Current Indian Eye Research

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- Neural and behavioral correlates of face recognition
- Intravitreal Bevacizumab in macular edema associated with retinal vein occlusions
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We are glad to introduce the June Issue of CIER. This issue covers a wide spectrum of topics with a dynamic balance between anterior and posterior segments of eye. LASIK remains an important refractive surgery practiced all over the world.\(^1\) Dr Savale et al presented an interesting paper on ocular surface thermal changes following LASIK surgery. Macular oedema remains the most significant cause of loss of vision in veno-occlusive disorders.\(^2\) Dr Panigrahi et al had tried to establish the role of anti-VEGF (Bevacizumab) in retinal venous occlusions. Amniotic membrane transplantation remains a viable option in dealing with ocular burns and limbal stem cell loss due to varied reasons.\(^3\) Dr Dutta et al had presented their findings regarding outcome of amniotic membrane transplantation in varied indications. Dr Chowdhury et al has presented an interesting article on blindness in rural West Bengal. They have covered the remote and underserved rural Bengal. Lastly we have two interesting review articles. Dr Biswas has extensively covered the benign lid tumors. Dr Chatterjee et al has the second review article on neural and behavioral correlates of face recognition in human infants.

References:

Benign eye lid lesions
Arnab Biswas
(Excerpts from Eyelid Tumor Clinical Evaluation and Reconstruction Techniques Authors: Biswas, Springer; 2014 edition)

Any Eyelid mass or ulcer could be a benign or a malignant lesion. An accurate diagnosis can be reached based on history and clinical examination. If in doubt surgical biopsy followed by histo pathological evaluation can clinch the diagnosis. In this review article we look at some of the more common eyelid lesions that an ophthalmologist may encounter in a general practice.

BENIGN TUMORS OF EPIDERMIS

Squamous Papilloma

Introduction: It is one of the most common benign eye lid lesion. It is not a specific clino-pathological entity.

Age of Presentation: It is a group of condition that usually presents in middle or elderly age.

Clinical Feature: It can have a varied presentation, ranging from sessile to pedunculated, solitary or multiple, can be pigmented or similar in colour to skin. A rough irregular surface with keratinized crust formation is a common finding.

Prognosis: Their growth pattern is very slow, if rapidly growing, one should suspect other conditions.

Treatment Options: Shave excision is the best option. Other options include ablative carbon dioxide or Argon laser application to the base.

Seboric Keratosis

Introduction: Seborrheic keratosis( Basal cell papilloma, seborrheic warts) are common benign lesions on the face and abdomen. It can also present on the lids of aging individuals.

Clinical Features: They are well circumscribed, waxy, friable and appear stuck on to the skin. Some lesions are covered by an adherent greasy-appearing scale and are raised above the surface of the skin. They can feel soft and greasy.

The shape is round to oval, and multiple lesions may be aligned in the direction of skin folds. The lesion is very superficial and may be pigmented from slight discoloration to deep brown in colour.

Prognosis: They are usually assymptomatic, but can sometimes cause pruritis and irritation.

Treatment Options: Treatment involves surgical excision or laser ablation

Inverted Folicular Keratosis

Introduction: It is a benign cutaneous lesion almost similar in character to seborrhoeic keratosis. The term Inverted follicular keratosis is a misnomer, as it was thought that
these lesions arose from hair follicle. However recent studies suggest that they are basically an irritated form of Seboric Keratosis.

**Age of Presentation:** It appears in middle age.

**Clinical Presentation:** It can present as nodular, papillomatous or pigmented lesion. The differential point from a Seborric Keratosis, is its rapid growth pattern.

**Treatment:** Treatment consists of surgical removal.

**Keratoacanthoma**

**Introduction:** It is a form of pseudocarcinomatous hyperplasia. It has recently been re-classified as low grade form of squamous carcinoma.

**Age of Presentation:** It usually occurs in the middle age.

**Clinical Features:** It is similar in clinical look to a nodulo-ulcerative variety of basal cell carcinoma. It has rapid growth pattern. It grows over a period of 2 to 6 months.

**Treatment Options:** Treatment options range from observation, to cryo application, to surgical resection. There have been reports of spontaneous regression.

**Actinic Keratosis**

**Introduction:** Actinic keratosis also called solar keratosis—is associated with chronic sun exposure. Actinic keratoses are significant because they are recognized precursors of squamous cell carcinoma.

**Age of Onset:** It is commonly encountered in patients past age 50 who have fair skin.

**Clinical Features:** Clinically, the keratoses usually appear as nondescript, reddish-brown scaly patches in sun-exposed areas of lids 3mm to 10mm in diameter.

**Treatment Options:** Isolated actinic keratoses may be treated with cryotherapy or curettage. However, because these lesions are often precancerous. Excision with biopsy in larger lesions may be advisable.

**BENIGN SEBACEOUS GLAND TUMOURS**

**Sebaceous Gland Hyperplasia and Adenoma**

**Introduction:** The meibomian glands of the tarsal plate, the gland of Zeis of the cilia, and the sebaceous gland of the caruncle are the different types of sebaceous glands of the lid. Tumour arising from these glands can either benign Adenoma, or malignant (Adeno carcinoma).

**Clinical Presentation:** Hyperplasia and adenoma of the sebaceous gland appears almost similar clinically. It appears as a yellowish nodule of the lid with smooth surface. The curuncular variety is slightly more irregular in appearance.

**Age of Presentation:** It can present in any age, but is usually common in young adult hood.

**Treatment:** Benign tumours of the sebaceous gland of the lid usually never turn malignant. They can be observed or a simple surgical excision can be planned.

**Systemic Association:** A systemic association with Muir-Torre syndrome has been reported. It is an autosomal dominant condition where patients with cutaneous sebaceous tumours, basal cell carcinoma or keratoacanthoma, have a high incidence of visceral malignancy, special cancer of the colon. Almost 70% of these patients have a positive family history.

**SWEAT GLAND TUMOURS**

**Syringoma**

These are benign tumors of the eccrine sweat glands around the lid and adnexae.

**Age of Presentation:** It is common in young females, but can present at any age.

**Clinical Presentation:** They appear as subtle yellowish small nodulated elevations in the periorbital region. They can be single, or appear in clusters.

**Treatment:** As they are benign in nature, a simple observation is enough. If it becomes large or cosmetically ugly, surgical excision is the treatment of choice. Other options include ablative carbondioxide or Argon laser resurfacing.
Prognostic Factors: Good, practically no chances of malignant transformation.

Eye lid Pleomorphic Adenoma

Pleomorphic adenoma (also referred to as benign mixed tumor or chondroid syringoma) is among the rarest of the adenomas and adenocarcinomas of the eyelids. Pleomorphic Adenomas (PAs) can arise from sweat glands in the dermis of the eyelid skin. It is a rare cutaneous neoplasm. It may arise from eccrine or apocrine glands.

Age of Presentation: It usually affects the elderly.

Clinical Presentation: It usually presents as nodulated lump of the upper or lower eye lid margin, which has been slowly increasing in size. Clinical differentiation from other similar nodulated growth is very difficult.

Treatment: Surgical excision, followed by reconstruction (Similar to what is done in BCC).

TRICHEOEPITHELIOMA

Introduction: Trichoepithelioma is a benign adnexal neoplasm. The gene involved in the familial form of trichoepithelioma is located on band 9p21. Trichoepitheliomas consisted of nests of basaloid cells. Mitoses are uncommon when compared to basal cell carcinoma.

Age of Presentation: Lesions usually start appearing in childhood and gradually increase in number with aging.

Clinical Presentation: Slow-growing, single or multiple papules or nodules are typically observed on the lid skin and face. The lesions are rounded, skin-colored, firm papules or nodules that are 2-8 mm in diameter. Lid skin involvement occurs as an associated involvement. The occurrence of multiple trichoepitheliomas is transmitted as an autosomal dominant trait.

An association may exist with other cutaneous tumors (eg, cylindroma or Brooke-Spiegler syndrome, spiradenoma, basal cell carcinoma, ungual fibromas) or dystrophia unguiis congenita.

Trichoepithelioma can be part of the Rombo syndrome (ie, vermiculate atrophoderma, milia, hypotrichosis, trichoepithelioma, basal cell carcinoma, peripheral vasodilatation).

Treatment: The treatment of the trichoepithelioma lesion is primarily surgical, only for cosmetic purpose. Solitary lesions may be excised. In the case of multiple tumors, this surgical approach is usually not feasible.

Split-thickness skin grafting, dermabrasion, and laser surgery have been tried when huge cluster lesions have to be managed. Recurrence of solitary trichoepithelioma is uncommon. When the multiple lid and lesions are surgically flattened by dermabrasion or laser therapy, they tend to regrow into elevated papules or nodules.

MELANOCYTIC TUMOUR

Melanocytic nevus

Introduction: A Melanocytic Nevus is usually a benign tumour derived from the cutaneous melanocytes.

Age of Presentation: Depending on the time of presentation a nevus can either be congenital or acquired. A congenital nevus usually shows up some time after birth, and shows a very slow growth pattern till puberty.

An acquired Melanocytic Nevus starts developing in early adult hood and can occur any where over the eye lid skin.

Clinical Presentation: They are commonly found on the skin of the human body. A nevus can also occur on the eyelid skin. These tumors are usually brownish pigmented and have thickness. It can range from being flat non elevated to a large nodular pigmented growth in the eye lid margin, over the eye lid skin or even over the eye brow. The pigmentation can vary from being just few spots of brown to very darkly brown. The eye lid margin lesions usually extend beyond the mucocutaneous junction into the tarsal conjunctiva. In the lid two very characteristic variety have been described.
Kissing nevus or Divided nevus is a rare form of congenital nevus that usually occurs on adjacent parts of the upper and lower eyelids of one eye. Most often, the formation is present from birth, but it may also appear later.

Hairy naevus is a dark colored, often hairy patch of skin present in the peri ocular region present at birth. It can be along the distribution of the lacrimal drainage system. Sometimes it may form a teardrop pigmentation over the periocular region.

**PROGNOSTIC FACTORS:** A Melanocytic Nevus is usually a benign condition. In very rare situations, if the lesion shows very rapid increase in pigmentation and growth in middle ages, especially in sun exposed areas. A malignant conversion should be suspected.

*Treatment:* Eyelid nevi are usually benign tumors. They can be photographed and followed for evidence of change or growth prior to consideration of biopsy or treatment. Large eyelid nevi can be a cosmetic problem. It requires complex and challenging rotational flaps to restore and give a better cosmetic outcome.

**NEURAL TUMOURS**

**Neurofibroma**

*Introduction:* Neurofibroma affects the bone, the nervous system, soft tissue, and the skin. Increased concentrations of nerve growth stimulating activity have been linked with the development of neurofibromatosis.

In Neurofibromatosis beside the characteristic skin lesions, other clinical features include skeletal bony abnormalities, mental deficiency, seizures, neurofibromas of the spinal and cranial nerve roots, iris hamartomas, optic nerve gliomas, endocrine disorders, endocrine tissue tumors, other visceral tumors, etc.

The genetic defect is localised to chromosome 17 and is transmitted in an autosomal dominant pattern.

**Clinical Presentation:** In the eye lid and periorbital region, two forms of presentation are usually noted.

- **Plexiform neurofibroma:** presents as a diffuse and elongated swelling along in the lateral aspect of the lid and periorbital region. It can range from a small bulkiness of the lateral upper lid to a mechanical ‘S’ shaped ptosis due the increased weight of the lid. In severe cases, a large fold of skin occupying the whole of the lateral side of the face and lid can be found and usually follows the course of facial nerve trunk. These tend to infiltrate into deeper structures like fascia, muscles and bone.
- **Neurofibroma nodules:** Soft multiple lesions ranging from a small lesion to large nodule or peduncule is seen all over the lids, periorbital region and face. Similar lesions are also seen all over the trunk and body. They are usually very slowly growing but it continues to grow lifelong.

