are treatable while Vitamin A deficiency is preventable. Delay in diagnosis may result in irreversible visual loss and in case of retinoblastoma, potential death. It also affects the ability to learn, adjustment in society and development of personality in children [1]. Around 30% 0f the paediatric blind population lose their eyesight before the age of 20 years [2]. So, this study and early diagnosis and treatment 0f ocular diseases in paediatric population is important to prevent the child fr0m being handicapped.

MATERIALS AND METHODS

* Study Design – Retrospective Study

* Place of Study – Department of ophthalm0l0gy, MKCG MCH

Department of Paediatrics, MKCG MCH

* Study Populati0n – All paediatric patients 0-15 years of age attending the ophthalmology oPD.

* Study Period – August 2017 to July 2018

INCLUSION CRITERIA

* All children who attended the oPD (Referred / Self reporting)

EXCLUSION CRITERIA

* Incomplete data

* Uncooperative child

* Children whose parents did not give consent for Direct/Indirect ophthalmoscopy.

DATA COLLECTION AND ANALYSIS

Data was collected from the records in the case files of children who attended the eye OPD during the study peri0d. Inf0rmati0n was collected about the Age, gender, duration of illness and type 0f ocular disease. The data was tabulated in MS 0ffice Excel sheet and analysed.

RESULTS

TABLE -1

S.NO	DISEASE	TOTAL NO.	MALE	FEMALE
		636	346 (54.40%)	290 (45.59%)
1.	Refractive Error	242 (38.05%)	131	111
2.	Allergic Conjunctivitis	136 (21.38%)	76	60
3.	Rhinosporidiosis	49 (7.70%)	31	18
4.	VKC	48 (7.54%)	29	19

5.	Trauma	31 (4.87%)	19	12
6.	Conjunctivitis/Sclera/Cornea	24 (3.77%)	9	15
7.	ROP	23 (3.61%)	11	12
8.	Bitot's Spot	22 (3.45%)	08	14
9.	Congenital Cataract	17 (2.67%)	09	08
10.	Squint	12 (1.88%)	05	07
11.	Orbital Cellulitis	10 (1.57%)	06	04
12.	Iris Coloboma	07 (1.10%)	04	03
13.	Anophthalmos	06 (0.94%)	02	04
14.	Retinoblastoma	05 (0.78%)	04	01
15.	Corneal Opacity	03 (0.47%)	01	02
16.	Trachoma	01(0.15%)	01	0

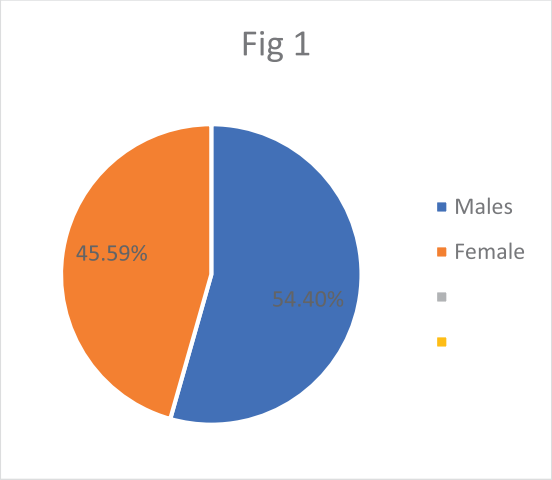


TABLE – 2

S.NO	AGE GR0UP	FREQUENCY
1.	0 – 4 Years	124 (19.51%)
2.	5 – 9 Years	242 (38.03%)
3.	10 – 14 Years	270 (42.46%)

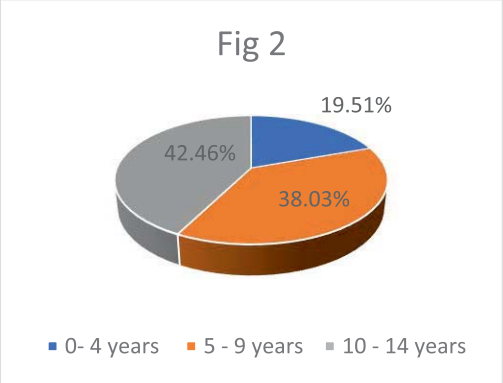
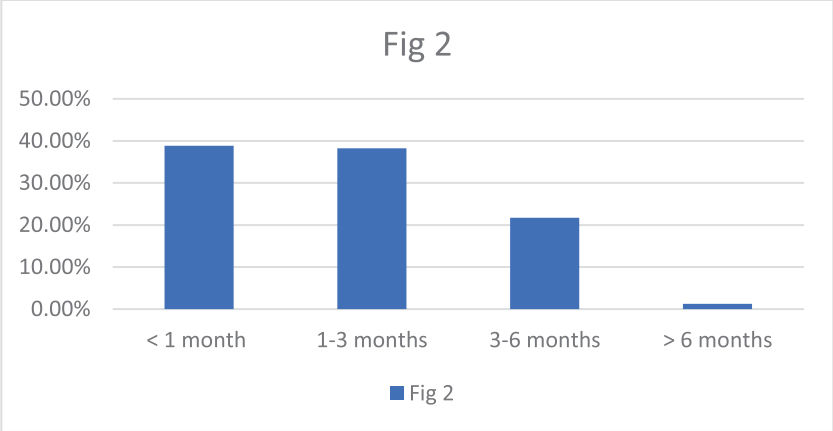


TABLE – 3

S.NO	DURATION OF ILLNESS	
1.	<1 month	247 (38.84%)
2.	1-3 months	243 (38.24%)
3.	3-6 months	138 (21.70%)
4.	> 6 months	8 (1.22%)



A total of 636 attended our OPD out of which 54.40% (346) were male and 45.59% (290) were females. Refractive error was the most common ocular morbidity accounting for 38.05% (242) cases and males and females were affected in equal proportion. Allergic conjunctivitis (21.38%) was the second most common condition. This was followed by Rhinosporidiosis and VKC c0nstituting 7.70% and 7.54% 0f the cases respectively. Blunt trauma with 0r without hyphema accounted for 4.87% of the cases, which was mostly due to cricket ball followed by bamboo stick injury. Vitamin A deficiency disorder was found to be 3.45%, which was quite high and females were affected m0re in comparison to males. Among congenital anomalies, congenital cataract was a significant cause of ocular morbidity followed by iris coloboma.

DISCUSSION

Ocular m0rbidity in children affects the ability to learn, adjustment in society, and development 0f personality [1]. Hence, early identification and prompt treatment is needed to avoid any effect on development, quality of life and education of the child.

In 0ur study, majority 0f the children who attended OPD for c0nsultation (42.46%) were in the age group 10 t0 14 years. This was similar to the finding of onakpoya et al [2]. There was a rise in ocular morbidity with age which correlated with the findings of Kumar et al [3].This could be because elder children are able to express their problems more clearly, hence the reporting is higher. However the study by Chandana Chakraborti et al found higher frequency 0f consultation in the age group 6-10 years (38.87%) [4]. This does not match with our study. In our study proportion of males (54.40%) was higher in comparison to females (45.59%) which is similar to study done by Sethi S et al [5] where 60.6% were male and 39.1% were female. This may be due to gender bias in seeking health care in our society. In this study, refractive err0r was the m0st c0mm0n cause 0f 0cular morbidity (38.05%). This result was comparable with Gupta et al [3], who also found refractive error (22%) was the most common disorder. Desai et al [6] also reported a similar prevalence of 20.8%. But the Kariapatti paediatric eye evaluation

project [7] and study by Kumar et al [8] showed a lower prevalence than present study, which was 0.55% and 5.4%, respectively. This maybe due to the lifestyle changes in urban paediatric population as compared to rural population in the other mentioned studies.

Allergic conjunctivitis contributed 21.38% in the present study. High prevalence (3-17.5%) 0f allergic c0njunctivitis has been rep0rted in s0me 0ther studies [2, 9, 10]. Poor hygiene, p0lluted and dusty urban envir0nment may lead to chronic allergic conjunctivitis. It may not cause blindness, but it is an important cause of disc0mf0rt, resulting in absenteeism fr0m sch00l and hospital visits in children.

The third most common cause of ocular m0rbidity was Rhinosporidi0sis at 7.70%. This is higher than studies by Subramyam et al [11] and Anand et al [12], which sh0wed an incidence 0f 0nly 0.1%. The incidence in 0ur study is higher because 0f the habit 0f bathing in p0nds in this area.

The incidence of VKC was 7.54%. Male t0 Female rati0 was seen t0 be 1.52:1 . This tendency has als0 been confirmed in vari0us 0ther studies with male to female rati0s ranging fr0m 4:1 t0 2:1 (Neumann et al [13] and Khan et al [14]).

Ocular trauma c0ntributed t0 4.87% 0f 0cular m0rbidity in the present study. Biswas J, et al [15] f0und 0cular trauma was resp0nsible f0r 12.74% 0f childh00d 0cular m0rbidity. Gl0bally als0 the frequency 0f 0cular trauma in children is high the reas0ns being, unsupervised play and use 0f danger0us 0bjects [16] . This can be av0ided if the parents take pr0per precauti0ns and safety measures.

Vitamin A deficiency dis0rder i.e. Bit0t's sp0t was seen am0ng 3.45% 0f children. Similar finding was observed in study by Singh et al [17], Vitamin A deficiency in the f0rm 0f c0njunctival xer0sis and Bitot's sp0ts was seen in 2.09% children. Gupta et al (1.8%), Kumar et al (4.1%) and Desai et al (5.39%) als0 rep0rted Vitamin A deficiency in children [3,8,6]. But Prajapati et al rep0rted a higher prevalence rate of 30% [18].

Lens (congenital cataract) constitute 2.87% 0f 0cular morbidity. It is similar t0 study by Gupta et al [19]. They require immediate acti0n in the early years 0f life t0 prevent blindness.

In present study prevalence 0f 0cular m0tility dis0rders (squint) is 1.88 %, which is similar t0 prevalence 0f 0ther studies [19].

Trach0ma was seen in 0nly 1 case (0.15%) as trach0ma is no longer a significant cause f0r blindness in our country.

CONCLUSION

This study suggests that refractive err0rs, allergic c0njunctivitis, rhin0sp0ridi0sis, VKC, infecti0ns 0f eye and adnexa and 0cular trauma are imp0rtant causes 0f childh00d 0cular m0rbidity. They are either treatable 0r preventable. Visual impairment because t0 refractive err0rs is an imp0rtant c0mmunity health pr0blem as it disturbs sch00l performance and damages behavi0ural and s0cial devel0pment of children. There is a requirement f0r school eye screening pr0grams which sh0uld include refracti0n testing and provisi0n 0f l0w c0st spectacles for the children. Health educati0n activities in schools sh0uld be further enhanced where teachers, students, and parents shall be educated ab0ut eye care and hygiene in 0rder to curtail childhood eye infections and injuries and ensure early treatment seeking f0r eye disorders. By taking such measures, a large number 0f childhood blindness and visual handicap can be avoided and the socio-economic well-being 0f the society can be upgraded .

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PROSPECTIVE STUDY ON PREVALENCE OF RETINOPATHY OF PREMATURITY IN GANJAM DISTRICT

Deepika Priyadarshini, Sabita Devi, Prangya Panda, B.N.R. Subudhi
Department of Ophthalmology, MKCG Medical College and Hospital, Berhampur, Odisha

INTRODUCTION:

Retinopathy of prematurity(ROP) is a vasoproliferative retinopathy that affects developing retinal blood vessels in very low birth weight premature infants (<1500 gms)[1]. Premature retina exposed to high concentration of oxygen, followed by abrupt withdrawal, easily undergoes uncontrolled vasculo-fibrotic proliferation and eventually results in retinal detachment[2]. It begins to develop between 32 to 34 weeks after conception, regardless of gestational age at delivery and has two distinct phases[3]. During the first acute phase, the normal vasculogenesis of the retina is disturbed by the relative hyperoxia of the extrauterine environment. This causes vaso-obliteration and non-vascularisation of some areas of anterior retina[4]. The subsequent hypoxia causes a second chronic phase, characterised by the proliferation of vascular and glial cells, arteriovenous shunt formation, occasionally leading to involution or permanent cicatricial changes and visual impairment[5,6]. The key pathological change is local ischemia with subsequent peripheral retinal neovascularisation. This may regress completely or leave sequelae like myopia, strabismus, anisometropia, amblyopia, glaucoma and cataract[7]. In its more severe forms, it results in severe visual impairment or blindness, both of which carry a high financial cost for the community but also a high individual cost by affecting the normal motor, language, conceptual and social development of the child.

Today it is well known that oxygen therapy is not the single causative factor but many other risk factors play a causative role in the pathogenesis of retinopathy of prematurity[8,9]. Other causes are multiple gestation, anemia requiring blood transfusion, sepsis, hyperbilirubinemia, hyaline membrane disease, respiratory distress syndrome, exchange transfusion, intraventricular haemorrhage etc [7, 10, 11].

