EPIDEMIOLOGICAL PROFILE AND PROGNOSTIC ASSESSMENT OF PEDRIATIC OPEN GLOBE INJURIES IN TERTIARY HOSPITAL OF VIJAYAPURA

By

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Dissertation submitted to the

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In partial fulfilment of the requirements for the degree of

MASTER OF SURGERY

IN

OPHTHALMOLOGY

Under the guidance of

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List of abbreviations

POTS – Paediatric ocular trauma score

OTS – Ocular trauma score

OCT – Optical coherence tomography

VA – Visual acuity

AC – Anterior chamber

IOFB – Intraocular foreign body

IOL – Intraocular lens

IOP – Intraocular pressure

ETDRS – Early Treatment Diabetic Retinopathy Study

NPL/NLP – No perception of light

PL – Perception of light

HM – Hand movements

CF – Counting finger

PVD – Posterior vitreous detachment

BCL – Bandage Contact lens

OGI – Open globe injury

IVA – Initial visual acuity

FVA – Final visual acuity

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ABSTRACT

BACKGROUND: Open globe injuries in the pediatric age group commonly cause acquired blindness, 90% of them are preventable. Most ocular injuries in children are due to playing with sharp objects like wooden sticks, pens, stones, etc., without knowing the nature of dangerous things, especially in rural areas. Parents should be educated enough to prevent the trauma from happening. Open globe injuries can make the children blind and affect social lives and academic performance. Treatment modalities depend upon the injuries and age group in which they occur. Visual outcomes depend upon several factors, including etiology, severity, and duration of injury. Here, an attempt has been made to study the epidemiological profile and assess the prognosis of pediatric open globe injuries in Northern Karnataka.

AIM AND OBJECTIVES: To evaluate the epidemiology and demographic profile and to understand the most common causative factors associated with open globe injuries in the pediatric age group attending the tertiary hospital of Vijayapura and assess the prognosis and predict the final visual outcome using the Pediatric Ocular Trauma Score.

MATERIALS AND METHODS: A prospective interventional study was conducted on pediatric open globe injury patients in the outpatient, inpatient and casualty of Shri B M Patil Medical College Hospital and Research Centre, B.L.D.E. (D.U.) from September 2022 to February 2023 (18 months). After obtaining informed consent from the parents/guardians, a detailed ocular examination was done to assess both anterior and posterior segments. Investigations like B Scan, OCT, CT and M.R.I. were done wherever necessary.

After examination, raw points are calculated to get the Pediatric ocular trauma score, and are converted into a percentage chance of the final visual outcome at 6 months.

RESULTS: A total of 45 eyes of 45 patients were included in the study. The mean age group of patients was 10.13 years, ranging from 4-15 years. Among 45 patients, 36 were boys and 9 were girls (5:1). There was no significant difference between the two eyes. Wooden stick injury was the most common cause (46.66%), followed by stones (15.55%). Most of the open globe injuries happened at home (75.6%) and a few at school and farm. Zone I was the most common location (66.7%) of injury. Most patients had a visual acuity of Hand movements (33.33%), followed by Counting fingers (26.66%). 71.1 % of cases had one or more than one complication at presentation, in which hyphema was the most common (35.55%). Most patients fall in the category of POTS 2 (55.6%).

CONCLUSION: Pediatric open globe injury is a significant cause of hospitalization, especially in rural children. Boys far outnumbered girls because of their habit of playing with sharp objects. Studying the epidemiological profile of pediatric open globe injuries gave us a clue about the areas to be focused in prevention. Prognostic assessment using the Pediatric Ocular Trauma Score predicted the final visual outcome and helped educate the parents accordingly.

INTRODUCTION

Ocular trauma in the pediatric age group is a common cause of acquired blindness. [1] Each year, an estimated 3.3 to 5.7 million ocular injuries occur worldwide. [2] It is the most common visual morbidity, and 90 % of them are preventable. [1] Strategies of preventive and treatment modalities depend upon the injuries and age groups in which they occur. [3]

Diagnosing and treating ocular injuries in children is challenging as the primary assessment can be difficult in these uncooperative patients. Visual outcomes depend upon several factors, which include etiology, severity, and duration of the injury. [4]

Open globe injuries are the full thickness wound of the eye wall in which sclera and cornea are breached through and through. [5] They damage eyeball structure, leading to blindness or removal of eye in some cases. [6] Causative factors responsible for open globe injuries differ in children from adults. It might be an occupation-related injury in adults, while, in children, it is due to playing with sharp objects like stones, knives, glass, wooden stick or fireworks without knowing the nature of dangerous things. [7]

Pediatric trauma can lead to severe vision loss due to trauma itself or secondary complications. It also has functional and psychosocial implications. More importantly, it negatively affects their growth, such as the risk of delay in learning, limitations in skill acquisition, and impaired social relationships, leading to a lower quality of life score than their peers. Timely intervention and prevention of blindness are thus necessary. [8] An accurate assessment and prospective visual outcome prediction before surgery are of tremendous clinical significance. [6]