**Age of Presentation:** It starts at or after birth and grows lifelong

*Treatment:*

- **Plexiform neurofibroma:** There is no definitive plain of differentiation between the fibromatous growth to healthy tissue. Debulking of the excess tissue is often tried. How much to debulk is a tricky situation to evaluate. Some prefer a pinching technique, where you pinch the excess tissue with your fingers, and make the base, so that the tissue can be a posed after excision. Others prefer to use a template of the other side eye lid and remove the excess tissue. The
difficulty during debulking is because the tissue oozes quite significantly during dissection. Preferably multiple figure of eight sutures should be applied in the deeper plain to help in hemostasis. Then skin is sutured in interrupted layers. Another issue is the relapse or recurrence. This needs to be explained and discussed clearly with the patient.

- **Neurofibroma nodules:** They usually do not require any intervention, as it is not practically possible to remove them all. Only when a lesion becomes cosmetically too large, or is obstructing vision, that specific lesion can be removed.

**Schwannoma**

*Introduction:* Schwannoma also called neurilemmoma, is a benign tumour arising from the Schwan cells of the neural sheath of a peripheral nerve. Isolated eye lid schwannoma is extremely rare.

*Age of Presentation:* Usually occur in adults from age 20 to 70 years.

*Clinical Features:* It presents usually as a solitary smooth very slowly growing nodule over the lid margin or peri orbital area. It is very difficult clinically to differentiate the lesion from other similar benign nodules like chalazion or inclusion cysts. Surgical excision followed by HP evalution can confirm the pathology. The presence of multiple schwannoma should usually arise a suspicion of associated Neurofibromatosis type 1 or 2. Associated schwannoma have been described in conjunctiva, uvea tract and in the orbit.

*Treatment:* Treatment consists of surgical excision followed by histopathological evaluation. The prognosis is excellent with very rare recurrences.

If it is in the periorbital region, dissection and removal of the nodule usually solves the problem. If the lesion lies over the lid margin, fullthickness lid excision, followed by lid reconstruction, following the principles of reconstruction, gives very good cosmetic outcome.

**VASCULAR TUMOURS**

*Congenital capillary hemangioma*

*Introduction:* It is a benign vascular tumour of the child hood. These lesions are considered hamarfomas.

*Age of Presentation:* Usually present congenitally or arise in early infancy They may appear after birth but usually cease growing by one year of age and most will shrink by first decade.

*Clinical Presentation:* Multiple Red or purple elevated, subcutaneous soft spongy mass that will blanch with pressure. The lesions are composed of dilated capillary network, and looks like the surface of a strawberry, so the name “Strawberry marks”. They are usually unilateral and located on the eyelid or brow. Capillary hemangiomas are without pulsation and have no bruit

A mass effect of the lesion may result in significant ptosis of an involved eyelid. Reduced visual acuity may be noted (either due to amblyopia or uncorrected astigmatism from mass effect of a hemangioma on the cornea)

*Treatment:* Spontaneous involution occurs in most cases, so observation may be appropriate. Usually 40% completely involute by age 4, while 80% completely involute by age 8.

In cases there is occlusion amblyopia or significant astigmatism, prompt treatment should be initiated. The different options are:

- **Intralesional steroid injection** with a mix of long and short acting steroid (i.e. 40mg/ml of triamcinolone and 6mg/ml of betamethasone )
- **Oral prednisone** (1-2mg/kg/day given with the involvement of the child’s pediatrician - treatment is usually for months with slow taper)
- **Surgical excision** (for debulking - lesion is not encapsulated and there is a risk of recurrence. )
- **Other treatments** have been described (topical steroid, radiation, and a variety of lasers) but they are considered somewhat controversial and not used routinely.

**Associations:**

- In PHACES (Posterior fossa malformations, Hemangiomas, Arterial anomalies, Coarctation of the aorta, Eye abnormalities, Sternal clefting and supraumbilical raphe), especially if the hemangioma involves more than one dermatome.
In Maffucci syndrome the patient has multiple cutaneous and visceral hemangiomas.

In Kasabach-Merritt syndrome there is thrombocytopenic coagulopathy where platelets are rapidly sequestered within the vascular lesion. This is a rare condition with high mortality which requires prompt management by multiple subspecialists.

**Differential Diagnoses:**
- Vascular malformation
- Lymphangioma
- Arteriovenous malformations
- Nevus Flammeus (port-wine stain) (Port-Wine stain will not typically blanch with pressure — a capillary hemangioma will usually blanch)

**Acquired capillary hamangioma**

*Introduction:* Acquired capillary haemangioma also called cherry angioma are benign vascular lesions, rarely involving the eye lid.

*Age of Presentation:* It is a common cutaneous lesion of the young adult hood or in middle age.

*Clinical Presentation:* It presents as small nodular reddish structure either at the lid margin or over it. They can become pedunculated with a cherry like surface irregularity. They can bleed on a subtle trauma. These types of localized haemangiomas are usually very compressible.

*Treatment:* If the lesions are small, one can wait and observe. If the lesions increase in size a wedge resection of full thickness lid along with the lesion, followed by lid apposition in layers give excellent result. Radioablation, cryo application or electrodesection are other alternative methods of treatment that have been applied.

Differential Diagnoses:The differential diagnosis include Kaposi’s sarcoma, cavernous haemangioma, angiosarcoma and varix.

**Nevus flammeus (port-wine stain)**

*Introduction:* A port-wine stain or nevus flammeus is a vascular anomaly consisting of superficial and deep dilated capillaries in the skin lid or one side of the face. They resemble that of port wine.

*Age of Presentation:* Port-wine stains are present at birth and persist throughout life; The area of skin affected grows in proportion to general growth.

*Clinical Presentation:* A reddish to purplish discoloration of the skin typically following the distribution of the Trigeminal nerve. It usually does not cross the midline. Port-wine stains occur most often on the face but can appear anywhere on the body.

Early stains are usually flat and pink in appearance. As the child grows, the color may deepen to a dark red or purplish color. In adulthood, thickening of the lesion or the development of small lumps may occur. It affects both males and females of all ethnic backgrounds.

**Associations:**

**Sturge–Weber syndrome:** It is one of the phakomatoses and is often associated with port-wine stains of the face, glaucoma, seizures, mental retardation, and ipsilateral leptomeningeal angiomia.

Klippel-Trenaunay-Weber syndrome (KTWS) is characterized by a triad of port-wine stain, varicose veins, and bony and soft tissue hypertrophy involving an extremity.

*Treatment:* Different options are tried, ranging from freezing, surgical removal, local radiation, and tattooing. Port-wine stains can also be masked with cosmetics.

Lasers have application to the cutaneous capillaries with minimal damage to the overlying skin is one of the recent advances, in the management of this cosmetic blemish.

**Miscellaneous Benign Vascular tumour (LID VARIX and Lymphangioma)**

*Introduction:* A varix or lymphangioma consists of abnormally distended vein, artery or lymphatic vessel. Orbital varix and lymphangioma are a common entity but isolated eyelid varix are rare. Orbital and lid varix may be associated with additional venous malformations elsewhere in the body.

*Age of Presentation:* Lymphangioma usually present at birth, which gradually increases. Whereas usually present in adult hood, when the vascular channels become dilated, and lid appers bulky.

*Clinical Presentation:* Clinically the Lid varix and Lymphangioma may present almost similarly. Lymphangioma are usually present as a bluish well circumscribed or lobulated lesion over the lid skin. The lesions often enlarge and increase in size on Valsalva maneuver. Patients with orbital component of varix may present with proptosis or complain of visual disturbance.
On palpation a bag of worm like feeling can sometimes be felt. It is usually soft, is compressible on pressure, again regaining shape on release of pressure over the lesions. A lid varix can rupture on subtle trauma and bleed heavily.

**Differential Diagnosis:** The differential diagnosis includes hemangioma, and lymphangioma.

**Treatment:** They are difficult to treat. Most of the case can be left as it is with assurance. Ligation of small sections of the varix or Lymphangioma, as appropriate, may achieve the desired cosmetic effect and improve patient comfort. Venography should be used to evaluate the extent and supply before surgery.

### CYSTIC LESIONS

**Introduction:** There are various cysts that can arise around the eye. Common ones include sebaceous cysts (as with any other part of the body), cysts of Moll (benign, non-tender translucent lesions arising from the apocrine sweat glands) and cysts of Zeiss (similar to cysts of Moll but containing oily secretions).

**Clinical Presentation:** In the eye lid and peri orbital region, three forms of presentation are usually noted.

- **Epidermal Inclusion Cysts** These are small white-yellow cystic lesions occurring on the lid skin, conjunctiva, face or neck and are very common. They may develop spontaneously or arise following trauma or after surgery along an incision line. They originate from pilosebaceous follicles or invagination of surface epidermis. Some of these cysts occurring amongst the lashes will be difficult to distinguish from a blocked Zeiss gland (sebaceous gland).

- **Sudoriferous Cysts (Retention Cysts, Hidrocystomas)** The lid skin has numerous sweat glands (eccrine glands) and modified sweat glands (apocrine glands) such as the glands of Moll. Blockage of these glands leads to the formation of a translucent (water blister-like) lesion on the lid skin or lid margin amongst the lashes. They may occur as a single lesion or as multiple.

- **Sebaceous cysts** Sebaceous cysts may occur in and around the eyelid area and clinically resemble epidermal inclusion cysts. They are generally found in locations with many hair follicles, particularly the brow area and medial canthus. These cysts can occur secondary to obstruction of the Zeiss gland, meibomian gland or sebaceous glands associated with hair follicles of the lid skin or brow area. Unlike an epidermal inclusion cyst (filled with keratin material), a sebaceous cyst contains epithelial cells, keratin, fats and cholesterol crystals.

**Age of Presentation:** It can present at any age. It can remain static or can grow over time.

**Treatment:** Treatment involves total excision. Otherwise they will recur. Simply stabbing them with a needle is ineffective in allowing their resolution.

Cite this article as:
Human adults are endowed with the abilities to quickly and accurately recognize the identity of other human faces attributed to both configural processing (processing the relations among the facial features as a cognitive whole) and featural processing (independent processing of information of individual facial features) of faces. Human infants, like adults, also show significant capacity to recognize faces using both configural and featural modes of information processing from the first months of their lives. In this review, we have discussed the theories and evidences that unveil the cognitive and neural mechanisms that human infants employ for face recognition.

**Configural and Featural face processing mechanisms in infancy**

Configural face processing according to Maurer, Le Grand, and Mondloch (2002) can be distinguished into three types: 1.) ‘sensitivity to first-order relations’ – that confirms a stimulus as a face from the arrangement of its features with two eyes located above the nose and a mouth below the nose, 2.) ‘holistic processing’ – that glues all facial features together and process them as a cognitive unit, 3.) ‘sensitivity to second-order relations’ – that accounts for the specific distances among the features. Featural or analytical or componential or piecemeal processing on the other hand neither looks for relations between the facial features nor does it combine and process the features as a whole, rather it processes the single facial features independently of the context of whole-face.

**Theories and evidences of perception of first-order relations**

Minutes after birth, newborn babies show preferential visual orientation towards schematic face-like or protoface stimuli than to scrambled face stimuli. Newborn’s preference to stimuli with face-like first-order relations has also been reported by Simion et al. (2002) as they found that newborns were not only able to discriminate between the schematic face-like and non-facial like configurations but also preferred the face-like pattern, as well as retained this discriminability after a retention interval of 2 min. Such preference in newborns was even found to be independent of the shape of the contour as they showed preference for the face-like arrangement of internal blobs even when a square and not just a head-shaped contour was used. These results are in accordance with the existence of a pattern learning mechanism that drives newborn's learning of specific patterns, including the first-order relations of faces.