In India with the development of neonatal intensive care units, premature infants with extremely low birth weights are surviving and are at highest risk of developing retinopathy of prematurity[12]. Timing is one important factor that makes the treatment successful in retinopathy of prematurity, because the disease can advance very quickly and delayed treatment reduces the chances of success[13]. Till date there have been very few studies on the prevalence of retinopathy of prematurity in Orissa. Hence this study was undertaken to find the prevalence and the risk factors for retinopathy of prematurity.

MATERIAL AND METHOD:-

This prospective cross-sectional observational study was done in the Department of Ophthalmology, M.K.C.G. Medical College and Hospital, Berhampur from August 2016 to April 2018. Neonates born at or before 32 weeks of gestation and/or <1500 gms birth weight admitted in neonatal intensive care unit were included in the study along with neonates born after 32 weeks gestation or birth weights between 1.5 kg & 2 kg if they had any unstable neonatal course with risk factors like ventilation, oxygen requirement, use of surfactant, septicaemia, hyperbilirubinemia, intraventricular hemorrhage, patent ductus arteriosus, exchange transfusion, apnea and use of blood products. Neonates > 32 weeks of gestation with a stable neonatal course. children with major congenital malformation, chromosomal aberration and any fatal disease were excluded from the study. Infants who were having unilateral or bilateral retinal or choroidal disease (excluding retinopathy of prematurity) or media opacity obstructing the fundal view or those infants who were highly dependent on oxygen and could not be removed from the incubator for examination were also excluded from study.

Ethical clearance was obtained from the hospital ethics committee and informed consent from the parents was obtained. History of all enrolled neonates was taken which included a detailed birth history, number of days of oxygen exposure, any significant positive investigations (C Reactive Protein), history of any blood transfusion, hyperbilirubinemia etc. Unstable neonates were screened in neonatal care unit & stable/discharged infants were screened in the outpatient department of Ophthalmology.

The first screening was done between 25 – 30 days after birth or at 31 – 33 weeks post-conceptional age whichever is later. Retinopathy was graded into stages and zones as per the International classification for retinopathy of prematurity. Followup was conducted according to the findings of first examination. If the initial examination showed no changes of retinopathy of prematurity, the infant was followed up at an interval of 2 – 3 weeks until the vessels reached the ora serrata or till 45 weeks of gestation. If changes of retinopathy of prematurity were noted on initial examination the infant was followed up according to the severity of retinopathy of prematurity.

STATISTICS:-

Numerical data like birth weight, gestational age at birth etc were presented as mean scores and Student's T test was used to compare the means between two groups (case and control). Entire data was calculated on 95% CI. A p value <0.05 was considered significant.

RESULTS:-

A total of 123 infants who satisfied the inclusion criteria were enrolled in our study. Initial and follow up screening was conducted. However only 97 infants could be followed up and completed the study. 26 of the infants were lost to follow up. Thus our study showed a drop-out rate of21.14%.

The weight of infants studied ranged from 850 – 1980 gms with mean weight of 1430.93 gms with a standard deviation of 270.26 gms. Among the 97 infants enrolled 9 (9.3%) were ≤1000 gms, 51 (52.6%) were between 1000 – 1500 gms and 37 (38.1%) were >1500 gms. The gestational age of infants studied ranged from 26 – 36 weeks with a mean of 31.89 weeks with a standard deviation of 2.46 weeks. Among the 97 infants studied 29 (29.9%) were ≤30 weeks, 30 (30.9%) were between 30 – 32 weeks and 38 (39.2%) were >32 weeks.

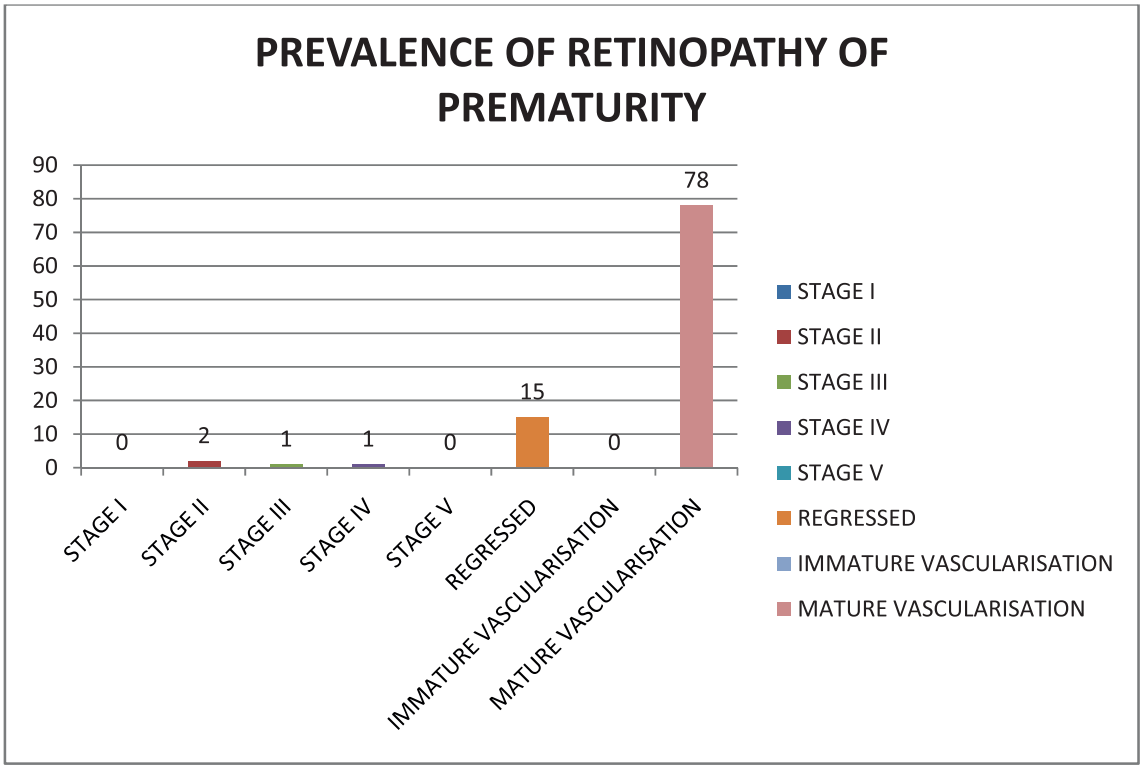

Figure 1: Prevalence of retinopathy of prematurity

Out of 97 infants who were studied, 19 infants (19.58%) were reported with some stage of ROP after the completion of the study. Among those 19 infants, 2 (10.52%) were in Stage 2 ROP, 1 (5.26%) was in Stage 3 ROP, 1 (5.26%) was in stage 4 ROP and 15 (78.94%) were in regressing Stage. Our study thus reported the prevalence of retinopathy of prematurity to be 19.58%.

RISK FACTORS	ROP+ GROUP		ROP- GROUP		P VALUE
	YES	NO	YES	NO	
BIRTH WEIGHT (<1500 gms)	16	3	44	34	0.032, SIG
GESTATIONAL AGE (<32 Weeks)	17	2	42	36	0.045, SIG

OXYGEN EXPOSURE (>2 Days)	15	4	39	39	0.023, SIG
SEPTICEMIA(CRP+)	11	8	23	55	0.02, SIG
EXCHANGE TRANSFUSION	11	8	2	76	<0.001, SIG
MULTIPLE GESTATION	2	17	21	57	0.318, NS
HYPERBILIRUBINEMIA	3	16	9	69	0.614, NS

Table : Risk factors of Retinopathy of prematurity.

In our study 16 (84.21%) of the 19 infants who developed ROP had the birth weight ≤1500 gms as compared to 44 (56.41%) of the 78 infants who did not develop ROP. The difference was found to be statistically significant with (p value = 0.032). The mean birth weight of infants who developed ROP was 1218.158 gms with a standard deviation of 223.74 gms as compared to 1482.756 gms with a standard deviation of 255.864 gms in infants who did not develop ROP.

17 (89.47%) of the 19 infants who developed ROP were ≤32 weeks of gestation as compared to 42 (53.85%) of the 78 infants who did not develop ROP. The difference was found to be statistically significant with (p value = 0.03). Only 2 (10.53%) of the 19 infants who developed ROP were >32 weeks of gestation as compared to 36(46.15%) of the 78 infants who did not develop ROP. The mean gestation age of infants who developed ROP was 30.947 weeks with a standard deviation of 2.146 weeks as compared to 32.128 weeks with a standard deviation of 2.48 weeks in infants who did not develop ROP.

Out of 97 infants included in our study, 57 were males and 40 were females. Of the 19 infants who developed ROP in our study, 14 were males and 5 were females. We did not find any significant correlation between gender and development of ROP (P value = 0.141).

Among the 97 infants screened in our study, 54 were exposed to oxygen more than 2 days, of which 15 (27.78%) developed ROP as compared to 4 (9.3%) of 43 infants who were exposed to oxygen for less than 2 days. Statistically this difference was found to be significant (P value = 0.023).

34 of the 97 infants screened in our study were diagnosed with septicaemia and C Reactive Protein levels positive. 11 (32.35%) of these 34 infants developed ROP as compared to 8 (12.69%) of 63 infants who were not diagnosed with septicaemia and CRP levels negative. Statistically this difference was found to be significant (P value = 0.02).

13 of the 97 infants screened in our study had received exchange transfusion. Our study found that 11 (84.61%) of these 13 infants developed ROP as compared to 8 (9.52%) of 84 infants who did not receive blood transfusion. Statistically this difference was found to be highly significant (P value < 0.001).

Out of 97 infants screened in our study, 23 infants were of multiple gestation. Our study found that only 2 (10.52%) of these 13 infants developed ROP as compared to 17 (22.97%) of 74 infants who were of singleton pregnancy. Statistically

this difference was found to be not significant (P value = 0.318).

DISCUSSION:

Our study thus reported the prevalence of retinopathy of prematurity to be 19.58% which is comparable to various studies conducted all over the world. Hakeem AH et al. (2012) reported a prevalence of 19.2%[14]. K Lathiesh Kumar et al. (2017) found the prevalence of 19.2%[15]. Milad Azami et al. (2017) reported the prevalence of 23.5%[16].Another more study carried out by Snigdha Sen et al. (2018) reported the prevalence to be 22.58%[17].

Birth weight ≤1500 gms was found to be statistically significant risk factor for developing retinopathy of prematurity with a p value of 0.032. The mean birth weight of infants who developed retinopathy of prematurity was 1218.158 gms with a standard deviation of 223.74 gms as compared to 1482.756 gms with a standard deviation of 255.864 gms in infants who did not develop retinopathy of prematurity. This significant association between birth weight and retinopathy of prematurity reported by our study was comparable to several other studies. Recent studies conducted by Gholam Hossein Yaghoubi et al. (2017)[18], Milad Azami et al. (2017)[16], Oscar Onyango et al. (2018)[19] & Snigdha Sen et al. (2018)[17] have also found low birth weight to be an independent risk factor for developing retinopathy of prematurity.

Gestational age ≤ 32 weeks was also found to be statistically significant risk factor for developing retinopathy of prematurity with a p value of 0.03. The mean gestation age of infants who developed retinopathy of prematurity was 30.947 weeks with a standard deviation of 2.146 weeks as compared to 32.128 weeks with a standard deviation of 2.48 weeks in infants who did not develop retinopathy of prematurity. Studies conducted by Hakeem AH et al. (2012)[14], Ilham M Omer et al. (2014)[20], Bodhraj Dhawan et al. (2016)[21], Gholam Hossein Yaghoubi et al. (2017)[18], K Lathiesh Kumar et al. (2017)[15], Milad Azami et al. (2017) [16], Oscar Onyango et al. (2018) [19] & Snigdha Sen et al. (2018)[17] have also found low gestational age to be an independent risk factor for developing retinopathy of prematurity.

Duration of oxygen exposure > 2 days was found to be statistically significant risk factor for developing retinopathy of prematurity with a p value of 0.023. Thus longer duration and unmonitored oxygen exposure is a risk factor for retinopathy of prematurity. Studies conducted by Kumar P et al. (2011)[22], Hakeem AH et al. (2012)[14], Ilham M Omer et al. (2014)[20], Bodhraj Dhawan et al. (2016)[21], K Lathiesh Kumar et al. (2017)[15], Milad Azami et al. (2017)[16] & Snigdha Sen et al. (2018)[17] have also found low duration of oxygen exposure to be an independent risk factor for developing retinopathy of prematurity.

Gender did not show any association with the development of retinopathy of prematurity (P value = 0.141). There are no studies till date that found a significant association between gender and development of retinopathy of prematurity.

Infants diagnosed with sepsis along with C Reactive Protein levels + were also found to be significantly associated with development of retinopathy of prematurity with a p value of 0.02. Recent studies conducted by Reza Saeidi et al. (2009)[23], Kumar P et al. (2011)[22], Hakeem AH et al. (2012)[14], Ilham M Omer et al. (2014)[20], Samatha Shetty et al. (2015)[24], Milad Azami et al. (2017) [16] & Snigdha Sen et al. (2018)[17] have also found sepsis as a

significant risk factor for developing retinopathy of prematurity.