Epidemiological parameters of pediatric ocular trauma vary from place to place and with gender. Innumerable studies on ocular trauma were conducted in developed countries, but the pattern of injuries in developing countries is not yet well known. [1]

SURGICAL ANATOMY OF EYE

LAYERS OF EYEBALL

- Corneoscleral Envelope
- Uvea
- Retina

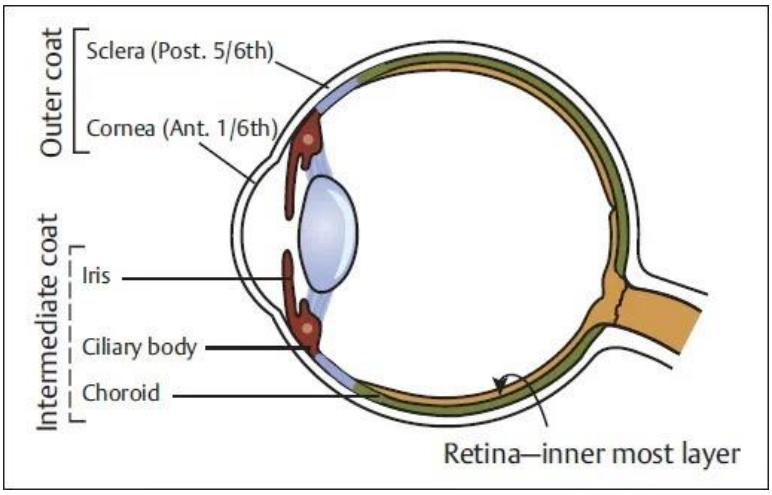


FIGURE 1 – Layers of eyeball

CORNEOSCLERAL ENVELOPE

Corneoscleral envelope confines the intraocular pressure and preserves the eye's dimensions. It is made of dense connective tissue with interwoven fibrous collagen that renders it rigid and inelastic. Cornea is exposed to external environment, while anterior portion of sclera is covered by conjunctiva and hence no direct exposure. The anterior 1/6th is transparent (Cornea) & posterior 5/6th is white and opaque (Sclera). Cornea serves as a ‘window’ that allows entry of light and sclera as ‘dark box’ that allows image formation on retina. [9]

CORNEA

Cornea is the anterior most transparent part of the outer coat of eyeball which is prolate spheroid in shape. It is shortest in its vertical diameter because of the scleral overlap above and below

Horizontal diameter – 11-12 cm [10]

Vertical diameter – 9-11 cm [10]

Outer limit is the limbus after which it is continuous with sclera.

SCLERA

Sclera is the tough coat of connective tissue, in which collagen fibrils vary widely in diameter and are intricately interwoven. This accounts for its light-scattering property and makes it opaque.

It is thinnest beneath the rectus muscle attachments (0.3 mm) and at the equator (0.4mm), thicker near the limbus (0.8 mm) and thickest around the optic nerve (1.0-1.35 mm).

Ground substance is less in the sclera than in the cornea.

The loose connective tissue layer over the sclera is episclera.

The globe is invested with a thin fascia of connective tissue – Tenon's capsule. It fuses anteriorly with episclera at the limbus and posteriorly over the distal part of the optic nerve.

LIMBUS

The specialized transitional zone is at the external scleral sulcus, where the sclera merges with the cornea.

The scleral overlap is more significant above and below. The corneal epithelium becomes conjunctival, lacking the bulbar conjunctiva's goblet cells.

The superficial width of the limbus is 2 mm in the vertical meridian and 1.5 mm in the horizontal.

Its corneal limit is the termination of Bowman's layer anteriorly and of Descemet's layer posteriorly; the Scleral limit is the tip of the scleral spur.

At the limbus, collagen lamellae lose their regular fibril width and separation in the cornea and blend with interwoven networks of the sclera.

UVEA

The middle layer is highly vascular and nutritive

It consists of iris, ciliary body, and choroid from anterior to posterior.

Iris separates the anterior segment into anterior and posterior chambers with the cornea in front and the anterior surface of the lens behind, respectively.

The ciliary body secretes aqueous and flows into the posterior chamber through the pupil and out of the globe through drainage apparatus at the angle of AC. Uveal circulation nourishes the outer, non-vascularized retinal layers.

Choroid is bounded anteriorly by ora serrata and posteriorly ends around optic nerve head. It is the chief vascular layer that supplies outer retinal layers.

RETINA

Retina is the internal photosensitive layer of eyeball. It lines the whole posterior part of eye except at optic disc and extends anteriorly up to ora serrata [(10)] It is concerned with initial visual information processing.