Why the three high-contrasted blobs (positively contrasted), a low spatial frequency image of a face serve to draw attention in newborns is an open debate with two contrasting views tested; the first view posits that newborn’s preferential orientation towards faces is due to the preferential sensitivity of their visual system towards specific structural properties of patterned stimuli that are although present in faces but not face-specific per se. The sensory hypothesis proposed that newborn’s visual system is particularly sensitive to the amplitude spectrum (comprises the amplitude and orientation of the component spatial frequencies) of any visual pattern. Thus, newborns prefer to look at faces or face-related stimuli simply because the amplitudes at different spatial frequencies of these stimuli match well with the sensitivity of newborns visual system. This
hypothesis has gained its support from the series of investigations that demonstrate the perceptual bias in newborn for top-heavy configurations. Simion et al. (2002) tested whether due to asymmetric sensitivity of the upper and lower visual field newborns preferentially orient and look longer towards any one of the two types of visual pattern (stimuli) containing greater number of high-contrast areas either in the upper or lower visual field? Results of the visual preference task showed a consistent preference of newborns for the stimuli that contained more number of elements in the upper than lower part. Few other studies however, failed to find any consistent general upper field bias or bias for top-heavy configurations in newborns of 2-4 months old. On-top of that, Chien et al. (2010) have disproved the hypothesis of perceptual bias for top-heavy configuration as they found that 2 - 4.5 months old infants were able to discriminate reliably between the top-heavy and bottom-heavy configurations in a forced-choice familiarization/novelty procedure. Morton and Johnson (1991) in their pioneering study also did not find any preferential eye-turning response between the top-heavy (a face-config stimulus containing three squares at locations correspond to two eyes and mouth) and bottom-heavy stimuli (inverse of the ‘config’ stimulus) in the newborns. In addition, directed attention in newborns towards a face-like pattern has been documented when it was presented along with a non-facelike stimulus with optimal spatial frequency for the visual system of newborn. These evidences together with the evidence that phase information (phase and orientation of the component spatial frequencies) alone can influence newborn’s preference towards faces under the condition of controlled amplitude lead to the rejection of ‘the sensory hypothesis’.

The other view postulates that newborns born with an innate bias to respond to faces; an already existing mental representation that is face specific. A series of experiments performed on newborn chickens revealed that newly hatched chickens show specific predisposition to orient towards objects that resemble a mother hen. At the same time, newborn chicks were reported to acquire information, recognize, and develop attachments for the conspicuous objects that they see after hatching (a process called filial imprinting). Biochemical, electrophysiological, and lesion experiments showed that chick brains have two separate neural systems which are associated with the specific predisposition and preferences to objects through exposure. In human, Morton and Johnson (1991) were able to replicate the early findings of Goren et al. (1975) and Maurer and Young (1983) that newborn babies preferentially orient towards schematic face-like patterns than a scrambled face-control stimulus. The existence of two brain systems in newborn chicks for the acquisition of social preference and learned expertise has inspired Morton and Johnson (1991) who extended these findings for face detection in human newborns. They proposed the ‘two-process theory’ of the development of face processing in human that hypothesized the existence of two brain systems for face recognition in human newborns; one that is innate and confers preferential orientation in newborns towards faces just after birth (CONSPEC), and the other that is specialized for acquiring information on different outlooks of face processing (CONLEARN). CONSPEC has largely been described as a sub-cortical unit that contains the rudimentary perceptual information about the structure of faces in form of three dark patches within a triangular contour correspond to the two eyes and the mouth and which is capable of eliciting newborn’s visual attention to faces. CONSPEC being present during the birth strongly influences or biases the input signal processing of the developing cortical circuitry over certain time span (over first weeks and months) to develop the specialized system for face processing called CONLEARN. However, CONSPEC is not limited to the possession of the basic structural information about faces in form of three dark patches. Evidences demonstrating that human newborns can rapidly recognize and discriminate between faces while forming facial prototype, orient their attention preferably towards attractive faces, mimic facial and non-facial gestures, detect eye-like stimuli, show enhanced attention towards mutual eye gaze, and gradually learn their mother’s faces over a time scale of hours suggest that neonates already born with the specialized neural processing mechanisms that constitutes the CONSPEC, and most likely laid the foundation for the development of a social network that drives the future development of social skills.

Evidences of holistic vs. featural processing

Cohen and Cashon (2001) have tested the ability of 7-month-old infants to process faces configurally vs. featuraly. The authors had taken the strategy of ‘switch design’ whereby they habituated infants with two adult female faces and measured the ‘looking time’ of infants to a familiar habitation face, a ‘switched’ face, and a novel (new) face. A switched face was a composite face of the
two habituation faces; composed of the internal features of one and the external features of other. The infants were split into two groups with one experienced only upright faces and the other only inverted faces throughout the experiment. The authors reasoned that if infants process individual facial features independently then the switched face should not be perceived by them as a novel one compare to the familiar face. Thus, they will not spend more time looking at the switched face over the familiar face. In contrary, if infants process the relationships among facial features (processing configurations), then the switched face should look novel to them (rationale was based on the consistent finding that inversion disrupts configural processing of faces). The results confirmed the original hypothesis showed that infants habituated and tested on upright faces looked longer at the switched test face than at the familiar test face. However, in the inverted condition, infants did not show any significant difference between the looking time for the composite and familiar test faces. In addition, infants were also found to look longer on the novel test trials than the familiar test trials for both upright and inverted conditions. These findings led to the conclusion that 7-month-old infants use different strategies to process faces depending on their orientation. While the whole upright face is processed as a gestalt (holistically), the inverted face is processed by a piecemeal strategy whereby the single facial features are processed independent of the context of the face. However, the study design of Cohen and Cashon (2001) has posed the limitation that the results fail to disclose whether infants were also processing the internal features as a combined whole as found for adults. Holistic vs. featural processing in newborns was also addressed in an investigation carried out by Slater et al. Previously it was shown that when newborns with an average age of less than 3 days were presented with pairs of female faces which varied only in the stimulus property of attractiveness as judged by adults, they showed consistent preference for the more attractive face in all face pairs. This attractiveness effect in newborns was found to be orientation specific (such that newborns only looked at the attractive faces for longer time than the unattractive ones when faces were presented in upright but not in inverted orientation) as well as driven by the processing of internal facial features. The orientation sensitive perception of facial novelty and judgement of facial attractiveness in newborns together indicate the existence of holistic processing of facial features that drives newborn’s understandings of both identity and non-identity based facial information from the very first months of their lives.

**Infant’s sensitivity to second-order relations is unclear**

No study has yet addressed the issue of sensitivity of infants to the manipulation of second-order relations in the context of face processing. Slater et al. (2000) have found that infants of less than 3 days of age can distinguish between faces and show preference to the more attractive than to the less attractive faces based on their attention to the internal features of faces. These results have raise the possibility that newborn’s perception of differential attractiveness of faces may be due to their sensitivity to particular second-order relations among particular internal features, however the direct evidence is missing yet. Take together all these studies on infant’s face processing appreciate the fact that young infants use at least two types of configural processing viz. first-order relations and holistic processing to process facial information.

**Featural face processing in infants**

There are fewer studies that probe featural face processing in infancy compares to the amount of existing data that demonstrate the employment of configural processing of faces in young infants. Kestenbaum and Nelson (1990) showed the operation of both configural and featural processing modes to process facial expression in infants of 7-month-old. Infants were randomly divided into two groups; one group experienced only upright and the other only inverted face stimuli. Infants were habituated with photographs of three adult women with toothy happiness and were tested for discrimination of the facial expression of happiness from expressions of fear and anger. During test trials infants were presented with each of three photographs of a novel woman with facial expressions of toothy happiness, toothy fear and toothy anger. For the upright and not for inverted faces, infants were able to recognize the similar expression of happiness over changing identities and discriminated between the facial expressions of happiness, anger, and fear. In another experiment, it also was found that infants were able to discriminate between emotional expressions in both upright and inverted orientations when the face stimuli used were of a single woman. This showed that when the task demands attention to more than one feature, young infants of 7-month are able to categorize emotional expressions in an orientation-sensitive manner or on the basis of more
configural information. However, on the basis of one single feature (featural basis), discrimination of emotional expressions can be done irrespective of the orientation of stimuli. The results of this study however, do not clarify whether infants did process the upright faces holistically based upon a set of features or they actually processed just the single feature of toothy smile, albeit the differential response of infants to upright and inverted faces provides the circumstantial evidence in favour of the holistic processing of faces. Work of De Schönen and Mathivet (1990) on the hemispheric specialization in face perception provides additional evidence of featural and configural face processing in infants between the age groups of 4 to 9 months\(^4\). Investigations using the method of divided visual field presentations to discriminate between the face-like and arbitrary patterns strongly suggest that from the age of 4 months onwards, the right hemisphere takes the upper hand in processing of information related to the spatial arrangement of the components of face stimuli (configural processing) as opposed to the left hemisphere which gets the advantage in processing of the shapes of local aspects of faces (featural processing). This conclusion has been supported by the evidence of an efficient recognition of a frontal view of the mother’s face by the right hemisphere than the left hemisphere\(^4\). Schwarzer and Zauber (2003) investigated whether 8 month-old infants process facial features as an interactive-whole (as configuration) or componentially as individual features independent of the whole face\(^7\). Infants habituated only with upright faces were tested with a habituation face, a switched face, and a novel face, and the looking times were measured. The results showed that when photographs of faces were used, infants processed facial features configurally whereas features (eyes, nose, and facial contour) of the schematic faces were processed analytically or componentially. These results point to an interesting difference between the face processing systems of adults and infants. Adults use both analytical and configurational modes of processing while perceiving and recognizing the real-world upright faces, however for infants, the functioning of analytical processing mode was only evident for the processing of schematic faces but not for the face-photos of real world. It appears that although the infant system of face processing possesses the fundamental modes of processing but it may have a bias towards the mode of configural processing. Such a system is likely to be shaped up by the process learning in course of development for an optimum use of its components.

### Evidences favouring sub-cortical route mediating face preference in newborns

Technical and ethical reasons limit the use of techniques like fMRI, MEG or PET scan to investigate the neural basis of face perception in healthy newborn babies. However, converging evidences stand by the view of Johnson and Morton (1991) that newborn’s preferential visual orientation towards faces is mediated by a sub-cortical route of information processing\(^1\). Evidences indicate relatively immature visual cortical areas which are partially activated in newborns during the first months, and have less control over the visually-guided behavior (e.g., infant cortex has delayed onset of control over saccades during development) of infants\(^4,48,50,51\). The involvement of sub-cortical pathway in newborn’s perception of visual stimuli has been recommended on the basis of its apparently more developed structures than visual cortical areas around the time of birth\(^5\).

In humans, the nasal and temporal visual fields are known to feed differentially into the cortical and sub-cortical visual areas\(^53,54\). Therefore, the involvement of a sub-cortical mechanism in infants can be demonstrated by exploring the asymmetry between the temporal and nasal hemifields through the presentation of visual stimuli in either of the two hemifields. Simion et al. (1998) did the experiment where newborns under monocular viewing condition (newborns wore patches on one eye) were presented with face-like stimuli (either a pattern with 3-blobs correspond to the locations of two eyes and mouth or a stimulus with inverted positions of the blobs) to the other eye in either visual field\(^55\). Results showed that newborns preferentially oriented to the face-like stimulus only when it was presented in the temporal hemifield. However, when patterns were presented in inverted orientations, newborns showed preferential orientation to the striped-blobs-pattern over the black-blobs-pattern in both hemifields. These results are consistent with the premise that preferential looking at faces in newborns is driven by the activity of a sub-cortical mechanism.

It has been hypothesized that sub-cortical processing routes not only control the preferential orientation of newborn infants towards faces but might also activate and help developing the relevant cortical regions which together constitute the social brain network of adults. Since activation of the sub-cortical structure of amygdala was found to be related to the low spatial frequency information about faces, it has been implicated that malfunctioning of
amygdala may lead to disorders affecting social brain network\(^5\). The association between deficiencies in amygdala and autism spectrum disorder (ASD) has been shown in multiple studies: abnormalities in amygdala were reported in autistic patients with reported deficit in social behavior, abnormality in the grey matter content of amygdala was detected in the structural MRI of patients with autism, lesions in amygdala induce symptoms of autism in monkeys, adult patients with autism showed hypo-activity in the face-processing area of fusiform cortex as well as atypical patterns of activation in cortico-limbic neural circuits (involved in face-processing) than control subjects when responding to the facial emotional expressions, autistic patients showed atypical activation of fusiform cortical area with no activation in amygdala when performing a task that required decision making about other persons based on their face stimuli\(^5\). These evidences together support the premise about the existence of a social brain network that encompasses amygdala and is responsible for social intelligence\(^6\). In ASD, the deficit in social intelligence and the inappropriate activation of social brain circuit are supposed to be caused by the disrupted development of sub-cortical face processing route. This in turn could prevent the development of typical patterns of regional activity (prevent emerging specialization of cortical circuitry) in cortical areas in response to face stimuli\(^5\).