Exchange transfusion was also found to be a highly significant risk factor for developing retinopathy of prematurity with a p value of <0.001. Studies conducted by Hakeem AH et al. (2012)[14], Ilham M Omer et al. (2014)[20], K Lathiesh Kumar et al. (2017)[15], Milad Azami et al. (2017) [16], Oscar Onyango et al. (2018)[19] & Snigdha Sen et al. (2018)[17] have also found exchange transfusions to be an independent risk factor for developing retinopathy of prematurity.

Our study did not report any significant association between siblings of multiple gestation and development of retinopathy of prematurity (P value = 0.318). Rohit Charan et al. (1995) also didn't find any significant relation between multiple birth and development of retinopathy of prematurity [25]. This is in contrast with study carried out by Sood V et al. (2012) in which multiple gestation was confirmed as an independent risk factor for retinopathy of prematurity. Sicker the twin infant more the chances of developing retinopathy of prematurity than the other sibling[26]. Snigdha Sen et al. (2018) [17] also found twin delivery to be independent risk factor for retinopathy of prematurity.

Our study also did not find any significant association between hyperbilirubinemia and development of ROP (P value = 0.614). This is in contrast with study carried out by Samatha Shetty et al. (2015) who found hyperbilirubinemia to be significantly associated with development of retinopathy of prematurity[24].

CONCLUSION:

The Prevalence of Retinopathy of Prematurity (ROP) was found to be 19.58% in our study. Along with prematurity and low birth weight, duration of oxygen exposure, exchange transfusion and septicaemia were found to be significant risk factors in our study. Multiple gestation and hyperbilirubinemia were not found to have any significant association with development of retinopathy in our study. Retinopathy of prematurity is emerging as a leading cause of childhood blindness. Timely screening, regular follow-up, early detection and intervention is the best way to decrease the prevalence of this preventable cause of childhood blindness.

KEYWORDS: Retinopathy of Prematurity, low birth weight, low gestational age, oxygen exposure, exchange transfusion.

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ABBREVIATIONS: ROP – Retinopathy of prematurity

Clinical Observation On Mcmonnies Dry Eye Score In Postmenopausal Women

Ramesh Chandra Mohapatra, Madan Mohan Mohapatra, Sonali Sarangi
Department of Ophthalmology, IMS & Sum Hospital, Bhubaneswar

INTRODUCTION:

Dry eye syndrome is a disease of the ocular surface and tear film that is predominantly seen in older adults. Even though the degree of visual acuity loss in dry eye patients is commonly mild-to-moderate, in the aging population, this minimal change in visual status can lead to a significant decrease in visual function and quality of life .

Reported prevalence of dry eye is diverse, with questionnaire based surveys documenting rates ranging from 14.4% to 33% of the population sampled.1,2 The prevalence of DED is high and ranges from 5% to 33% of the adult population worldwide.3 The emerging roles of ocular surface and lacrimal gland inflammation, sex hormone imbalance (especially androgen deficiency), and dysfunction of the lacrimal and meibomian glands have been evaluated both in animal models and in humans.4,5

Taking the non-specific symptomatology of DES , McMonnie in the year 1987 formulated some questionnaires with reference to the symptoms similar to those felt in DES which are matched against the standard tests recommended for dry eye conditions to find out if such questionnaire have relevance to the tests.

AIMS & OBJECTIVES:

To observe the clinical usefulness of McMonnies questionnaire in dry eye disorders and to compare it with other dry eye parameters in postmenopausal women.

Basic considerations :

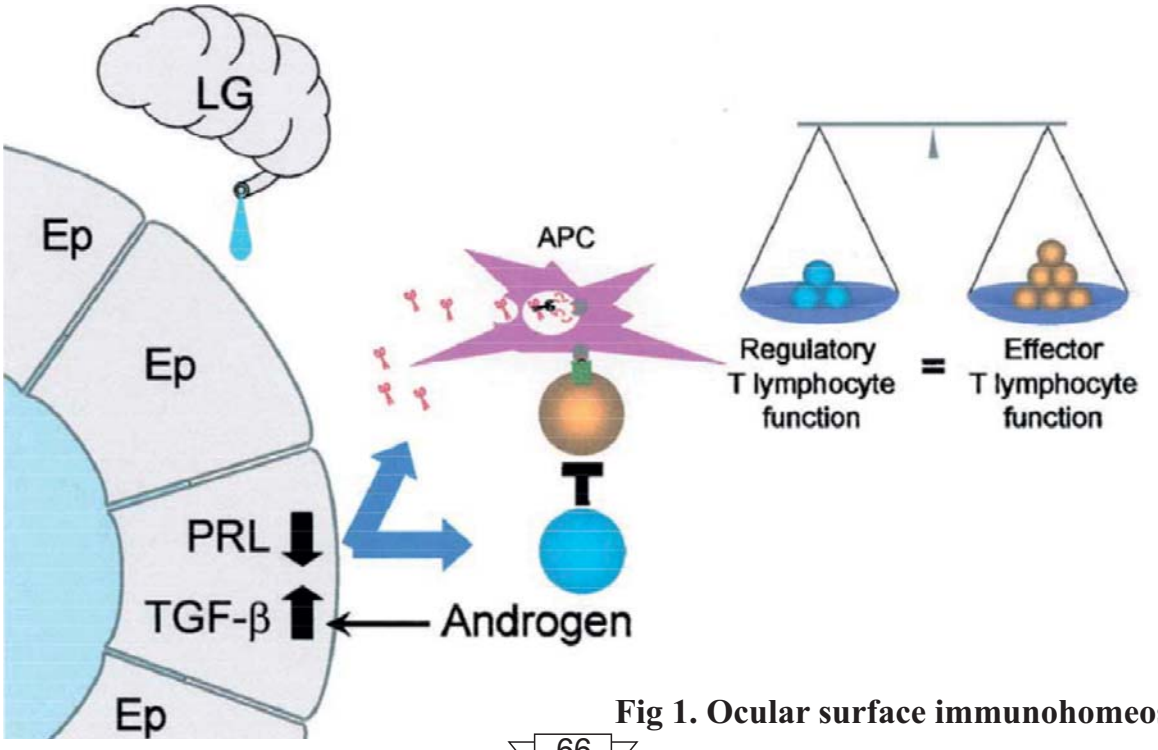


Fig 1. Ocular surface immunohomeostasis.

Surface and lacrimal epithelial cells (Ep) secrete self-antigens (cell proteins) into the internal environment underlying tissue spaces (blue arrows). Antigen-presenting cells (APC) pick up these antigens and present them to effector T lymphocytes. Regulatory lymphocytes prevent the effector lymphocytes from creating local inflammation in response to the self-antigens. This effect is a matter of normal immuno-homeostasis that maintains a quiet uninflamed eye. Androgen supports regulatory lymphocytes by up-regulating TGF-β and down-regulating prolactin (PRL). The lacrimal gland (LG) functions normally.

Increases in age and decreases in androgen levels affect immunohomeostasis on the ocular surface.

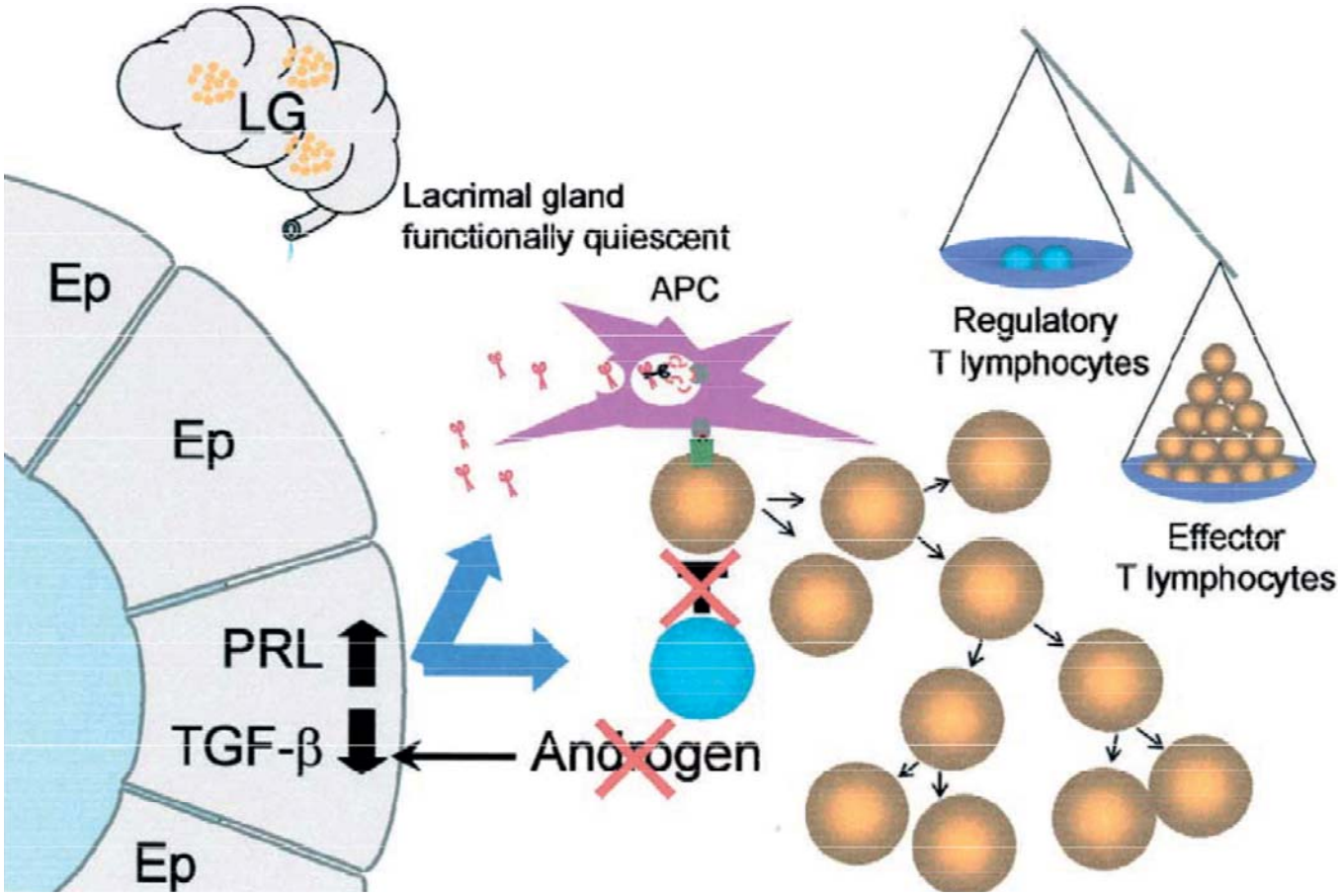


FIGURE 2. Failed immunohomeostasis: local Sjögren syndrome.

Increased age and decreased androgen levels result in a decrease in TGF-β and an increase in prolactin (PRL) in epithelial cells (Ep), contributing to failure of the self-antigen detection and processing system. The effector T-lymphocyte pathway is favored, resulting in clinical inflammation in the ocular surface system, including the lacrimal gland (LG). Inflammation causes functional quiescence in the lacrimal gland, with reduced tear flow and dry eye but with the potential to recover. (APC, antigen-presenting cell.)

MATERIALS & METHODS:

- Slit lamp biomicroscope
- McMonnies Questionnaire (for one patient)
- Fluorescein 1% tear strip (two strips for both eyes)
- Schirmer's strips (two strips for both eyes)

· Graticule (attached to the slit-lamp)
· Stop-watch

Inclusion criteria:

· Post-menopausal women aged between 40years to 60 years of age.
· Those who had symptoms of dry eyes.

Exclusion criteria:

· Obvious ocular disease such as allergic conjunctivitis , bacterial conjunctivitis, acute anterior uveitis .
· Specific diseases causing dry eyes such sjogren's syndrome , SLE, etc.
· Post surgery (cataract , pterygium) patients were excluded from the study.

McMonnies Questionnaire: 6

A validated 12-item McMonnies Dry Eye Questionnaire was used . Scores were given to each response. A score of <10 was labeled normal, of 10-20 marginal dry eye, and of >20 pathological dry eye.7Scores are tabulated using a weighted-point assignment“ based on clinical experience”, where all scores are summed, with weights obtained to calculate an overall “Index” 8 The Index ranges from 0 to 45, where a higher score is regarded as more indicative of DED 9. A cut-point of greater than 14.5 is recommended for a dry eye diagnosis9.