The sub-cortical route hypothesis is additionally supported in light of another disorder, developmental prosopagnosia. Adult prosopagnosics have severe deficit in recognizing facial identity but have residual abilities to detect facial expressions which are proposed to be mediated by sub-cortical routes\(^6\). In the cases of congenital prosopagnosia, the cortical face-processing system which is intact in other cases of developmental prosopagnosia could arise from an early deficit in the sub-cortical pathway that causes inappropriate development of cortical specialization for processing face-information in course of development. The hypothesis was tested in an experiment that measured the face-sensitive ERP component of N170 in control and developmental prosopagnosics (DPs). Presentation of faces in either the nasal or temporal visual fields elicited N170 in control subjects and can be of higher amplitude when stimuli were presented in temporal field. However, an opposite pattern of N170 was found for DPs whereby a greater N170 was elicited when faces were presented in the nasal visual field. This clearly indicates a lack in functioning of the sub-cortical system which probably has failed to activate the cortical face processing\(^5\).

References:


22. Quinn PQ, Tanaka JW, Lee K, Pascalis O, Slater A. Are faces special to young infants? Configural and upper-region processing advantages for houses in 3- to 4-month-olds. in XVII ICIS-2010.


Effect of single intravitreal bevacizumab in macular edema associated with retinal vein occlusions

Pradeep Kr Panigrahi

Abstract

Background: To evaluate effects of intravitreal bevacizumab on macular edema associated with retinal venous occlusion. Material and method: Total 35 patients presented with macular edema (central macular thickness greater than 300 micron in OCT) secondary to retinal vein occlusion were selected for the study. Baseline BCVA by ETDRS chart and fast macular scan was performed in Stratus OCT to detect CMT. The patients were randomized into study group (n=22, study group, who received single intravitreal bevacizumab 1.25mg in 0.05ml) and the rest of 12 patients did not receive any treatment (served as control group). The patients were followed up at 1 week, 1 month, 2 months and 3 months after the injection. Appropriate statistical analysis was done at the end of the study period to note any change of BCVA as noted in ETDRS chart and any change in CNT as seen in OCT. Result: The mean baseline VA in the study patients was 1.34±0.34 logMAR units (mean ETDRS score-21.64±12.72 letters). The mean VA improved to 0.96±0.45 (41.13±19.97 letters), 0.89±0.42 (42.68±20.53 letters), and 0.87±0.44 (44.09±20.92 letters) logMAR units 1 week, 1 month and 2 months after treatment. Maximum improvement in visual acuity took place in the second month. The change in mean visual acuity from mean baseline VA was found to be statistically significant (p=.000). In the control group, the visual acuity did not show a great deal of improvement as in the study group. The mean VA almost remained constant throughout the study period. The mean baseline VA in the control group was 1.24±0.46 logMAR (mean ETDRS score-27.23±18.48 letters). The mean baseline VA at the end of the third month was 1.20±0.49 logMAR (30.92±21.21 letters). The change in the mean visual acuity between the study and control patients at the end of the study period was found to be statistically significant (p=.002). The mean baseline CMT in the study group was 489.95 ±102.53µ. CMT started reducing from the first week following a single injection of bevacizumab. The mean baseline CMT decreased to 293.77±88.46µ, 287.77±83.32µ, 297.41±94.26µ and 326.68±106.19µ at the end of 1 week, 1 month, 2 months and 3 months respectively. This equated with a 40.04%, 41.27%, 39.29% and 33.32% decrease from the baseline at the end of 1 week, 1 month, 2 month and 3 months respectively. Change in mean CMT from the mean baseline CMT at the end of the third month was statistically significant (p=.000). Almost every patient showed a reduction in CMT following a single injection. However, CMT started increasing again from the third month in most of the patients indicating that the action of bevacizumab was short lived. In only 5 (22.72%) patients, the CMT was found to be less than 250 microns at the end of the study period. The mean baseline CMT in the control group was 442.62±111.40µ. At final follow up, there was a small reduction in the mean CMT to 411.08±16.37µ. This represented an overall reduction of only 7%. Conclusion: A single dose of intravitreal bevacizumab (1.25 mg in 0.05 ml) is effective in improving the visual acuity and decreasing the macular edema associated with retinal vein occlusion. However, the duration of this beneficial effect is short lived.

Keywords: Branch Retinal Vein Occlusion; Central Retinal Vein Occlusion; Macular Edema; Anti-VEGF; Bevacizumab.

Retinal vein occlusion (RVO) is the second most common vascular disorder affecting the eye after diabetic retinopathy. Its prevalence varies from 0.7% to 1.6%. It is a common cause of ocular morbidity. Hayreh et al classified retinal vein occlusion (RVO) to central, branch and hemi-central types. Branch retinal vein occlusion (BRVO) is a common retinal vascular disease with an incidence of 2.14/1000/year in the population of over 40 years of age. Once a BRVO occurs, retinal ischemia ensues downstream from the site of occlusion. It is also often complicated by macular edema. This edema may cause an additional reduction in visual acuity that often exceeds the primary ischemic damage and thus represents an important treatment target. Loss of visual acuity (VA) in patients with CRVO results primarily from retinal ischemia and macular edema. Central retinal vein occlusion (CRVO)
causes decreased tissue perfusion and increased hydrostatic pressure within the involved segments as a consequence of the vascular obstruction. This leads to a constellation of findings including intraretinal hemorrhage, exudation of fluid, varying levels of ischemia and the possible development of neovascular complications including rubeosis iridis and neovascular glaucoma.5

Various treatment modalities have been advocated for RVO. Currently available treatment modalities aim to reduce macular edema. The first such widely accepted treatment in macular edema associated with BRVO was grid pattern laser photocoagulation which was reported to be effective in the Branch Retinal Vein Occlusion Study (BVOS).6 Despite encouraging results from various studies most patients have experienced limited improvement in VA following grid laser photocoagulation.7,8 Intravitreal triamcinolone acetonide has been used in reducing macular edema associated with RVO. Initial studies for reduction of macular edema with triamcinolone acetonide (TA) revealed promising results.8,10 However, treatment effect after TA was short-lived and associated with major side effects such as increase of IOP and cataract formation,11-18 Retinal ischemia associated with both CRVO and BRVO is one of the most important up-regulators of vascular endothelial growth factor (VEGF).20 RVO is associated with increased intravitreal levels of VEGF, particularly in cases complicated by neovascularisation.21,22 Bevacizumab is a humanized recombinant monoclonal immunoglobulin that binds and inhibits all VEGF isoforms. It has been approved by the US Food and Drug Administration as an adjuvant agent in the treatment of metastatic colorectal carcinoma.23 Recent encouraging reports from various studies on the use of intravitreal anti-VEGF agents in the treatment of macular edema secondary to RVO prompted us to undertake this study. This is a prospective interventional study in which we aim to determine the visual and anatomical outcomes after a single dose of intravitreal injection of bevacizumab in patients with macular edema secondary to retinal vein occlusion.

Material and method:

Thirty-five consecutive patients (age 18 years and above) clinically diagnosed with macular edema secondary to retinal vein occlusion (BRVO or CRVO) presented at Institutional out patient department and Retina Research Clinic (RRC) between February 2009 to June 2010 were recruited for the study. These patients were randomly divided into two groups. 22 patients were randomly selected to receive treatment and were designated as the study group. The study group received active treatment (intravitreal injection of 1.25mg in 0.05ml of bevacizumab using standard strict aseptic precautions) and was followed up as per study protocol. The control group of 13 patients did not receive any treatment and were also followed up as per the study protocol. The best corrected visual acuity (BCVA) was measured using the Early Treatment Diabetic Retinopathy Study (ETDRS) chart before and after intravitreal injection of bevacizumab. The central macular thickness was measured using the fast macular thickness scan of the Stratus OCT machine (model 3000, Carl Zeiss Meditec In, Dublin, California, USA, version 4.0.2) before and after intravitreal injection of bevacizumab. Six scans with a length of 6 mm each, centered on the fovea and with 30 degrees displacement from each other were performed. The thickness of the central retina was measured in all 6 scans manually placing the ruler in the retinal thickness program at the central fovea and letting the software calculate the foveal thickness in this point as the distance between the inner retinal surface and the retinal pigment epithelium. The average from these 6 measurements was used for the central retinal thickness.

The patients were followed up at 1 week, 1 month, 2 months and 3 months after the injection. The patients were instructed to adhere to their follow up regimen and report at the first sign of worsening vision, pain or redness. Visual acuity using the ETDRS chart was measured at each visit. Central macular thickness using the fast macular thickness scan of the OCT machine was determined at each visit. IOP was measured using Goldmann applanation tonometer at each visit. All patients were followed up for a minimum period of 3 months.

The main outcome measures were the change in the scores for ETDRS visual acuity and the change in the central macular thickness 1 week, 1 month, 2 months and 3 months following the injection. Appropriate statistical analysis was done at the end of the study period. ETDRS visual acuity was converted into the logarithm of minimum angle of resolution (LOGMAR) to allow for statistical analysis. Analysis of data was performed using the bilateral Wilcoxon signed rank test for paired data. Student’s paired t-test was used as appropriate for the analysis. The null hypothesis was rejected for p value < 0.05.
**Results:**
A total of 22 patients were included in the study group. There were 10 (45.45%) males and 12 (54.55%) females. Out of the 22 eyes, 13 (59.09%) were right eye and 9 (40.91%) were left eyes. 2 cases of CRVO, 8 cases of ITBRVO, 10 cases of STBRVO and 2 cases of tributary RVO were included in the study group. The mean baseline VA in the study arm was 1.34±0.34 (mean ± SD) logMAR (Table 1). The mean VA at 1 week, 1 month, 2 months and 3 months were 0.96±0.45, 0.89±0.42, 0.87±0.44 and 0.93±0.44 logMAR respectively. The mean baseline CMT in the patients was 489.95 ±102.53µ (Table 2). The mean baseline CMT decreased to 293.77± 88.46µ, 287.77± 83.32µ, 297.41 ± 94.26µ and 326.68 ±106.19µ at the end of 1 week, 1 month, 2 months and 3 months respectively (Table 3). Almost, all patients in the study group experienced decrease in the CMT at 1 week following the injection. This improvement was maintained through 1 and 2 months of the follow up. By the third month, however, maximum patients experienced an increase in their CMT. This increase in the mean CMT was associated with a slight worsening of the mean VA scores.

A total of 13 patients were included in the control arm and were followed up over the 3 months period. There were 7 males and 6 females. Out of the 13 eyes, 5 (38.46%) were RE and 8 (61.54) were LE. 2 cases of CRVO, 8 cases of ITBRVO and 3 cases of STBRVO were included in the control group. The mean baseline VA in the control group was 1.24±0.46 logMAR (Table 4). The mean VA remained almost constant during the follow up period. The mean VA at the end of 1 week, 1 month, 2 months and 3 months were 1.22±0.46, 1.21±0.49, 1.19±0.51 and 1.20±0.49 logMAR units respectively (Table 5).

The mean baseline CMT in the controls was 442.62±111.40µ (Table 6). Throughout the study period, there was a slow but steady decrease in the CMT. The

<table>
<thead>
<tr>
<th>Table 1: Change in mean VA following injection</th>
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<tbody>
<tr>
<td><strong>No Of Pairs</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Pair 1</td>
</tr>
<tr>
<td>Pair 2</td>
</tr>
<tr>
<td>Pair 3</td>
</tr>
<tr>
<td>Pair 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Descriptive statistics of the CMT in the study group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre Inj</strong></td>
</tr>
<tr>
<td>Mean (microns)</td>
</tr>
<tr>
<td>Sd</td>
</tr>
<tr>
<td>Median (microns)</td>
</tr>
<tr>
<td>Maximum(microns)</td>
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<tr>
<td>Minimum(microns)</td>
</tr>
<tr>
<td>Range(microns)</td>
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</tbody>
</table>
mean CMT at the end of the study period was 411.08±16.37µ (Table 7). This represented a 7.13% reduction in the CMT the baseline. There was a statistically significant change in mean VA between the study and the control groups at the end of the 3 month period (Table 8). The mean VA improved from a baseline value of 1.34±0.34 to 0.93±0.44 logMAR units in the study group. The mean baseline VA IN the control group was 1.24±0.46 logMAR.