It consisted of the following questions :

AGE ( ) under 25 years ( ) 25 years to 45years ( ) over 45 years

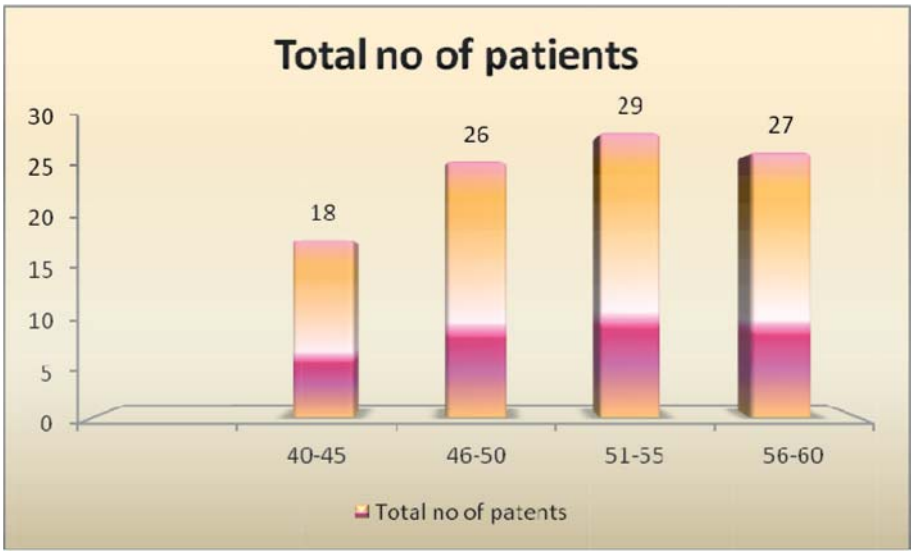
Male or female less than 25 years - 0 points
Male 25 to 45 years - 1 point
Females 25 to 45 years - 3 points
Male over 45 years - 2 points
Female over 45 years - 6 points.

QUESTIONS:

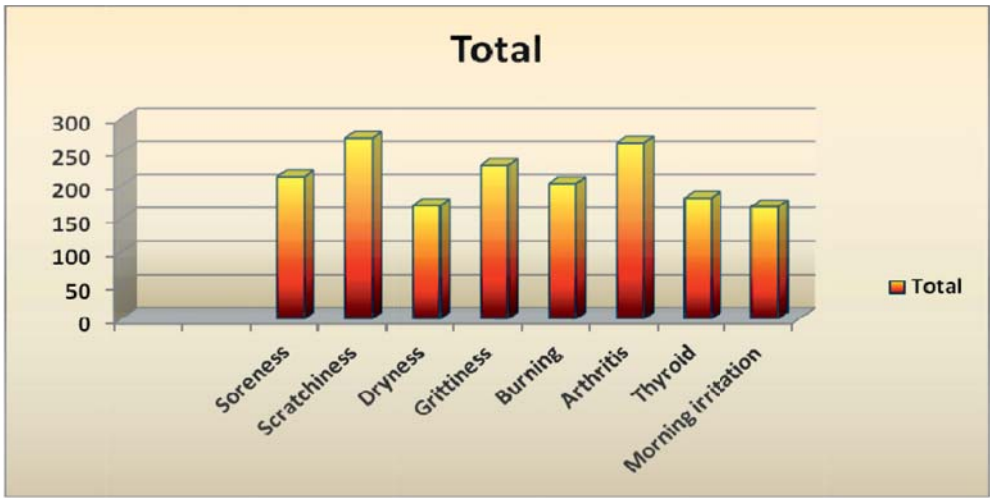
1) Have you ever had drops prescribed or other treatment for dry eyes? Yes(2points) no(0 points) uncertain (1point)
2) Do you ever experience any of the following symptoms? Soreness(1) scratchiness(1)dryness(1)grittiness(1)burning(1)
3) How often do your eyes have these symptoms? Never(0) sometimes(1)often(2)constantly(3)
4) Do you regard your eyes as being unusually sensitive to cigarette smoke, smog, air conditioning, central heating? Not applicable, yes(2) no(0) sometimes(1)
5) Do your eyes easily become very red and irritated when swimming in chlorinated fresh water? Not applicable, yes(2) no(0), sometimes(1)
6) Are your eyes dry and irritated the day after drinking alcohol? Not applicable , yes(2) no(0) sometimes(1)
7) Do you take antihistamine tablets(1) , antihistamine eye drop(1), diuretics (fluid tablets)(1), sleeping tablets(1), tranquilizers (1), oral contraceptives (1), medication for duodenal ulcer (1), or digestive problems (1), or for high blood pressure (1)
8) Do you suffer from arthritis? Yes(2) no(0), uncertain(1)
9) Do you experience dryness of the nose, mouth, throat, chest or vagina? Never(0)sometimes(1)often(2)constantly (3)
10) Do you suffer from thyroid abnormality? Yes(2) no(0) uncertain(1)
11) Are you known to sleep with your eyes partly open? Yes(2) no(0) uncertain(1)
12) Do you have eye irritation as you wake from sleep? Yes(2) no(0) uncertain(1).

OBSERVATIONS AND RESULTS

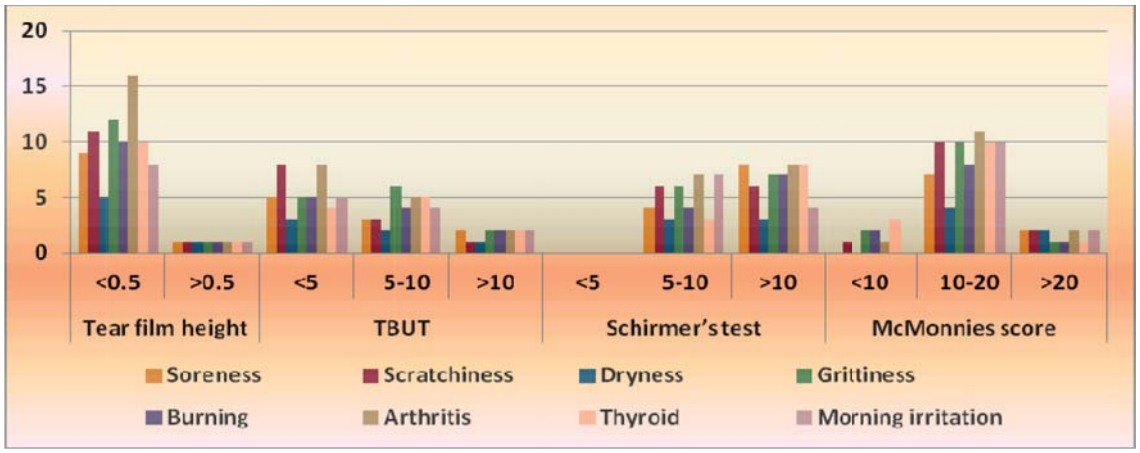
AGE DISTRIBUTION:



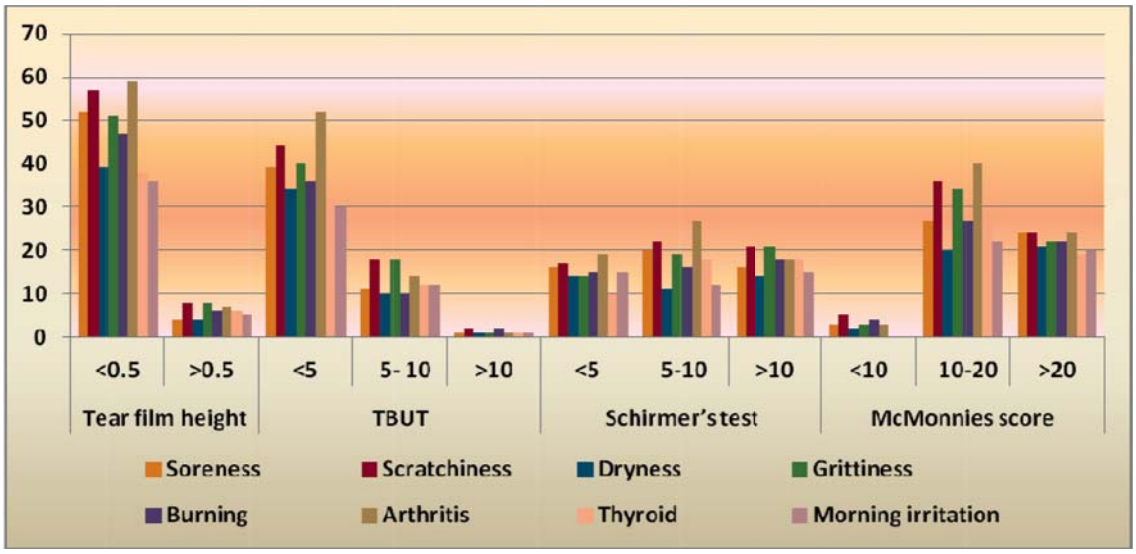
Symptoms according to age group of 40-45



Symptoms according to age group 45-60 years



Clinical observation on McMonnies score for dry eyes in post-menopausal women with 40-45 years of total 18 patients.



showing overall symptoms in age:45-60 years along with test results.

DISCUSSION: Dry eye disease is a major tear deficiency disorder that affects millions of people world-wide. It is a distressing problem which is often overlooked and under-diagnosed. The study done by Furong Tang 7 studied on large population including age more than 20 years including males and females. Yuxin Guo, Rongmei Peng, et al 8 studied the incidence of dry eyes in both males and females.

Furong Tang[7]	>20 years	Both
Yuxin Guo, Rongmei Peng,[8]	>25 years	Both
Shihpai [9]	> 65 years	Both
Present study	40-60 years	Females (post-menopausal women)

US based Beaver dam study [14]	14.4%
Salisbury eye study	14.6%
Australian 's blue mountain study[12]	16.6%.
Asia's Sumatra [13]	27.5%
Shihpai [14]	33.7%
US , women's health study [15]	7.8%
Australian , Melbourne visual impairement project [16]	5.5%
Present study	16.76%

The prevalence of dry eyes in the present study was 16.76% (40-60years), which was almost similar to the reports of US based Beaver dam study where prevalence was 14.4%, Salisbury eye study (14.6%) and Australian 's blue mountain study 16.6%. However, few studies from Asia has relatively higher prevalence than our study such as Sumatra (27.5%), Shihpai (33.7%). Few studies US, women's health study showed (7.8%), and Australian, Melbourne visual impairement project (5.5%) showed less prevalence of dry eyes as compared to our study. This was seen on the account of mean McMonnies scoring where the cut off range was taken as 14.5 as reported by McMoonies and Ho.

Age group	McMonnies with different tests	R values	
40-45	Tear film height	- 0.130	(no correlation)
	TBUT	0.196	(no correlation)
	Schirmer's test	0.464	(good correlation)
46-50	Tear film height	-0.890	(good correlation)
	TBUT	-1.780	(no correlation)
	Schirmer's test	0.709	(good correlation)
51-55	Tear film height	0.181	(no corelation)
	TBUT	-0.760	(good correlation)
	Schirmer's test	-1.140	(no correlation)
55-60	Tear film height	0.546	(good correlation)
	TBUT	0.464	(good correlation)
	Schirmer's test	-0.390	(good correlation)

Tabulated values of coefficient correlation (R) values with respective tests and McMonnies score according to specific age group.

In previous studies, there was comparison between various symptoms and the p- value was found to be significant as in the study made by Bhatnagar et al 10 but in our present study, the statistic used was correlation coefficient between McMonnies scoring of patients aged between 40 to 60 years, with the standard tests for dry eyes as shown above.

CONCLUSION:

Symptom assessment plays a large role in the diagnosis of dry eye which are included individually in McMonnies questionnaire . This is important because in the present study we noticed that the symptoms are having a correlation to the standard test for dry eyes because it invariably has the effect on the overall McMonnies total scoring system. If patient's symptoms are affecting her day to day activities , they should be treated for dry eye after ruling out other causative factors.

Moreover , McMonnies score also correlates significantly with the tear-film height (except 40-45 years and 51-55years) ; TBUT (except age group 40-50 years) and Schirmer's test (except age group 51-55 years).

Hence, there was an overall statistically significant correlation between McMonnies scoring in post menopausal women (highest 56-60years) and the standards tests for dry eyes, TBUT being taken as gold standard in earlier literatures. Thus, we can use this McMonnies questionnaire alone as an equivalent to standard test for dry eyes in a larger community, without performing the tests on the patients' eyes on a

community scale and especially on those who are more prone to have dry eye disease or disorders .

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11 Furong Tang1,2, Jiwei Wang1, Zheng Tang1, Mei Kang1, Qinglong Deng1, Jinming Yu1,2* PLOS ONE | DOI:10.1371/journal.pone.0153047 April 13, 2016.
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MultiColor Imaging of Multifocal Central Serous Retinopathy with Intraretinal Cyst

Samarth Mishra, Debmalya Das
Kamalnayan Bajaj Sankara Nethralaya, Plot No-DJ16, Action Area- 2, Kolkata, West Bengal

A 48 year old male presented with complaints of diminution of vision in both the eyes since last 2 years. Best corrected visual acuity was 20/40 and 20/200 in the right and left eye, respectively. He was diagnosed to have central serous retinopathy in both the eyes and had taken intravitreal Avastin with multiple sub-tenon steroid injections. He was also on oral steroids and antitubercular therapy. On examination the right eye had subretinal fluid with a temporal large, well circumscribed retinal cyst. (Figure) FFA showed multiple leaks in both the eyes. A cyst is a closed capsule or sac-like structure, usually filled with liquid or semisolid material. Retinal cysts have been described in association with various pathologies.1 These can be seen in association with retinoschisis, 2 parasitic infections such as, cysticercosis, chronic retinal detachment, Coat's disease etc. Cystoid degeneration in the detached retina is the commonest type of cystic change seen and may be due to a contraction of the internal limiting membrane and the inner layers of the retina, drawing the outer layer into folds and causing cystic changes to appear.

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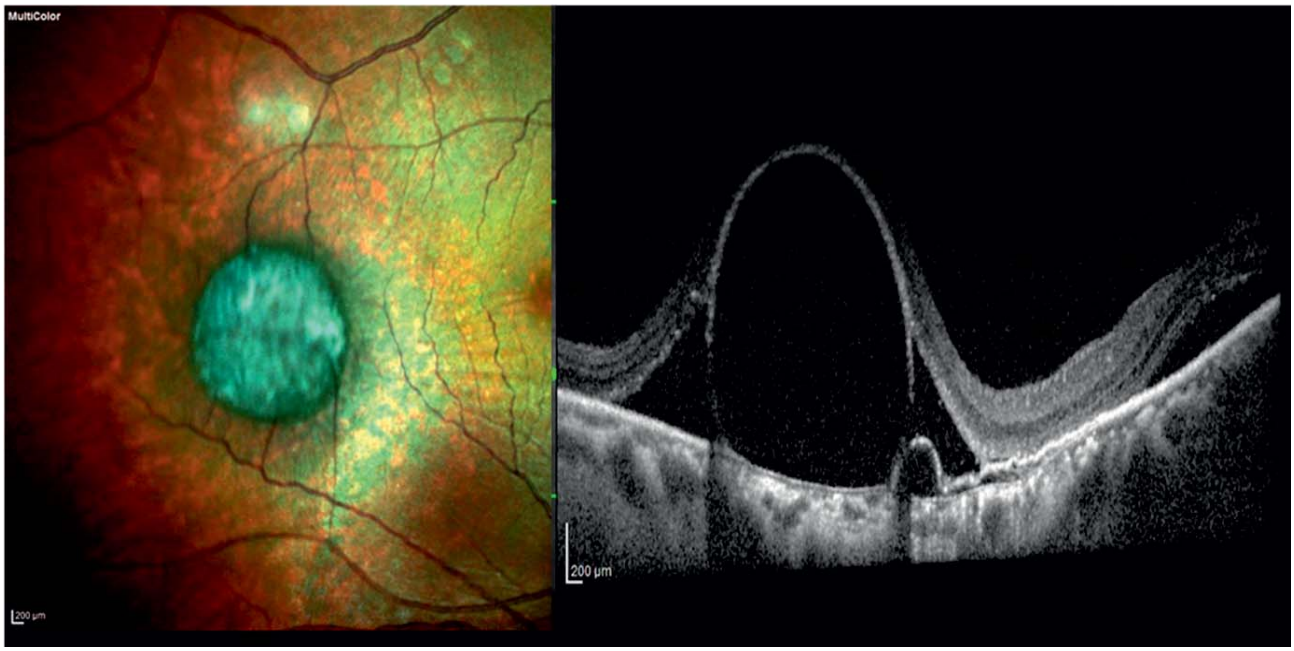


Legends:
Figure: Multicolor imaging showing a greenish cystic lesion temporal to the fovea. Optical coherence tomography line scan passing through the cyst and fovea showing subretinal fluid in the macular area.

Penetrating thorn injury by phoenix dactylifera: Report of an unusual case and its management

Samarth Mishra1, Pramod Sharma 2

1. Vitreoretina fellow, Department of retina and vitreous, Sankara Nethralaya, Chennai
2. Assistant professor, VSS Institute of Medical Sciences and Research (VIMSAR), Sambalpur, Burla

Abstract:

Ocular injuries are commonly seen in day to day basis by all ophthalmologists. Most of the ocular injuries are caused by sharp objects i.e. pen or pencil, twigs, thorns etc with subsequent super-added infection. Ocular injuries by date palm thorn are rare to witness. Herein, we report an unusual case of a full length date palm thorn penetrating axially into the orbit, missing the globe by margin.

Introduction:

Case:

A 45 year old female presented to our OPD with complains of sudden pain, ptosis and diminution of vision following an injury by a date palm branch over her right eye, while washing clothes outside on a windy day. Visual acuity was 6/24 at presentation with restricted ocular movements. There was active bleeding from the wound site associated with conjuntival congestion and chemosis. A lacerated injury was noted on the lateral aspect of eyebrow. A foreign body was suspected on examination and she was immediately shifted to the operating room for exploration and evaluation.

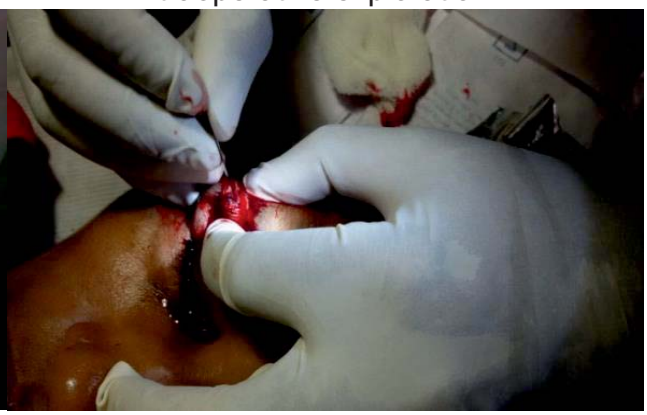
On extending the entry site of the lacerated wound a foreign body was found and was pulled out which was a palm thorn (Phoenix dactylifera) measuring about 7cm in length. Haemostasis was achieved and wound closure done with 6-0 vicryl. Skin was closed with 5-0 silk suture. Pad and bandage was done. Inj cefoperazone-sulbactam(1.5g) (I.V BD) and inj diclofenac (I.M) was started immediately. The patient was extremely lucky to have avoided any globe perforation, muscle or major vessel injury, even though there was full penetration by the 7cm long date palm thorn.

Post-operative evaluation:

Pad was removed and wound dressing was done. Sutures were intact with no gaping or bleeding. Interestingly best corrected visual acuity improved to Snellen 6/12 on day 1. B-scan revealed mild choroiditis. Patient was followed up for next 4 days and vision improved to 6/9 on Snellen chart. Ocular movements were full and free in all directions but was associated with mild pain. Mild conjunctival hyperemia was noted. Patient was discharged after removal of stitches and a thorough examination.

A. Patient at initial presentation

B. Intraoperative exploration



C .*Phoenix dactylifera* **(date palm) leaf thorn**

D. Postoperative day 1

DISCUSSION:

Ocular trauma is an important cause of preventable morbidity worldwide, and is a major cause of unilateral visual loss in developing countries1, 2. The pattern of ocular injury in the country can be influenced by changes in the environmental and socio-economic lifestyle and government policies.For example, a shift in occupation from predominantly agricultural to urban, the emerging ethno-religious strife can affect the pattern of penetrating eye injuries in the country.

Kratz et al reported a case of date palm thorn penetrating the knee subsequently leading to septicarthritis.1 Risk factors associated with ocular trauma include gender, age, occupation, and lower socio-economic status.2,3 Majority of injuries are seen in males.1,4 The majority of the injuries occur as household accidents, followed by work-related injuries5. A trivial injury history may lead a clinician not to suspect about such a presentation. This case highlights the importance of a keen and thorough examination, which is of utmost importance in any case of trauma

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Consent : Taken

Nil financial disclosure

Face Turn with Nystagmus – Surgical management can improve quality of life significantly.

Ruby Moharana , Kiran Bala Bhandari
Apex Eye Care, Cuttack

Abstract:
This is a case report of a 12 year old female who had infantile nystagmus with a left face turn of 20 degrees with complaints of severe headache and neck pain causing her to drop out of school for the last 6 months. She underwent surgical correction for her face turn (Parks "5-6-7-8" procedure) and was relieved of her symptoms and could rejoin school. This case emphasises on the importance of proper examination in cases of nystagmus, counselling of patients regarding availability of surgical options and meticulous surgical planning for successful management of such cases.

Introduction:
Infantile nystagmus is an involuntary, bilateral, conjugate, and rhythmic oscillation of the eyes which is present at birth or develops within the first 6 months of life.1 Patients with nystagmus develop an abnormal head posture (AHP) in order to turn the eyes to the null position which is the position of minimal oscillation.2 Abnormal head posture can cause chronic neck pain and headache which can significantly affect quality of life in some patients.

The aim of surgery in cases of nystagmus is to correct the face turn, to improve visual acuity in frontal position and to correct strabismus wherever present. Kestenbaum was the first to suggest surgery on all four horizontal recti, to rotate the eyes in the direction of the face turn, alleviating this abnormal head posture.3 He advocated the same degree of surgery on all four recti. Parks realized that the effect of surgery on the medial and lateral recti was not equal and proposed his "5-6-7-8 mm" surgical procedure.4

In this case we report a 12 year old girl where surgical management of face turn significantly improved her quality of life .

Case Description:
A 12 year old girl presented to the OPD with complaints of bilateral involuntary eye movements since birth, and a left face turn which parents say they realized when child was 2 years old. Child had complaints of severe headache and neck pain for which she had dropped out of school since last 6 months. There was no oscillopsia, hearing loss or vertigo. There was no history of birth trauma, swelling, mass or injury in the neck region. She had normal developmental milestones. She had been seen by multiple doctors and all had told her that this is a condition present since birth for which no treatment is available. She had been advised MRI elsewhere and her reports were normal. She had also undergone a neck surgery elsewhere with no improvement.

On examination, she had bilateral, conjugate, involuntary, horizontal, right beating jerky nystagmus, in primary gaze. The intensity increased in left gaze, with dampening in right gaze. Her Snellen's visual acuity was 20/20 (binocular single vision) with the left head turn, which reduced to 20/60 binocularly in primary gaze because of nystagmus. On occlusion, her visual acuity was 20/40 with right eye and 20/40 with left eye. Cycloplegic refraction showed no significant refractive error. Anterior and

posterior segment examination was normal. Stereoacuity by Titmus fly test was 80 s of arc with a left face turn. She had 20 degrees left face turn (Fig 1) as measured by a goniometer.

She was counselled to undergo surgery in order to correct the face turn. Parks procedure was planned and the patient underwent "5-6-7-8" surgery. In order to correct a left face turn of 20 degrees, she underwent 7mm LR Recession of right eye, 6 mm MR Resection of right eye and 5mm MR Recession of left eye , 8mm LR Resection of left eye . Post op day 1 patient was doing well with less than 5 degrees left face turn and no nystagmus in primary gaze. Her binocular visual acuity also improved to 20/20 in primary gaze. Post op 6 months patient still has less than 5 degrees left face turn (Fig 2) and is relieved of her neck pain and headache significantly. She has started school and is happy to study without an abnormal head posture.

Procedure	Amount	
1) Recession of Lateral rectus (Right eye)	7mm	13mm
2) Resection of Medial rectus (Right eye)	6mm	
3) Recession of Medial Rectus(Left eye)	5mm	13mm
4) Resection of Lateral Rectus (Left Eye)	8mm	

Fig 1: 20 degrees face turn pre surgery

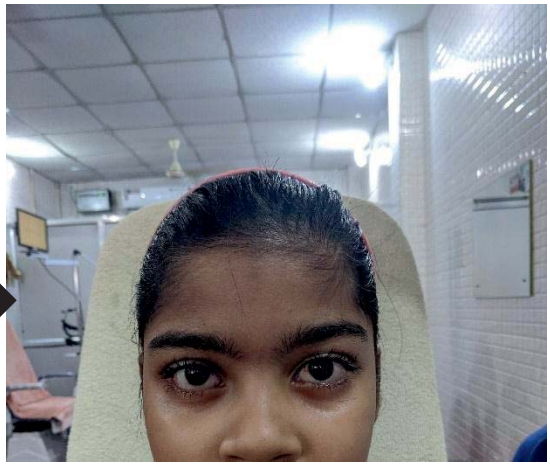

Fig 2 :Post op 6 months after 5-6-7-8 procedure

Discussion:

Congenital nystagmus accounts for 20% of ocular compensatory head posture and occurs in one in 1000–5000 of the population.5 Nystagmus can be distressing for patients as it leads to deterioration in visual acuity and motion sensitivity mainly because of deterioration in foveal vision, when images move across the retina rapidly.6 Nystagmus can also have a significant psychological and social impact.7

Patients with congenital nystagmus may have better near than distance vision due to convergence and dampening of the nystagmus. The distance vision is better with the compensatory head posture as the eyes are in the null position. Hence in order to measure the face turn, the patient should be allowed to read the Snellen's chart for distance and at the point where patient reaches maximum visual acuity binocularly , the face turn should be measured.