Table 3: Change in mean CMT following injection

<table>
<thead>
<tr>
<th>No Of Pairs</th>
<th>Pre Inj Mean Cmt and Post Inj Mean Cmt 1 Week</th>
<th>Post Inj Mean Cmt</th>
<th>Mean Change (Microns)</th>
<th>Sd</th>
<th>Sig. (2-tailed) p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>Pre Inj Mean Cmt and Post Inj Mean Cmt 1 Week</td>
<td>489.95</td>
<td>293.77</td>
<td>-196.18</td>
<td>125.77</td>
</tr>
<tr>
<td>Pair 2</td>
<td>Pre Inj Mean Cmt and Post Inj Mean Cmt At 1 Month</td>
<td>489.95</td>
<td>287.77</td>
<td>-202.18</td>
<td>132.65</td>
</tr>
<tr>
<td>Pair 3</td>
<td>Pre Inj Mean Cmt and Post Inj Mean Cmt At 2 Months</td>
<td>489.95</td>
<td>297.41</td>
<td>-192.55</td>
<td>135.91</td>
</tr>
<tr>
<td>Pair 4</td>
<td>Pre Inj Mean Cmt and Post Inj Mean Cmt At 3 Months</td>
<td>489.95</td>
<td>326.68</td>
<td>-163.27</td>
<td>163.27</td>
</tr>
</tbody>
</table>

Table 4: Descriptive statistics of the VA in the control group

<table>
<thead>
<tr>
<th>Baseline Va</th>
<th>Va 1 Week</th>
<th>Va 1month</th>
<th>Va 2month</th>
<th>Va 3month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (logmar)</td>
<td>1.24</td>
<td>1.22</td>
<td>1.21</td>
<td>1.19</td>
</tr>
<tr>
<td>Sd</td>
<td>0.46</td>
<td>0.47</td>
<td>0.49</td>
<td>0.51</td>
</tr>
<tr>
<td>Median (logmar)</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
</tr>
<tr>
<td>Maximum (logmar)</td>
<td>1.80</td>
<td>1.80</td>
<td>1.80</td>
<td>1.80</td>
</tr>
<tr>
<td>Minimum (logmar)</td>
<td>0.60</td>
<td>0.60</td>
<td>0.60</td>
<td>0.60</td>
</tr>
<tr>
<td>Range (logmar)</td>
<td>1.20</td>
<td>1.20</td>
<td>1.20</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Table 5: Change in mean VA in the control group

<table>
<thead>
<tr>
<th>No Of Pairs</th>
<th>Baseline Va</th>
<th>Follow Up Va</th>
<th>Mean Change</th>
<th>Sd</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>Baseline Mean Va And Mean Va 1 Wk</td>
<td>1.24</td>
<td>1.22</td>
<td>-0.02</td>
<td>0.06</td>
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<tr>
<td>Pair 2</td>
<td>Baseline Mean Va And Mean Va 1mth</td>
<td>1.24</td>
<td>1.21</td>
<td>-0.03</td>
<td>0.11</td>
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<tr>
<td>Pair 3</td>
<td>Baseline Mean Va And Mean Va 2mth</td>
<td>1.24</td>
<td>1.19</td>
<td>-0.05</td>
<td>0.12</td>
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<tr>
<td>Pair 4</td>
<td>Baseline Mean Va And Mean Va 3mth</td>
<td>1.24</td>
<td>1.20</td>
<td>-0.04</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Mean Va 3mth
the end of the follow up period, the mean VA in the control group was 1.20±0.49 logMAR. The change in mean VA between the study group and control group was found to be statistically significant (p = .002). There was a decrease in the mean CMT of the study patients following injection. Macular edema decreased almost in every eye in the first 2 months. Mean CMT had fallen from a baseline value of 489±95µ to 326±106.19µ at the end of the third month. This represented a 33.32% decrease in the mean CMT from baseline. There occurred a steady decrease in the

Table 6: Descriptive statistics of CMT in the control group

<table>
<thead>
<tr>
<th></th>
<th>Mean Baseline Cmt</th>
<th>Mean Cmt 1week</th>
<th>Mean Cmt 1 Month</th>
<th>Mean Cmt 2 Months</th>
<th>Mean Cmt 3 Months</th>
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<tbody>
<tr>
<td>Mean(microns)</td>
<td>442.62</td>
<td>437.00</td>
<td>430.38</td>
<td>421.46</td>
<td>411.08</td>
</tr>
<tr>
<td>Sd</td>
<td>111.40</td>
<td>115.12</td>
<td>119.65</td>
<td>117.93</td>
<td>116.37</td>
</tr>
<tr>
<td>Median(microns)</td>
<td>419.00</td>
<td>413.00</td>
<td>423.00</td>
<td>433.00</td>
<td>400.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>611.00</td>
<td>610.00</td>
<td>623.00</td>
<td>611.00</td>
<td>603.00</td>
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<tr>
<td>Minimum</td>
<td>305.00</td>
<td>270.00</td>
<td>250.00</td>
<td>253.00</td>
<td>245.00</td>
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<tr>
<td>Range</td>
<td>306.00</td>
<td>340.00</td>
<td>373.00</td>
<td>358.00</td>
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Table 7: Change in the mean CMT in the control group

<table>
<thead>
<tr>
<th>No Of Pairs</th>
<th>Baseline Mean Cmt And Mean Cmt 1 Wk</th>
<th>Follow Up Mean Cmt And Mean Cmt 1mth</th>
<th>Mean Change</th>
<th>Sd</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Pair 1</td>
<td>Baseline Mean Cmt And Mean Cmt 1 Wk</td>
<td>442.62</td>
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<td>11.06</td>
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<tr>
<td>Pair 2</td>
<td>Baseline Mean Cmt And Mean Cmt 1mth</td>
<td>442.62</td>
<td>430.38</td>
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<tr>
<td>Pair 3</td>
<td>Baseline Mean Cmt And Mean Cmt 2mth</td>
<td>442.62</td>
<td>421.46</td>
<td>-21.15</td>
<td>22.23</td>
</tr>
<tr>
<td>Pair 4</td>
<td>Baseline Mean Cmt And Mean Cmt 3mth</td>
<td>442.62</td>
<td>411.08</td>
<td>-31.54</td>
<td>23.92</td>
</tr>
</tbody>
</table>

Table 8: Descriptive statistics of the change in mean VA at month 3 between the study and control groups

<table>
<thead>
<tr>
<th></th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Baseline Va (logmar)</td>
<td>1.34</td>
<td>1.24</td>
</tr>
<tr>
<td>Mean VA 3 Month (logmar)</td>
<td>0.93</td>
<td>1.20</td>
</tr>
<tr>
<td>Mean Change (logmar)</td>
<td>-0.41</td>
<td>-0.04</td>
</tr>
<tr>
<td>Sd</td>
<td>0.41</td>
<td>0.13</td>
</tr>
</tbody>
</table>

p-value = .002

Table 9: Descriptive statistics of the change in mean CMT at month 3 between the study and control groups

<table>
<thead>
<tr>
<th></th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meanbaseline Cmt (microns)</td>
<td>489.95</td>
<td>442.62</td>
</tr>
<tr>
<td>Mean Cmt 3 Months</td>
<td>326.68</td>
<td>411.08</td>
</tr>
<tr>
<td>Mean Change (microns)</td>
<td>-163.27</td>
<td>-31.54</td>
</tr>
<tr>
<td>Sd</td>
<td>140.13</td>
<td>23.92</td>
</tr>
</tbody>
</table>

p-Value = .000
was a slight worsening of the mean visual acuity.

The mean baseline CMT in the control group was 442.62±111.40 µ. At the end of the third month, it was 411.08±16.37µ. The change in mean CMT between the study and control group was found to be statistically significant (p = .000) (Table 9).

Discussion:

In the present study, the mean baseline VA in the study patients was 1.34±0.34 logMAR units (mean ETDRS VA score- 21.64±12.72 letters). The mean VA improved to 0.96±0.45 (41.13±19.97 letters), 0.89±0.42 (42.68±20.53 letters), 0.87±0.44 (44.09±20.92 letters) logMAR units at 1 week, 1 month and 2 months respectively following treatment with a single dose of intravitreal bevacizumab. Maximum improvement in visual acuity was observed in the second month. There was a slight worsening of vision in the third month. The mean VA at the end of the third month was 0.93±0.44 logMAR (mean ETDRS score- 40.95±22.14 letters).Visual acuity improved by a mean of 15 letters or more (ETDRS) in 12 (54.54%) patients in the study group at the end of the third month. In the control group, the visual acuity did not show a great deal of improvement. The mean VA almost remained constant throughout the study period. The mean baseline VA in the control group was 1.24±0.46 logMAR (mean ETDRS VA score- 27.23±18.48 letters). The mean baseline VA at the end of the third month was 1.20±0.49 logMAR (30.92±21.21 letters). The change in the mean visual acuity between the study and control patients at the end of the study period was found to be statistically significant (p=.002). Hsu J et al described the effects of intravitreal bevacizumab in eyes with macular edema resulting from CRVO. They observed that the effects of a single intravitreal dose of bevacizumab lasted for a period of 2 months. In the present study too, maximum improvement in the mean visual acuity took place in the second month. Stahl A et al conducted a prospective interventional case series to evaluate the response of a single intravitreal dose of bevacizumab in 21 patients with RVO. Peak VA was reached 2 months following a single injection of bevacizumab. A decrease in the VA was noted after the second month. The authors concluded that a single dose of intravitreal bevacizumab is able to improve VA within the first 1 to 2 months. The present study achieved similar results with improvement in mean visual acuity being maintained for a period of 2 months following which there was a slight worsening of the mean visual acuity.

The mean baseline CMT in the study group was 489.95 ±102.53µ. CMT started reducing from the first week following a single intravitreal injection of bevacizumab. The mean baseline CMT decreased to 293.77±88.46µ, 287.77±83.32µ, 297.41 ±94.26µ and 326.68 ±106.19µ at the end of 1 week, 1 month, 2 months and 3 months respectively. This equated with a 40.04%, 41.27%, 39.29% and 33.32% decrease from the baseline at the end of 1 week, 1 month, 2 month and 3 months respectively. Almost every patient showed a reduction in CMT following a single injection of bevacizumab. However, CMT started increasing again from the third month in most of the patients indicating that the action of bevacizumab was short lived. CMT was found to be less than 250 microns in 5(22.72%) patients at the end of the study period. The mean baseline CMT in the control group was 442.62±111.40µ. At final follow up, there was a small reduction in the mean CMT to 411.08±16.37µ. This represented an overall reduction of only 7%. This reduction in the macular edema can be attributed to the natural history of retinal vein occlusion in which spontaneous resolution of macular edema is known to occur in some patients with time. This change in mean CMT at the end of the study period between the study and control group was found to be statistically significant (P=.000). Jaissle GB et al and Hung KH et al have obtained similar results in their study. They opined that intravitreal bevacizumab is a useful adjunctive treatment for macular edema secondary to RVO. A short term study conducted by Yamauchi Y et al suggested that intravitreal bevacizumab was effective, although in short term, in reducing the macular edema secondary to retinal vein occlusion. Pai et al investigated the clinical, anatomic and electrophysiologic response after single intravitreal bevacizumab injection for macular edema attributable to retinal vein occlusion. The authors concluded that intravitreal injection of bevacizumab appeared to result in significant short term improvement and macular edema secondary to RVO. The worsening of VA after the second month is associated with a concomitant rise in the CMT. This worsening of the VA and increase in the mean CMT values after two months are indicative of the fact that the action of a single intravitreal injection of bevacizumab is short-lived.

No systemic or ocular side effects were seen in any of the patients during the entire study period. There were no cases of endophthalmitis, vitreous hemorrhage or retinal detachment during the entire study period. The present study has a few limitations. The sample size was small.
and the duration of the study was short. No appropriate masking technique was applied in the study. Well designed double masked studies with a larger cohort and longer duration are required to answer a few unanswered questions. Despite these limitations, this study provides proof of the principle that VEGF inhibition is beneficial in eyes with macular edema secondary to retinal vein occlusion.