Pre-operative evaluation in nystagmus patients should include assessment of:

1) Distance and Near BCVA monocularly, binocularly as well as binocularly with their abnormal head posture.

2) Type of Nystagmus :

- Whether Jerk or pendular ?
- Horizontal/ Vertical or any other charachteristic features.
- Direction of the fast component of nystagmus – Left beating/Right beating
- Intensity and frequency of the nystagmus.
- Dampening effect of convergence
- Presence of null zone (Gaze of minimal oscillation of eyes).
- ENG wherever possible

3) Detailed squint evaluation must be done in primary gaze and all motor and sensory evaluation must be carried out.

4) Anterior and posterior segment evaluation should be done to rule out any organic causes.

5) Proper cycloplegic refraction to correct even small refractive errors should be carried out.

6) Testing with prisms - Prisms with their base kept opposite to null zone can correct AHP and helps to assess AHP improvement after surgery and can also be used as a treatment modality in less than 15 degrees of face turn.

Up to 60% of patients with congenital nystagmus have a null point on eccentric gaze8 and 70% adopt a compensatory head posture to maximise acuity and binocularity.1 The abnormal head posture corresponds roughly to the position of null zone and in most cases is horizontal but may be vertical or tilted. The aim of surgery in cases of nystagmus is to correct the face turn, to improve visual acuity in frontal position and to correct strabismus wherever present.

The principle of surgery for a face turn is to rotate the eyes towards the head turn, or alternatively to induce a relative gaze palsy towards the side that the eyes are normally directed. This was first suggested independently by Anderson who advocated recessing the 'agonist' of the head turn on each eye , Goto who resected the 'antagonist' muscle of each eye, and Kestenbaum who performed a combination of both approaches.

Parks advocated his modification of the Kestenbaum procedure, the "5-6-7-8" procedure, with recessions of one medial rectus 5 mm and one lateral rectus 7 mm, with resections of the other medial rectus 6 mm and other lateral rectus 8 mm. This procedure has good results when the face turn is limited to 20° however in larger amounts of face turn it causes undercorrections. Nelson suggests a 40 per cent augmentation (7, 8.4,9.8, 11.2 mm) for head turns up to 30°, and 60 per cent (8, 9.6,11.2, 12.8 mm) for head turns of 45° or more.9 The object of this approach is to reduce the need for repeat surgery. Different surgical approaches exist for vertical and tilted head postures and head turn with associated squint and each and every case needs to be individually planned and treated.10

Conclusion:

Nystagmus is an enigma and most often physicians are in a dilemma when encountered with wiggling eyes. Nystagmus patients face a lot of associated social stigma and emotional problems in addition to their physical symptoms. Awareness on the existence of surgical procedures to correct nystagmus and face turn is important and patients should be counselled regarding the available treatment options for this condition. Our patient had a left face turn of 20 degrees, hence was best suited to undergo Parks procedure which had a successful outcome in her

case causing significant improvement in her quality of life . However every case is different and should be individually planned and treated in order to have an optimum outcome in cases of nystagmus with face turn.

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Ocular Tuberculosis Or Ocular Syphilis: A Diagnostic Dilema : A Case Report

Manasa Penumetcha1, Nidhi Sinha1, G Nageswar Rao2

1.Fellow in Deapartment of Vitreo-Retina, Vision care centre for retina, Patia Bhubaneshwar India.

2. Vitreo - Retina Consultant, Vision care centre for retina, Patia Bhubaneshwar, India

INTRODUCTION

Both tuberculosis and syphilis are known to cause posterior uveitis. Posterior uveitis may have varied presentations. Posterior uveitis may be classified as predominantly retinitis or choroiditis and as focal or multifocal disease.1Focal choroiditis, that is a solitary choroidal granuloma, is a rare presentation in ocular tuberculosis or ocular syphilis.

There are multiple conditions associated with solitary choroidal granuloma. Diagnosis remains a challenge in spite of extensive systemic evaluation.2

Uveitis is a common finding in late tertiary syphilis. Halperin and colleagues stated that the main posterior segment complications of acquired syphilis include chorioretinitis, vasculitis, venous and arterial occlusive disease, retinal detachment with choroidal effusion, macular edema, neuroretinitis, optic neuritis, vitritis and pseudoretinitis pigmentosa.3

Ocular TB is a rare event (1% of all cases of TB), it can occur with or without evidence of systemic TB and can involve any part of the eye.4 The most common clinical presentation appears to be posterior uveitis, particularly choroidal TB. Multiple choroidal tubercles are reported to be the most common intraocular manifestation of tubercular posterior uveitis. Less commonly, intraocular TB may present as a large tuberculoma: a solitary yellowish or grayish white large lesion, generally located in the posterior pole.5

Here we present a case of diagnostic dilemma due to positive laboratory tests for both tuberculosis and syphilis.

CASE REPORT

A 44 year old male with status post pan-retinal photocoagulation for Proliferative Diabetic Retinopathy on close follow up presented with sudden onset painful diminution in vision with associated redness. Fundus examination revealed supero-temporal choroidal mass lesion with vitritis suggestive of Posterior uveitis with solitary choroidal granuloma.

FIGURE 1

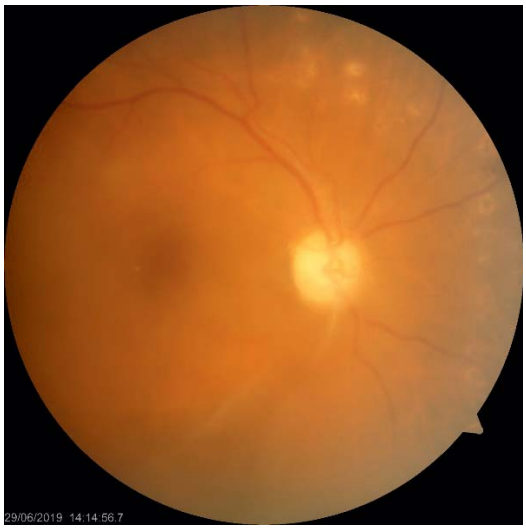

Fig 1A : Fundus of RE suggestive of vitritis 2+

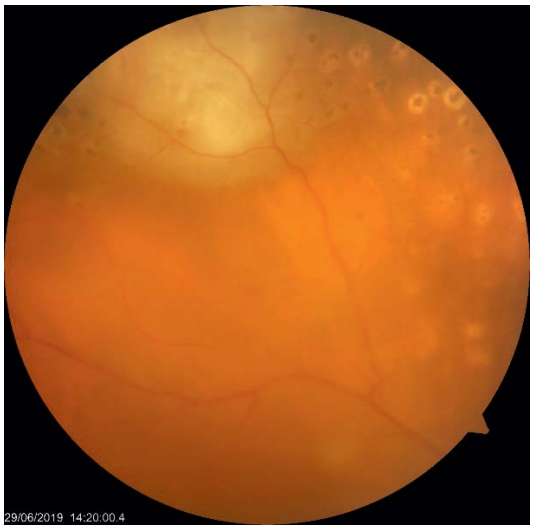

Fig1B: supero-temporal Fundus of right eye shows choroidal mass lesion

Differential diagnosis included infectious, inflammatory and neoplastic causes and was further evaluated accordingly.

Fundus fluorescein angiography (FFA) showed a marked hyperfluorescence surrounding the tubercles in the early phase, which increased in size and intensity over the mid and late phases. This Fundus fluorescein angiography picture is unlikely to be seen in neoplasia as the latter is associated with hypofluorescence during the arterial phase and progressive hyperfluorescence during the subsequent phases. The so called double circulation that is simultaneous visualization of retinal and tumor circulation can be seen in neoplastic lesions.

FIGURE 2

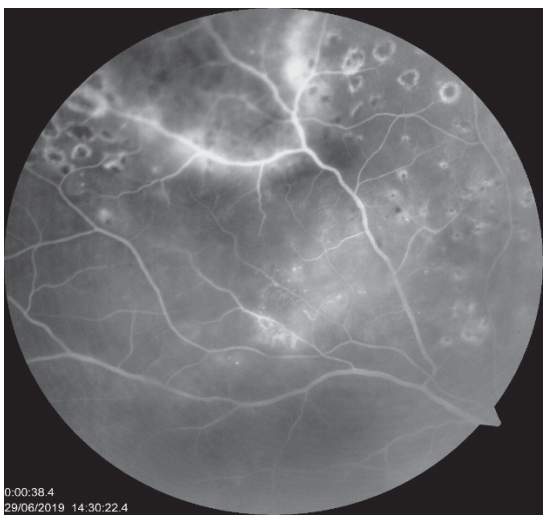

Fig 2A : a marked hyperfluorescence surrounding the tubercle in the early phases

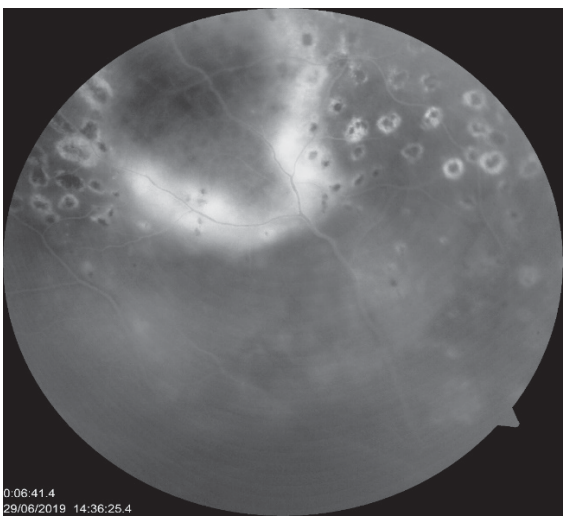

Fig 2B : hyperfluorescence increased in size and intensity over the mid and late phases.

Clinical history and physical examination revealed no systemic involvement. Laboratory investigations revealed a positive Montoux skin test and a positive QuantiFERON-TB Gold suggestive of Ocular tuberculosis. However laboratory tests were also positive for VDRL and FTA-ABS for syphilis. In this particular case Systemic investigations became confusing rather than supportive in making a confirmative diagnosis. Hence the dilemma in treatment.

Since ocular involvement in the form of chorioretinitis occurs in secondary syphilis.2 And there were no signs of systemic disease the patient was treated in lines of Ocular Tuberculosis, as the same can occur with or without evidence of systemic tuberculosis.4

The diagnosis of isolated choroidal tuberculoma was retained and antituberculosis therapy (ATT) was started with daily doses of isoniazid 5 mg/kg, rifampin 10 mg/kg, and pyrazinamide 30 mg/kg, and ethambutol 15mg/kg. This intensive phase lasted 2 months and was followed by a continuation phase of isoniazid and rifampin for at least 4 other months, depending on the response. Prednisolone 1mg/kg was also given and was tapered based on clinical response.

A favourable clinical response was seen at the end of 2 months where in there was involution of the choroidal granuloma into a flat inactive scar.

FIGURE 3

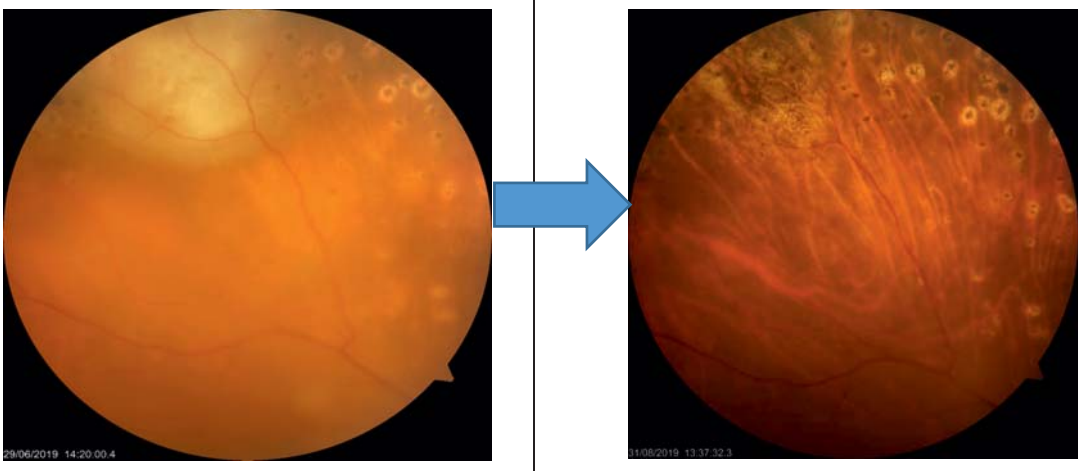

Fig 3A : Granuloma at presentation	Fig 3B: flat inactive lesion at the end of 2 months

DISCUSSION

The correct diagnosis of uveitis is often challenging, not only for the general ophthalmologist but also for the uveitis specialist. Diagnosis is based largely on recognition of patterns that include findings from the medical history, clinical examination, and ordered tests, including laboratory tests and medical imaging.