References:


24. Hsu J, Kaiser RS, Sivalingam A. Intravitreal bevacizumab (avastin) in central retinal vein occlusion:


Chalazion management – surgical treatment versus intralesional injection of long acting steroids

Akshay Anil Kothari 1, Ajoy Dey Sarkar 1

Abstract

Purpose: Comparison between the effectiveness of intralesional injection of long acting steroid (Triamcinolone acetonide) and surgical management (Incision and Curettage). Method: Hospital-based, two arm, prospective, comparative, interventional study on 100 patients who presented with chalazion who fulfill inclusion and exclusion criteria and gave informed consent were taken for the study. Preoperative detailed examination of chalazion included number, site, size (by caliper), tenderness, signs of inflammation and any other abnormal finding were noted. Test of proportion (Z-test) was used to test the significant difference between two proportions. t-test was used to test the significant difference between means. Results: The reduction in size of lesion (in mm) at post-operative third day, first week and first month follow up visits of the patients of Intralesional injection was significantly lesser than that of incision and curettage. Conclusion: Although intralesional injection was a simpler procedure, incision and curettage was a more effective method and remains the gold standard in the treatment of chalazia.

Keywords: Chalazion, Triamcinolone acetonide, Incision and Curettage, Chalazion Size.

Local swelling of the eyelid is a common complaint that is seen in the primary care or urgent care setting. Chalazion or meibomian cyst is a chronic inflammatory lipogranuloma caused by the blockage of gland orifices and stagnation of sebaceous secretions in the tarsus of an eyelid. The prevalence is unknown but it can occur in all age groups. Hormonal influences on sebaceous secretion and viscosity may explain clustering at the time of puberty and pregnancy. It is more common on the upper eyelid, where an increased number and length of meibomian glands are present. Chalazion is associated with seborrhea, acne rosacea, chronic blepharitis, high blood lipid concentration, leishmaniasis, tuberculosis, immunodeficiency, viral infection, and carcinoma. Poor eyelid hygiene is occasionally associated with chalazion, although its causal role needs to be established.

Chalazion usually causes local symptoms such as irritation, inflammation and cosmetic disfigurement. Bigger lesions can induce mechanical ptosis and cause blurred vision from induced astigmatism by pressing the cornea and rarely, they can lead to conjunctivitis or cellulitis. Eversion of the eyelid usually shows an inflamed chalazion through the tarsal conjunctiva, which further on becomes whitish.

It is essentially important to distinguish chalazia and malignant lesions such as sebaceous cell carcinoma which has very similar clinical presentation, but fortunately its appearance is extremely rare. The mean age of patients with sebaceous gland carcinoma is between 57 and 68 years. Therefore, it is obligatory to perform a histological verification of resected tissue in this group of patients.

Some smaller chalazia may disappear spontaneously while some have good therapeutic response to conservative treatment but a higher percentage of chalaziareact only to a surgical approach as the only method of treatment. Surgical treatment includes steroid injections, CO2 laser treatment, incision and curettage or total excision. The success of conventional surgical treatment of chalazia ranges between 60–89%, while conservative treatment may be successful in 25–77% cysts.

This study was done to compare intralesional triamcinolone acetonide (5mg/ml) injection with incision and curettage in the treatment of chalazia.

Materials and Methods:

Among the study population cases were assessed for suitability for inclusion in study using inclusion and exclusion criteria.
exclusion criteria. An informed consent (written) was taken from the selected cases. Those patients who were willing to participate were only included in the study.

All the patients in the study were examined by taking detailed history including patient particulars, chief complaint, duration of symptoms, past history of chalazion, history of past illness – ocular diseases, diabetes mellitus, bleeding disorder, personal history and family history.

Table-1: Outcome and two groups

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Group-1 (n=50)</th>
<th>Group-2 (n=50)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>40</td>
<td>47</td>
<td>87</td>
</tr>
<tr>
<td>Col %</td>
<td>80.0</td>
<td>94.0</td>
<td>87.0</td>
</tr>
<tr>
<td>Failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row %</td>
<td>10</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Col %</td>
<td>76.9</td>
<td>23.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Row %</td>
<td>68.0</td>
<td>32.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Col %</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Clinical examination included general examination, systemic examination, local examination of ocular adnexa and slit lamp examination of anterior segment of the involved eye. Preoperative detailed examination of chalazion included number, site, size (by caliper), tenderness, signs of inflammation and any other abnormal finding were noted. All routine pre-operative investigations of the patients were done before the surgery. Then, the patients underwent surgery under local anesthesia or injection under topical anesthesia.

Surgical Procedure done was incision and curettage of the chalazion. A vertical incision up to 3 mm over the area of the chalazion through the tarsal plate into the meibomian gland was made by a Number 11 Bard-Parker blade. Care was taken to avoid inadvertent extension of incision to the lid margin.

A vial of triamcinolone acetonide containing 40 mg/ml was diluted with seven ml of normal saline to make a suspension of 5 mg/ml. 0.2 – 0.6 ml (depending on the size of the lesion) of this suspension was then withdrawn in a tuberculin syringe. With a 26 gauge needle the suspension was then injected into the center of chalazion from the conjunctival surface. To avoid injury to the globe, the needle was always angled away from the globe when inserting the needle. The clamp was then removed.

Patients were discharged following the procedure with medications and advice for regular follow-up. Patients were followed up at three days, one week and one month interval. In each visit, patients underwent detailed ophthalmologic evaluation. Meticulous details of the size of chalazion in each follow-up visit were recorded in the case record form.

When the study period was over, outcome of the cases was analyzed using standard statistical methods. Test of proportion (Z-test) was used to test the significant difference between two proportions. t-test was used to test the significant difference between means.

Odds ratio (OR) with 95% Confidence Interval (CI) was calculated to measure the different risk factor. Significance level was set at 0.05 and confidence intervals were at 95 percent level. Also One Way Analysis of variance (ANOVA) followed by post hoc Tukey’s Test was performed with the help of Critical Difference (CD) or Least Significant Difference (LSD) at 5% and 1% level of significance to compare the mean values.

Result:

The patients of the two groups were comparable in respect of their ages, size, site and duration after a t test was applied.

Table-2: Comparison of size of lesion (in mm) of the patients of Group-2 at different time

<table>
<thead>
<tr>
<th>Values of descriptive statistics</th>
<th>Pre-operative (n=50)</th>
<th>At post-operative 3rd day (n=50)</th>
<th>At post-operative 1st week (n=50)</th>
<th>At post-operative 1st month (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± s.e.</td>
<td>3.67±0.88</td>
<td>2.04±0.78</td>
<td>1.01±0.73</td>
<td>0.13±0.41</td>
</tr>
<tr>
<td>Median</td>
<td>3.50</td>
<td>2.0</td>
<td>1.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Range</td>
<td>2.0-5.0</td>
<td>1.0-3.5</td>
<td>0.0-2.5</td>
<td>0.0-2.0</td>
</tr>
</tbody>
</table>
to each of the variables.

In this study the age range of patients was from 15 to 75 years, although most patients were within age group 15 - 30 years (53%) and mean age was 35.10 years for case group 1 and 34.68 years for case group 2. 47% patients were male and 53% were female.

Upper eye lid was predominantly involved in our study. Both case group 1 and 2 comprises 72 % involvement of the upper eyelid. The side of the lesion was almost similar in both the groups. 65 % were from rural location and 35 % from urban. Chi-square test showed that there was significant association between outcome and two groups (p=0.03).

The risk of failure was 3.91 times more among the patients treated with injection as compared to the patients treated with incision [Odds Ratio -3.91(1.01, 15.22); p= 0.03] and the risk was significant.

Discussion:

Although intralesional injection was a simpler procedure, incision and curettage was a more effective method and remains the gold standard in the treatment of chalazia. However, intralesional triamcinolone acetonide injection is a useful alternative method that some patients may prefer over incision and curettage because it is less painful, bloodless and requires no post treatment eye pad. It is a repeatable procedure and may be especially useful in cases that are not ideally suited to incision and curettage, for example multiple small chalazia, cases with chronic diffuse meibomitis where there is a thickened, inflamed tarsal plate with no removable granulomatous tissue, marginal chalazia and chalazion near the lacrimal drainage system. Bilateral cases can conveniently be treated at the same visit.

References:


Cite this article as:
Oculothermographic changes following LASIK surgery
Smruti Savale¹, Md Azhar², Himadri Datta¹, Anjan Dasgupta²

Abstract

Background: To evaluation of changes in symptom score and oculothermographic changes after Lasik surgery. Material and method: Patients who underwent Lasik surgery (n=32) were subjected to ocular thermal imaging once preoperatively and thrice postoperatively at one week, one month and three months. During analysis for standardization the mean dT of central 10 pixel by 10 pixel area of ocular surface has been used. Mean of the series of mean dT for each individual was calculated and compared using MATLAB software. Result: Thermal fluctuations were observed in the eyes after Lasik surgery but the findings were not statistically significant. Large scale fluctuations which were present preoperatively, were absent postoperatively on all 3 visits, maybe related to the gradual stabilization of the tear film with time after the surgery. Conclusion: Oculothermography or thermal studies may prove to be the future non-invasive diagnostic tools to detect development of dry eyes in the pre-clinical stages.

Keywords: Lasik, Dry Eye, Thermography, Ocular Thermography.

Dry eye disease can be caused by either inadequate tear production or excessive tear evaporation. Dry eye symptoms range from mild ocular irritation to severe discomfort, photophobia and vision loss. Clinical signs of dry eye include evidence of decreased aqueous tear production, decreased tear volume on the ocular surface, increased rate of tear evaporation, and increased tear osmolality.

Laser-assisted in situ keratomileusis (Lasik) is a safe and effective surgical option for treatment of refractive errors; however, dry eyes are a remarkably frequent consequence of Lasik surgery, with up to 95% of patients experiencing symptoms of dry eyes after corneal refractive surgery.¹, ² Prevalence of dry eye symptoms prior to undergoing Lasik is estimated to be between 38 and 75%.³, ⁴ Healthy corneal sensation is a requirement for maintaining communication of the ocular surface – lacrimal gland functional unit. Corneal denervation is believed to be the most significant cause of post-LASIK dry eyes.⁵ In vivo confocal microscopy (IVCM) can be used to identify and characterize the sub-basal nerve plexus and stromal corneal nerves in living subjects in a non-invasive and repeatable manner.

Temperature always tends to decrease on a vital mucous membrane surface such as an ocular surface always wetted with moister such as tears, thus the vital tear wettability of eyes in other words, the vital tear dryness, can be determined by analyzing changes in the ocular surface temperature.⁶ So this study had been undertaken to evaluation of changes in symptom score and oculothermographic changes after Lasik surgery.

Material and method:
The individuals for the study group were selected from those who had attended the Lasik Clinic of Regional Institute of Ophthalmology, Medical College, and Kolkata during the one year period of June 2013 to May 2014. Each of them underwent standard work-up followed in Lasik Clinic which included detailed medical and surgical history, history of any autoimmune disorder, any chronic drug intake, and age above 18 years with stable refraction in the last one year. To detect presence of dry eye, each of them underwent Schirmer I test, t-BUT and fluorescein staining. Routine disc evaluation by slit-lamp biomicroscopy and applanation tonometry was performed to rule out glaucoma. Indirect ophthalmoscopy was performed to examine the peripheral retina. Patients with myopia ranging from -2D to -8D and astigmatism upto 3D with pupil size less than 6mm in room light were included in the study. Patients with active eye infection and having corneal pathology including ectasia and having prior history of

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Conflict of Interest : None, Financial Disclosure : None
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refractive surgery were excluded from the study. Patients with dry eye, auto-immune and immune-deficiency disorders, systemic or retinal vasculopathies and pregnant ladies were also excluded from the study.

After informing the subject a written consent was obtained from the subject in presence of neutral witness. Subjects were explained about the non-invasiveness of the procedure and the safety of infra red imaging. Imaging room is a closed room with controlled temperature (25°C) and Humidity (40%). Pre-conditions for imaging include abstinence from putting any eye drop in the day of imaging, no meals and hot or cold drinks two hours prior to the procedure. No face wash is allowed 2 hours prior to the procedure. First the patient is instructed to sit in the room for 10 minutes in a relaxed state. The patient is counseled about the simple things he has to do. After connecting the instruments, first image was taken with normal blinking. Then the patient was instructed to wide open the eyes for at least 10 seconds.

Imaging done once pre operatively and thrice post operatively at Intervals 1 week, 1 month and 3 months.

During analysis for standardization the mean dT of central 10 pixels by 10 pixels area of ocular surface has been used. Mean of the series of mean dT for each individual was calculated and compared.

Lasik patients were compared once pre operatively and thrice post operatively at intervals 1 week, 1 month and 3 months.

In the study the analysis of the data has been done using MATLAB software. MATLAB (matrix laboratory) is a numerical computing environment and fourth-generation programming language. Developed by MathWorks, MATLAB allows matrix manipulations, graphical plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran. Microsoft Excel has also been used to analyze data for interpretation and preparation of graphs and tables.

**Result:**

The study included 32 patients for whom Lasik surgery was planned in both eyes, chosen in a random sequential manner from the Lasik clinic of the hospital and all cases underwent oculothermographic imaging once preoperatively and thrice postoperatively at 1 week, 1 month and 3 months. Results were analyzed following standard statistical protocol.

The epidemiological analysis of the present study showed that 22% of the patients were in age group 18-22 years, 37% in age group of 23-27 years and 41% were >27 years. Mean age was 26.43 ± 5.31 years. 50% of the patients were males and 50% were female.

The chief parameter for comparison was thermal score, in the form of mean of the temperature deviations (dT) in the central cornea, measured with thermal cameras. dT was compared between preoperative and each of the postoperative visits.

Preoperative mean of mean dT (RE) was -0.285 + 0.317 (Mean + SD) and that of (LE) was -0.315 + 0.313 (Mean + SD).

There is statistically no significant difference between the dT of the eyes preoperatively and on 1st postoperative visit at 1 week. On 1st postoperative visit at 1 week in case of right eye the mean of mean dT was -0.25 ± 0.247 (Mean ± SD) with a p value of 0.527 and in the left eye was -0.247 ± 0.252 (Mean ± SD) with a p value of 0.271 (Table 1). In the scatter plot (Figures 1 and 2) it can be seen that the mean of mean dT of both eyes preoperatively are as diffusely situated as those obtained on the 1 week visit.

There is statistically no significant difference between the dT of the eyes preoperatively and on 2nd postoperative visit at 1 month. On 2nd postoperative visit at 1 month in case of right eye the mean of mean dT was -0.312 ± 0.382 (Mean ± SD) with a p value of 0.742 and in the left eye was -0.475 ± 0.542 (Mean ± SD).

**Table 1: Comparison between Mean of Mean Preop Dt & 1st Postoperative Visit (1 Week):**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Preop (RE)</th>
<th>1st Visit (RE) (At 1 Week) p=0.527457654</th>
<th>Preop (LE)</th>
<th>1st Visit (LE) (At 1 Week) p=0.271045269</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-0.285885187</td>
<td>-0.250012754</td>
<td>-0.315402731</td>
<td>-0.247754843</td>
</tr>
<tr>
<td>SD</td>
<td>0.317497623</td>
<td>0.247266611</td>
<td>0.313662138</td>
<td>0.252677612</td>
</tr>
</tbody>
</table>
eye was \(-0.299 + 0.311\) with a p value of is 0.442. In the scatter plot (Figures 3 and 4) it can be seen that the mean of mean dT of both eyes preoperatively are as diffusely situated as those obtained on the 1 month visit.

There is statistically no significant difference between the dT of the eyes preoperatively and on 3rd postoperative visit at 3 months. On 3rd postoperative visit at 3 months in case of right eye the mean of mean dT was \(-0.309 + 0.277\) (Mean \(\pm\) SD) with a p value of 0.7 and in the left eye was \(-0.288 + 0.206\) with a p value of 0.63 (Table 3). In the scatter plot (Figures 5 and 6) it can be seen that the mean of mean dT of both eyes preoperatively are as diffusely situated as those obtained on the 3rd month visit.

Findings were not related to the degree of myopia corrected in the LASIK procedure and a similar scatter diagram was found in the all diopteric ranges of myopia. From the mean temperature deviation (dT) graph (dT v/s time) in right and left eyes of a patient before and after LASIK recorded on the 3 postoperative visits (derived from the infrared image with help of MATLAB Software), no correlation between the patterns or any specific patterns plotted for all the patients was not found (Figures 7).

From the normalized frequency plotted against the mean of mean dT in right and left eyes, large scale fluctuations which were present preoperatively disappear in the postoperative visits (Figures 8 & 9).

Preoperative mean Schirmer’s I test value (RE) was 17.56 + 2.16 (Mean + SD) and that of (LE) was 18.68 + 3.11

**Table 2: Comparison between Mean of Mean Preop Dt & 2nd Postoperative Visit (1 Month):**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Preop (RE)</th>
<th>2nd Visit (RE) (At 1 Month) p=0.742436361</th>
<th>Preop (LE)</th>
<th>2nd Visit (LE) (At 1 Month) p=0.442730721</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN</td>
<td>-0.285858187</td>
<td>-0.312641583</td>
<td>-0.315402731</td>
<td>-0.299041606</td>
</tr>
<tr>
<td>SD</td>
<td>0.317497623</td>
<td>0.382728434</td>
<td>0.313662138</td>
<td>0.311494638</td>
</tr>
</tbody>
</table>

**Table 3: Comparison between Mean of Mean Preop Dt & 3rd Postoperative Visit (3 Months):**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Preop (RE)</th>
<th>3rd Visit (RE) (At 3 Months) p=0.699602277</th>
<th>Preop (LE)</th>
<th>3rd Visit (LE) (At 3 Months) p=0.633551054</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN</td>
<td>-0.285858187</td>
<td>-0.315402731</td>
<td>-0.309572135</td>
<td>-0.288796721</td>
</tr>
<tr>
<td>SD</td>
<td>0.317497623</td>
<td>0.313662138</td>
<td>0.277426315</td>
<td>0.206891876</td>
</tr>
</tbody>
</table>
On 1st postoperative visit in case of right eye the mean of Schirmer's test value was 16.25 ± 2.18 (Mean ± SD) with a p value of <0.05 and in the left eye was 17.18 ± 3.12 (Mean ± SD) with a p value of <0.05. On 2nd postoperative visit in case of right eye the mean of Schirmer's test value was 16.78 ± 2.40 (Mean ± SD) with a p value of <0.05 and in the left eye was 17.71 ± 2.90 (Mean ± SD) with a p value of <0.05. On 3rd postoperative visit in case of right eye the mean of Schirmer's test value was 17.18 ± 2.87 (Mean ± SD) with a p value of 0.205 and in the left eye was 18.62 ± 3.33 (Mean ± SD) with a p value of 0.875.
It can be seen that the mean Schirmer’s I test values of both eyes drop on the 1st postoperative visit at 1 week, then gradually increases on subsequent visits at 1 and 3 months to reach nearly equal to the preoperative mean values (Figures 10 and 11). Thus there was statistically significant difference between the Schirmer’s I test results at the 1 week and 1 month postoperative visits but not at the 3 month postoperative visit. Any relation between the Schirmer’s test and the oculothermographic imaging was not found.

Preoperative mean TBUT value (RE) was 12.53 + 1.04 (Mean ± SD) and that of (LE) was 12.78 + 1.007 (Table 5). On 1st postoperative visit in case of right eye the TBUT value was 11.68 + 0.85 (Mean ± SD) with a p value of <0.05 and in the left eye was 11.9 + 1.14 (Mean ± SD) with a p value of <0.05. On 2nd postoperative visit in case of right eye the TBUT value was 12.18 + 0.93 (Mean ± SD) with a p value of <0.05 and in the left eye was 12.34 + 1.12 (Mean ± SD) with a p value of <0.05. On 3rd postoperative visit in case of right eye the TBUT value was 12.37 + 0.94 (Mean ± SD) with a p value of 0.377 and in the left eye was 12.53 + 0.91 (Mean ± SD) with a p value of 0.07. Thus there was statistically significant difference between the TBUT results at the 1 week and 1 month postoperative visits but not at the 3 month postoperative visit. Any relation between the TBUT and the oculothermographic imaging was not found. The significant improvement in the Schirmer’s test and TBUT results post LASIK surgery can be explained by the recovery of corneal sensation and tear production.

**Discussion:**

This does not denote the true age and sex distribution...
amongst Lasik patients in the community as the sample was too small and randomly selected for that comment to be made.

“The Medical use of thermography started shortly after 1950 in Germany, where long time before, Prof. Czerny in Frankfurt and Main presented the first infrared image of a human subject (1928). In the beginning, single IR detectors have been used. Due to the development of other thermographic devices like contact thermography by electronic thermometers and by LC (liquid crystal) plates they were integrated in medical diagnostic systems”. (Thermografie-Kolloquium 2007-Vortrag 04)7. The study of temperature has widespread applications across science and industry. Thermal imaging offers the great advantage of real time two-dimensional temperature measurement. With modern technology, a single image may contain several thousands of temperature points, recorded in a fraction of a second8. Infrared imaging has been used in a variety of disease conditions like osteoarthritis, Reynaud’s phenomenon, carpal tunnel syndrome, thoracic outlet syndrome and malignancy9,10,11.

Interest in the temperature of eye spans almost 130 years. With Technological development it is becoming more and more precise and more informative than before. The use of dynamic, real time thermography gives great opportunities for monitoring of the temperature of anterior eye12. There are several eye diseases where thermography may be an important diagnostic, as well as prognostic tool. Ocular vascular disorder, inflammatory conditions, ocular and orbital tumor and dry eye, glaucoma, Tolosa hunt syndrome, post herpetic neuralgia are few examples13, 14. There is a significant difference of ocular surface temperature between dry eye patients and normal individual and Oculothermography may be a method for the research and diagnosis of dry eye diseases15,16. Several studies have performed on corneal evaluations in conjunction with IVCM assessment of corneal nerve appearance. Most studies find no direct correlations between corneal nerve regeneration and recovery of corneal sensation17, 18. In general, corneal sensation is found to recover to preoperative levels within the first year after surgery, but corneal nerve morphology continues to be abnormal. Only one study found that recovery of corneal sensation correlated with regeneration of corneal nerves19.

The major outcome of this study is that thermal fluctuations were observed in the eyes after Lasik surgery but the findings were not statistically significant. Interesting finding was that the large scale fluctuations which were present preoperatively, were absent postoperatively on all 3 visits, maybe related to the gradual stabilization of the tear film with time after the surgery. However, this does not denote the true prevalence in the community as the sample was too small and randomly selected for that comment to be made. Hence, further studies with larger sample size would be necessary to test the role of thermal imaging as a diagnostic tool in detecting development of dry eyes in the pre-clinical stages post LASIK surgery. Oculothermography or thermal studies may prove to be the future non-invasive diagnostic tools to detect development of dry eyes in the pre-clinical stages. These results can be extrapolated to other ocular conditions as well and further research could be carried out to define proper guidelines in order to make full utilization of this tool in clinical setting. Nevertheless, clinical symptoms and signs shall always be invaluable to assess the disease status and all the findings must be correlated with the clinical picture.

References:


Cite this article as:
The efficacy of amniotic membrane transplantation in varied ocular surface disorder — a study with 2 years follow-up.

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Abstract

**Purpose:** To evaluate the long-term results of the efficacy of amniotic membrane transplantation in acid burn, alkali burn, thermal burn and Stevens-Johnson syndrome (SJS).

**Design:** Prospective interventional case series.

**Participants:** 15 patients with acid burn, 5 patients with alkali burn, 1 patient with thermal burn and 9 patients with SJS were included.

**Methods:** Amniotic membrane was processed under sterile conditions from a fresh placenta obtained from cesarean section in a seronegative pregnant woman and stored at -70°C. Release of symblepharon, epibulbar fibrous tissue excision and corneal fibro vascular membrane clearing was done. Obliterated fornices found in all 9 patients with SJS and 7 patients with ocular chemical burn were reconstructed were deepened by the use of fornix-formation sutures. Symblepharon ring was placed post-operatively in all eyes for 2 weeks to 3 months. Mean follow-up period was 24 months.

**Main outcome measures:** Integrity of ocular surface epithelium, restoration of adequate bulbar surface free of symblepharon and visual acuity during the 24 months of follow-up.