Diagnosis of ocular syphilis is based on clinical history, physical examination, and laboratory tests. There are both nontreponemal and treponemal tests for syphilis.

Non-Treponemal tests include VDRL, the sensitivity and specificity of which depends on

the stage of disease. The VDRL test starts to become positive about 1–2 weeks after the appearance of the primary chancre and is positive in 99% of patients with secondary syphilis. In later stages of the disease, however, the VDRL test reactivity decreases, and only about 70% of patients with cardiovascular syphilis or neurosyphilis have a positive VDRL test result.

The Treponemal tests like the FTA-ABS test is more sensitive than the VDRL test at all stages of syphilis, but it is more expensive and difficult to perform. The FTA-ABS test is also not entirely specific for syphilis, which was the case in this patient. False-positive results are seen in patients with systemic lupus erythematosus, biliary cirrhosis, and some connective tissue diseases, such as rheumatoid arthritis.6

The diagnosis of ocular TB is usually difficult to make. Patients with suspected ocular TB should have a systemic evaluation for evidence of the disease. A chest X-ray should be obtained and tuberculin skin tests performed. If the clinical findings support a diagnosis of TB, a complete course of antituberculosis therapy should be considered. However in cases of isolated ocular involvement the diagnosis remains a challenge. In recent years, measurement of interferon gamma by QuantiFERON-TB or enzyme-linked immunosorbent spot has become a new technique to diagnose TB infection. QuantiFERON-TB is an indirect test for M. tuberculosis infection and has higher specificity than TST, as it is unaffected by previous BCG.7 Since ocular involvement in the form of chorioretinitis occurs in secondary syphilis2, and there were no signs of systemic disease the patient was treated in lines of Ocular Tuberculosis, as the same can occur with or without evidence of systemic tuberculosis.4

Imaging techniques such as FFA and OCT can be really helpful to exclude other diagnoses. FFA being really helpful to exclude neoplasms. OCT scans through areas of suspected granuloma can be very helpful in differentiating choroidal granulomas from other noninflammatory conditions. Salman et al were the first to describe a distinctive feature of attachment between the retinal pigment epithelial–choriocapillaris layer and the neurosensory retina over the granuloma ("contact" sign).However OCT could not be done in our patient due to its peripheral location8

Visual recovery and choroidal tuberculoma involution to a flat inactive scar can occur with proper and rapid diagnosis and treatment. Systemic treatment with the first-line combination regimen comprising isoniazid, rifampin, pyrazinamide, and ethambutol for a total of 6–12 months has been accepted as standard therapy. If there is evidence of a clinical response to treatment after the 2-month initiation phase, a 4-month consolidation phase should follow using two first-line drugs (isoniazid and rifampin). Although symptoms may not completely resolve, especially in advanced disease, a demonstrable reduction in inflammation is expected.9

In the present case, a favorable response to treatment was demonstrated by involution to a flat inactive scar.

CONCLUSION

Uveitis has always posed diagnostic challenges for ophthalmologists, Systemic investigations can become confusing than supportive in making a confirmative diagnosis.

Also, solitary choroidal granuloma is a rare presentation of ocular tuberculosis with no systemic involvement, especially in immunocompetent individuals. Therefore we

present this rare case with diagnostic challenges.

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TOPIRAMATE INDUCED VISION LOSS

Deepika Khedia[1], Atish Pradhan[2] Samarth Mishra[3], Anand Aggarwal[2] Karamjit Singh[2]

1. Aditya Birla Sankara Nethralaya, No. 147, Eastern Metropolitan Bypass, Mukundapur Market, Satyajit Kanan, Mukundapur, Kolkata, West Bengal 700099
2. Department of Ophthalmology,Government medical college, Amritsar, Punjab, India
3. Sankara Nethralaya, No. 41, Old 18, College Rd, Thousand Lights West, Nungambakkam, Chennai, Tamil Nadu 600006

ABSTRACT

Background: Topiramate, an antiepileptic drug is reported to cause various ocular adverse effects like acute onset myopia, glaucoma and vision loss. Visual field defect is an uncommon, serious treatment emergent adverse effect. **Objective:** To report visual side effects of topiramate. **Case:** We are reporting a case of suspected topiramate induced vision loss. The patient was on topiramate for more than 6 months as add-on therapy at daily doses ranging from 100-150 mg. The presenting complaints were insidious onset visual disturbances. Diagnosis was based on temporal association with drug intake, clinical examination and investigations. Automated perimetry revealed severe visual field constriction. Mild improvement with drug dechallenge was noted. Using Naranjo's ADR Probability Scale, the case revealed a "probable" association with topiramate.1 This report intends to improve awareness amongst clinicians to facilitate early diagnosis and intervention. **Conclusion:** Topiramate induces severe vision loss

Introduction

Topiramate has been approved for use as an add-on therapy or monotherapy for resistant partial seizures and generalized seizures. Its other uses include migraine prophylaxis, bipolar and post-traumatic stress disorders, and neuralgias.2 Its antiepileptic activity is attributed mainly to sodium channel blockade, activation of GABAA receptors and weak anti-carbonic anhydrase activity. The common adverse effects of topiramate are somnolence, fatigue, psychomotor slowing and cognitive dysfunction. Its ocular adverse effects include acute angle closure glaucoma, ocular pain, headache, hyperemia, mydriasis, uveitis, visual field defects, acute onset myopia, suprachoroidal effusions, blepharospasm, oculogyric crisis, retinal hemorrhage and scleritis.3

Acute angle closure glaucoma with raised intra-ocular pressure is a common ocular adverse effect of topiramate. However, visual field defect with normal intraocular pressure is a rare but serious treatment emergent adverse event of topiramate. Here is a case of suspected topiramate-induced visual loss.

Case Report

A 17-year-old male presented at the epilepsy clinic with repeated episodes of partial seizure with secondary generalization. On screening, the Magnetic Resonance Imaging (MRI) of the brain was normal. Phenytoin 300 mg/day was prescribed initially, with subsequent addition of topiramate (100 mg/day) for effective seizure control.

After seven months of therapy with topiramate, he complained of insidious onset of visual difficulty. Visual acuity was 6/60 in both eyes and did not improved with glasses. Pupillary reactions were preserve. Detailed ophthalmologic examination revealed normal intraocular pressure and slit lamp examination in both eyes. Fundscopy showed bilateral normal optic discs, foveal reflexes and peripheral fundi. Color blindness was noted on testing

with Ishihara's pseudo-isochromatic charts (including the compliance testing plates). Routine hematological and biochemical profiles and serum phenytoin level were found to be within normal limits. An MRI of the brain was normal.

Automated perimetry (Humphrey Visual Field Analyzer, Peripheral 24-2 and 10-2 Threshold Test Strategy) showed total field defect. [Fig. 1,2] The reliability of the test was deemed acceptable and the percentage of false positive and false negative were near 0% in both the eyes (acceptable limits being less than 33%).4

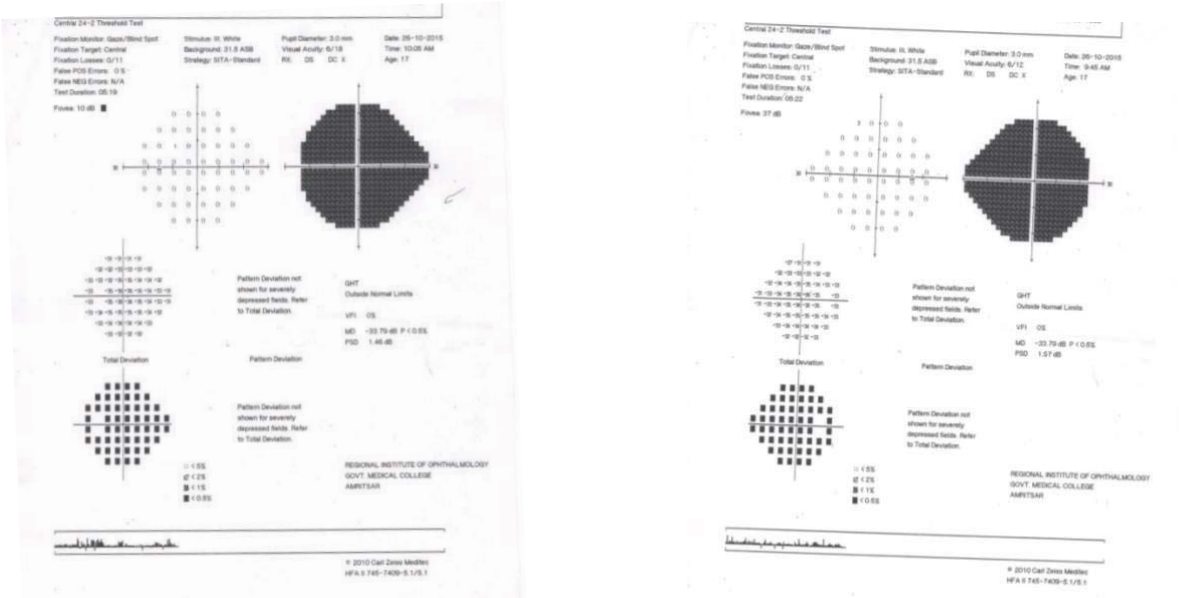


Fig 1: 24-2 pattern HVF showing severe visual field constriction in both eyes

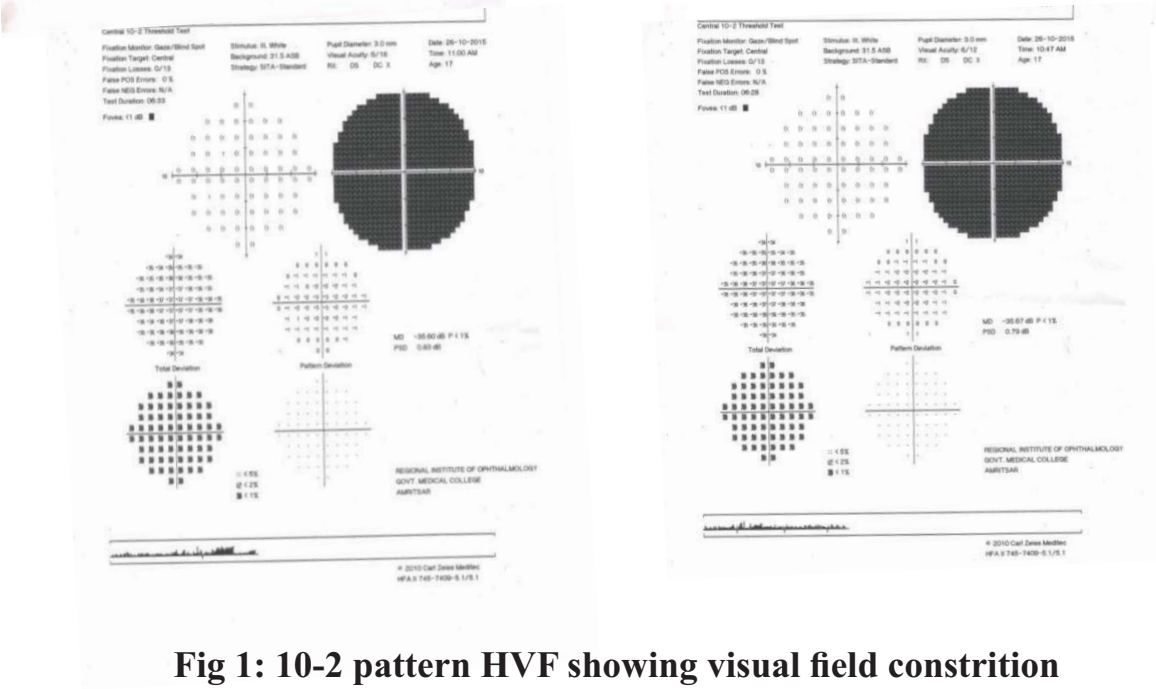


Fig 1: 10-2 pattern HVF showing visual field constrition

Topiramate was withdrawn gradually, within six weeks. Perimetry, after six weeks of drug withdrawal, showed mild improvement in visual field. A provisional diagnosis of suspected topiramate-induced visual field defect was made on the basis of temporal association and previous reports of association of such field defects with topiramate and exclusion of other ocular and non-ocular diseases like glaucoma, space occupying lesion in the pituitary fossa or visual cortex. Using the Naranjo's ADR probability score, it was concluded that this case revealed a probable association with topiramate.