**Results:** Complete corneal epithelialization occurred between 1 to 5 weeks in all eyes except for 1 patient with acid burn. All eyes were free of symblepharon at the final follow-up. 9 patients with acid burn and 1 patient with thermal burn had some residual stromal clouding at final follow-up. Cicatricial entropion of lower eyelid of 1 patient with SJS resolved with AMT. Limbal ischemia resolved in all patients except for the solitary patient with thermal burn. Visual acuity improved in 8 patients with acid burn, all 5 patients of alkali burn, and 2 patients with SJS.

**Conclusion:** Amniotic membrane transplantation promotes re-epithelialization, restores adequate ocular surface and prevents recurrence of symblepharon in severe ocular surface disorders.

**Keywords:** Ocular surface; Ocular surface reconstruction; Human amniotic membrane; Amniotic membrane transplantation.

Erythema multiforme or Stevens-Johnson syndrome (SJS) is a severe blistering disease of the skin and the mucous membranes associated with hypersensitivity to commonly ingested drugs. Chemical burns, thermal burns and SJS result in severe ocular surface damage with its resultant sequelae of extensive scarring of conjunctiva, symblepharon, dry eye, limbal stem cell deficiency, neovascularisation, and associated deformation of lid margins resulting in entropion trichiasis and distichiasis.

Amniotic membrane, that is, amnion, is the innermost layer of the placental membrane and consists of a thick basement membrane and an avascular stroma. When appropriately procured and processed, the preserved amniotic membrane can be used as a substrate to replace the damaged mucosal surfaces damaged by various ocular surface disorders. Several previous studies have demonstrated that amniotic membrane transplantation facilitates epithelialization and reduces inflammation, vascularisation and scarring. In this case series we have studied the potential efficacy of amniotic membrane transplantation in reconstruction of ocular surface damaged by SJS and burn injury to find out the long-term results.¹⁻⁵

**Patients and methods:** All the selected patients attended RIO Kolkata OPD between 2010-13. We performed ocular surface reconstruction on 15 patients (13 male, 2 female) with acid burn, 5 patients (4 female, 1 male) with alkali burn, 1 male patient with thermal burn and 9 patients (5 male, 4 female) of SJS. The initial clinical examination included slit lamp examination of the eyelids, conjunctiva, fornices and cornea. Any limbal stem cell deficiency was detected by presence of conjunctivalization of cornea, vascularisation, and recurrent or persistent corneal epithelial defect. Frequent instillation of artificial tears and treatment of meibominitis was the standard preoperative treatment. Informed consent was taken from all patients.

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prior to treatment.

**Preparation of human amniotic membrane:** AMT was prepared and preserved as per the standard protocol. The human placenta was obtained from elective cesarean section of women seronegative for HIV (human immunodeficiency virus), Hepatitis B, Hepatitis C, and syphilis. In a laminar flow hood the placenta was cleansed of all the adherent blood clots with sterile phosphate buffered saline solution containing 50µg/ml penicillin, 100µg/ml neomycin, and 2.5µg/ml of amphotericin B. The amnion was separated from chorion by gradual blunt dissection and flattened into nitrocellulose paper strips with epithelial- basement membrane side away from the paper. The paper strips were stored till transplantation at temperature of -70°C in Dulbecco’s modified Eagles medium and glycerol (1:1 ratio).6-9

**Surgical procedure:** Surgery included removal of all damaged ocular surface epithelium, epithelium and subconjunctival fibrous tissues, and release of symblepharon, fornix reconstruction and AMT. Any conjunctival epithelium covering the cornea was removed totally and healthy episcleral tissue exposed. The entire area that’s devoid of epithelium was covered with amniotic membrane with epithelium-basement membrane up. The membrane was secured to the conjunctival edge by interrupted 8-0 vicryl sutures. The membrane was secured to the episclera by interrupted 8-0 vicryl sutures placed outside the limbus. This helped to cover the entire corneal surface without stretching or folding of the membrane. At the end a snugly fitting symblepharon ring was placed in all cases.

Post-operatively all patients received 0.1% prednisolone acetate drops 4 hourly tapered off in 6 weeks time, 0.3% hydoxy propyl methyl cellulose drops 1 hourly, and 2% hydroxy propyl methyl cellulose ointment at bed time. Post-operative clinical evaluation was done on day 1, 1 week, 6 weeks, 3rd month, and every 3 months thereafter. At each visit visual acuity was assessed and position of eyelashes and eyelids were seen. Slit lamp examination was done to evaluate the fornices, bulbar and palpebral conjunctiva and the entire cornea.

**Result:**

The time to AMT from the onset of the disease ranged from 1- 29 months. None of the eyes had undergone any other previous surgical procedure. Complete corneal epithelialization occurred between 1 to 5 weeks in all eyes except for 1 patient with acid burn. All eyes were free of symblepharon at the final follow-up. 9 patients (60%) with acid burn and 1 patient with thermal burn had some residual stromal clouding at final follow-up. Cicatricial entropion of lower eyelid of 1 patient with SJS resolved with AMT. Limbal ischemia resolved in all patients except for the solitary patient with thermal burn. Visual acuity improved in 8 patients with acid burn, all 5 patients of alkali burn, and 2 patients with SJS. Patients reported some discomfort until the symblepharon ring was removed. It was done when the transplanted surface showed complete epithelialization. All patients reported a significant decrease in foreign body sensation, dryness, irritation, pain and photophobia at the final follow-up visit.

**Discussion:**

Ophthalmic involvement in SJS and ocular burns often result in a combination of clinical manifestations including conjunctival scarring, symblepharon, dry eye, conjunctivalization of the cornea and eyelid malformations—all of which are difficult to treat.10-13 Ideal management of these cases should consist of the following sequential steps:

- Management of dry eye and meibominitis
- Reconstruction of ocular surface with release of symblepharon
- Treatment of eyelid deformities –entropion, trichiasis, distichiasis
- Limbal stem cell replacement
- Optical PKP for visual rehabilitation.

Tseng et al have reported encouraging results in ocular surface reconstruction with AMT.5, 6 In the present series we have evaluated the out come of AMT in severe ocular damage by burn and SJS. By performing release of symblepharon, excision of epibulbar fibrous tissue, and clearing fibrovascular membrane over cornea followed by AMT and fornicial reconstruction, we achieved a stable ocular surface in 29 of 30 eyes. Improved ocular surface was in terms of reduced discomfort, reduced surface inflammation, and decrease in corneal vascularisation, corneal epithelialization, and non recurrence of symblepharon. Our observation that AMT is useful in restoring a stable and non-inflamed ocular surface finds support in literature. In conclusion AMT can be safely used as first and preparatory surgical step in ocular surface reconstruction in SJS and chemical or thermal burns to provide symptomatic relief, improved visual status and better cosmesis and the long-term follow up shows satisfactory results.
Reference:


Cite this article as:
Burden of incurable blindness in rural Bengal

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Abstract

**Background:** To report the estimated incurable blindness among rural cohort. **Material and Methods:** People belonging to 15 villages of Howrah district in West Bengal were screened for presence of incurable blindness through an outreach camp based evaluation during a single calendar year. Each of the participants was subjected to vision test, evaluation of anterior segment by portable slitlamp and assessment of posterior segment by slitlamp biomicroscopy and indirect ophthalmoscopy. All cases of incurable blindness were recorded and documented. **Results:** Total 986 people were screened for incurable blindness. Among 107 patients (male=52 and female=55) with incurable blindness, 77 belonged to below poverty line and 37 were illiterate. Only 6 patients were aware of schools for the blind and 3 of them were admitted in such school. Only 6 of them were rehabilited by some NGOs. Microcornea with microophthalmos was the commonest presentation (n=35). **Conclusion:** The widespread prevalence of incurable blindness among rural population warrants more intense and multidisciplinary approach with particular involvement of NGOs.

Keywords: Blindness; Incurable blindness; Rural Bengal

Blindness is a major public health concern in India and creating a huge burden to our growing economy. In countries like India, the tragedy of blindness is more poignant because preventable infections have spread unchecked, making millions blind. Moreover many in rural areas have no access to specialized treatment either due to illiteracy, ignorance or economic burden. To have the appropriate plan to eliminate avoidable blindness in India, current population-based data on the magnitude and causes of blindness in all age groups are a prerequisite. A national survey done during 1986–1989 reported that 1.5% of the population in India was blind, with presenting visual acuity < 6/60 in the better eye, and that 80% of this blindness was caused by cataract. Consequently, in the 1990s the focus of the National Program for the Control of Blindness was almost exclusively on reducing cataract blindness, which included large funding under a World Bank cataract project. The original target of the National Program was to reduce the prevalence of blindness to 0.3% by 2000, though it was acknowledged by the mid-1990s that achievement of this target was unlikely. Despite all the efforts the burden of incurable blindness in rural India is high. The present rapid study of blindness was undertaken in a rural community of India in order to survey the extent and etiology of the incurable blindness in rural Bengal and to measure the impact of physical and social rehabilitation efforts by Government and Non governmental organizations (NGO).

**Material and methods:**

It is a prospective case series study. The study took place at eye check up camps in 15 villages of Howrah district of West Bengal during the period of 2014-2015. All incurable blindness in the population was identified by history taking, portable slit lamp examination; intraocular pressure was measured with Goldman applanation tonometer. All participants had their pupils dilated unless contraindicated because of risk of angle closure. Selected patients were brought at Calcutta Medical College for stereoscopic fundus examination, including assessment of the vitreous, retina, and optic disc, was done at the slitlamp using 78 diopter lens and with the indirect ophthalmoscope using 20 diopter lens. Individuals were considered blind if they had distant visual acuity of less than 3/60 in their better eye and partially blind if they had visual acuity of 3/60 or less in their worse eye (World Health Organization, 1973b). Causes of blindness were identified retrospectively by taking a past history from the respondents and by careful examination of the past medical records. Curable cases were excluded from the study.

**Results:**

We identified total 107 incurable bilateral blindness. Age of the participating population ranged 5-75yrs. Total 52 male and 55 female patients participated in the study. Number of people belonged to below poverty line was 77. Out of all the participants, 70 were literate and 37 were illiterate.
Only 16 pts were aware of school for the blind, but only 3 out of 107 patients were admitted at such school. Six patients were rehabilitated by some NGOs. Microophthalmos with microcornea was noted in 35 patients. Anophthalmos was seen in 02 and cryptophthalmos in 01. One case presented with sclerocornea. Horizontal jerky nystagmus was noted among 3 patients. Some rare presentations were choroidal dystrophy (n=2), oculocutaneous albinism (n=3), hydrocephalous with optic atrophy (n=2) and post traumatic phthisis bulbi (n=1).

**Conclusion:**
There are 39 million people blind worldwide. About 90% of the world's visually impaired live in developing countries. As per survey conducted by MOH & FW of avoidable blindness in India is 1% (121 lakhs) considering current population to be 122 crores (population census 2011). 62% are due to cataract and 19.7% due to refractive error in all age groups. 1% of total blindness constituting 1.22 lakhs are bilaterally corneal blind in the country.9-12 We found blindness in the rural and semirural region of West Bengal to be quite high. This imposes substantial social and economic burden on society. We found women, illiterates and those belonging to poor socioeconomic status to be at a higher risk of having blindness. We found there are almost nil rehabilitation efforts among the blind. Total lack of awareness regarding blind Schools resulted in poor physical and occupational rehabilitation. Also delay in initiation of treatment resulted in bilateral blindness from cataract, glaucoma, keratitis, trauma etc. The so called home remedies used in many rural households for eye diseases need to be avoided as they more often cause harm than good. The major disease-related issues that need to be addressed in the eye care policy of India, if the goal of VISION 2020 to eliminate avoidable blindness is to be achieved, are improvement in the quality of cataract surgery and increase in the number of surgeries on persons blind in both eyes, effective screening to detect refractive error blindness and provision of spectacles and initiation of long-term strategies to prevent corneal and glaucoma blindness.13,14 These issues are more likely to be successfully addressed if emphasis is placed on training professionals to provide quality comprehensive eye care instead of a piecemeal approach addressing the different blinding conditions separately. Approaches would have to take into account recent data on blindness and barriers to eye care to plan the appropriate infrastructure and human resources needed to reduce blindness in India.

**References:**