EEG revealed bihemispherical discharge dysarray, spikes and wave pattern (Fig 3,4,5)

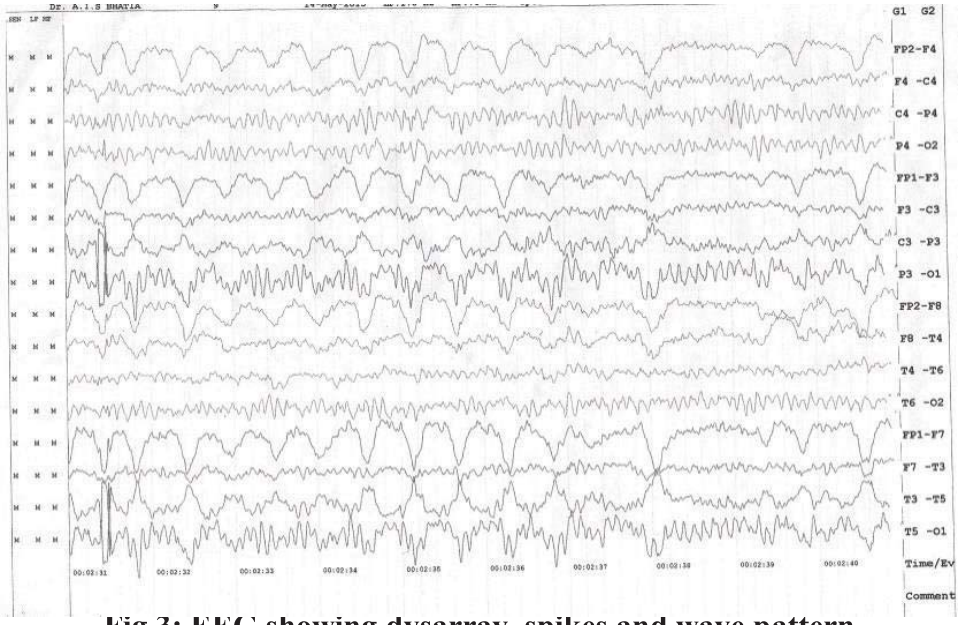


Fig 3: EEG showing dysarray, spikes and wave pattern

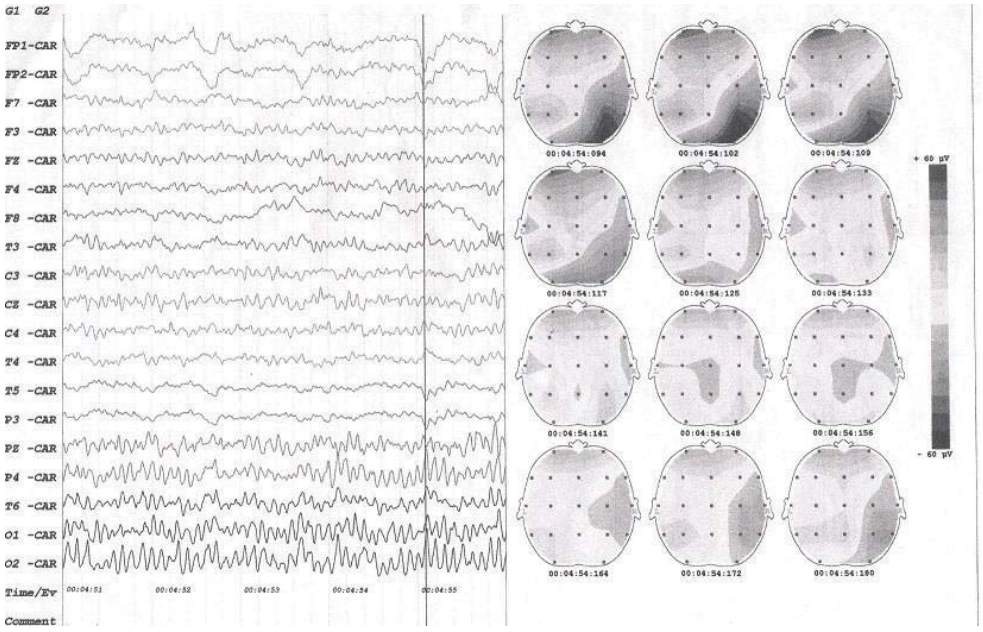


Fig 4: EEG dysarray, spikes and wave pattern

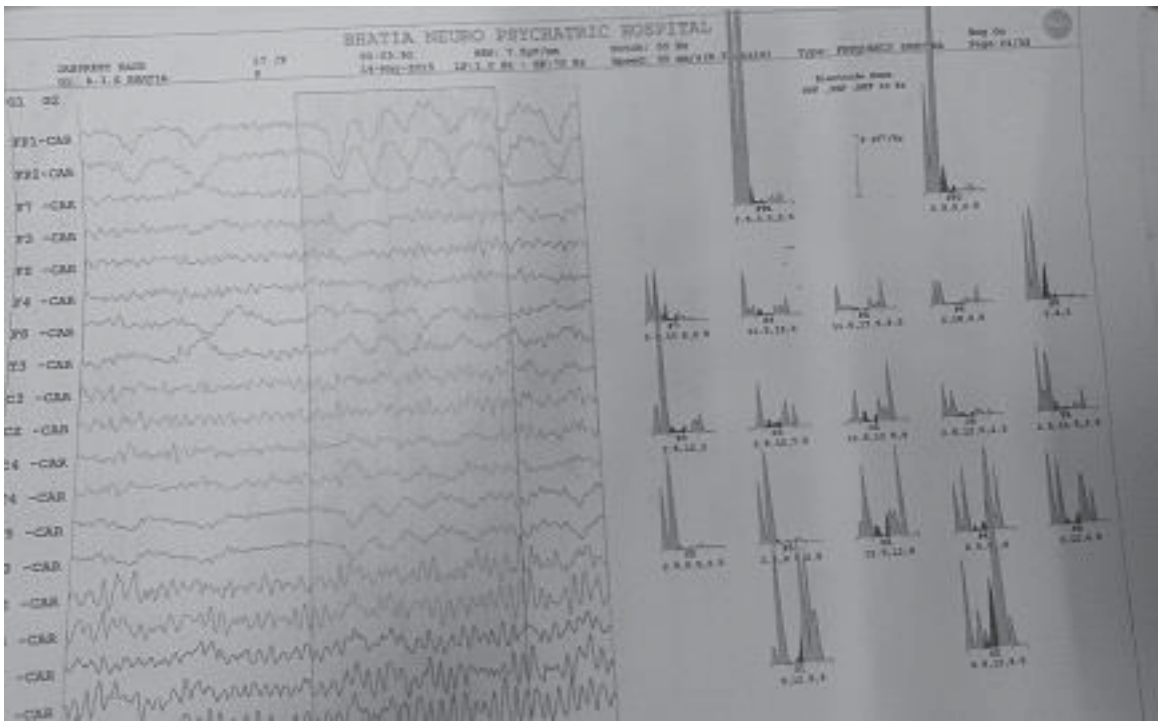


Fig 5 : EEG showing dysarray,spikes and wave pattern

VER study revealed significantly prolonged bilateral P-100 latency (both by LED Goggles and PSR methods) suggestive of bilateral optic neuropathy. (Fig 6,7)

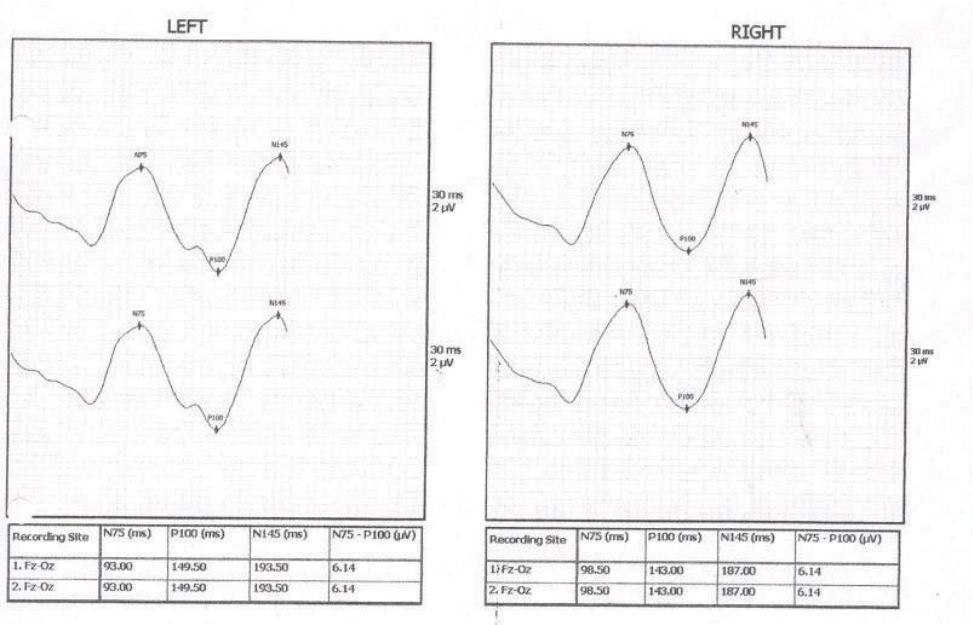
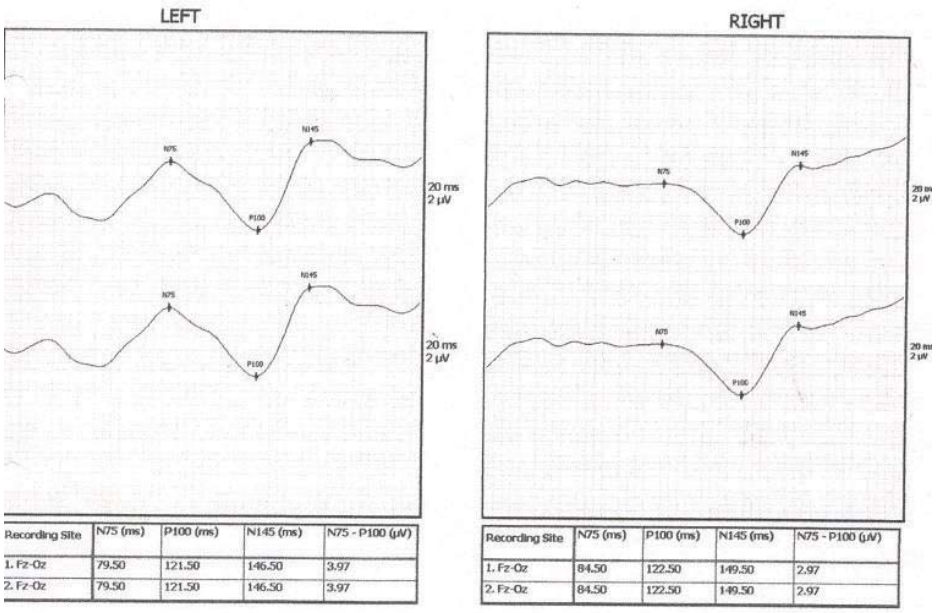


FIG 6: Flash VEP showing prolonged latencies in both eyes



Recording Site	N75 (ms)	P100 (ms)	N145 (ms)	N75 - P100 (µV)
1. Fz-Oz	79.50	121.50	146.50	3.97
2. Fz-Oz	79.50	121.50	146.50	3.97

Recording Site	N75 (ms)	P100 (ms)	N145 (ms)	N75 - P100 (µV)
1. Fz-Oz	84.50	122.50	149.50	2.97
2. Fz-Oz	84.50	122.50	149.50	2.97

Fig 7 : Pattern VEP also showing prolonged latencies in both eyes

Discussion

A visual field defect is partial loss of the usual field of vision, that may be central or peripheral. The common causes of visual field defects include glaucoma, retinal detachment and central retinal artery occlusion. Although rare, some drugs implicated in the causation of visual field defects are isotretinoin, chloroquine, vigabatrin, tiagabine, gabapentine, diazepam, phenytoin, carbamazepine and topiramate.5,6 Of the published reports of topiramate-induced field defects, the case developed complete blindness with topiramate usage for migraine prophylaxis.

Topiramate has several pharmacokinetics drug interactions with other anti-epileptic drugs, namely phenytoin, carbamazepine, valproic acid, phenobarbitone, primidone and lamotrigine. While lamotrigine can increase the plasma concentration of topiramate, phenytoin and carbamazepine may decrease it. Therefore, in the case that we are reporting, the occurrence of visual adverse effects cannot be explained on the basis of pharmacokinetic drug interactions with phenytoin since these drugs may decrease the plasma concentration of topiramate. However, the possibility of pharmacodynamic interactions cannot be ruled out.

The exact mechanism of drug-induced ocular field defects is not well understood. Vigabatrin-induced ocular field defects that are on record have led to the hypothesis that increased persistence of GABA in the retina; lateral geniculate nucleus and the visual cortex could be an underlying cause.7,8A recently published animal study, that evaluated the effects of chronic administration of topiramate in rabbits, has revealed that there was a significant reduction of the retinal function demonstrated by the reduced b-wave amplitude in the full-field Electroretinogram. Immunohistochemical changes characterized by a severe accumulation of GABA in the inner retina were observed.9 The retinal dysfunction and the morphological changes indicate that topiramate may damage the

retina, similar to vigabatrin and valproic acid.10

Conclusion

Since most anticonvulsant drugs are indicated for long term usage, their safety profile demands close monitoring. Spontaneous ADR reporting is an important tool for detecting such reactions.

This case series intends to improve awareness amongst clinicians and patients about such serious ocular ADRs, to facilitate early diagnosis and intervention.

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