CLASSIFICATION OF MECHANICAL EYE INJURY

BIRMINGHAM EYE TRAUMA TERMINOLOGY (B.E.T.T.) CLASSIFICATION [11]

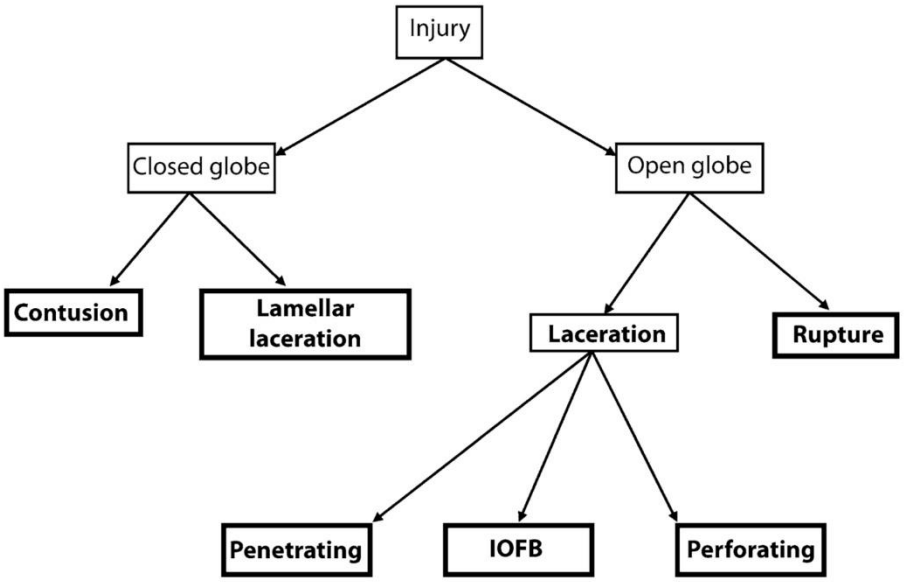


FIGURE 2

PRACTICAL GUIDE TO CLASSIFY MECHANICAL EYE INJURIES

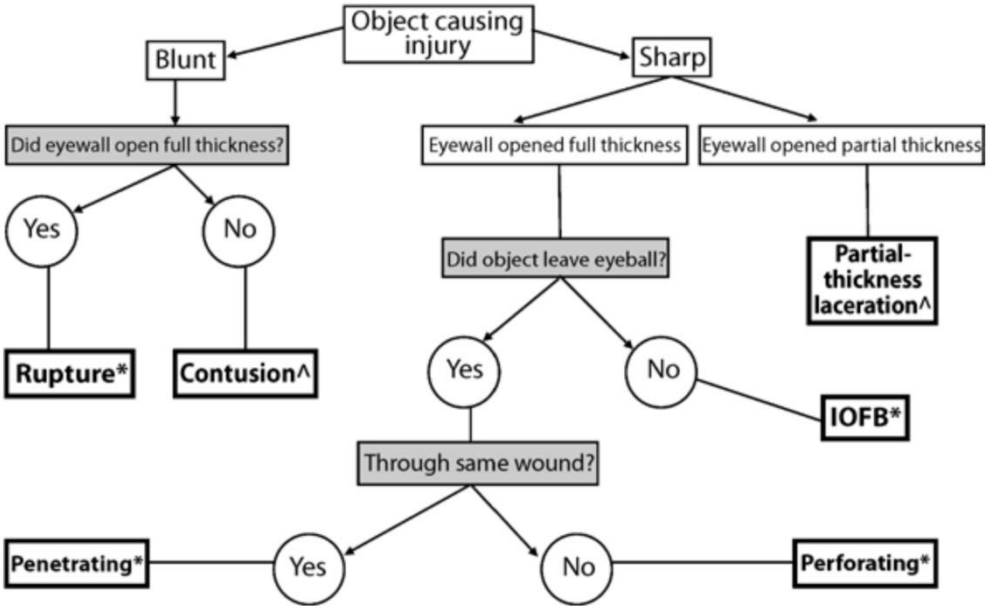


FIGURE 3

TERMINOLOGIES

Closed Globe injury: No full-thickness wound of the eye wall (Sclera and cornea)

Contusion: Closed globe injury in which damage is due to direct energy delivery by the blunt object

Lamellar laceration: Partial thickness wound of the eye wall which is not through but into

Open Globe injury: Full-thickness wound of the eye wall in which sclera and cornea are breached through and through

Rupture: Full-thickness wound of eye wall caused by a large blunt object, in which impact results in a momentary increase in I.O.P. and inside-out mechanism

Laceration: Full-thickness wound of the eye wall caused by a sharp object, in which wound occurs at the impact site by an outside-in mechanism

Penetrating injury: Full-thickness wound with only entrance wound present

Perforating injury: Full-thickness wound with both entrance and exit wounds present, caused by the same agent

Intraocular foreign body (I.O.F.B.): One or more foreign objects are present in the eye entered by penetrating injury

CLASSIFICATION OF OPEN GLOBE INJURY [12]

Open-globe injuries can be further classified based on the following:

1. Type – Based on the mechanism of injury – i) Rupture, ii) Penetrating, iii) Perforating, and iv) I.O.F.B.

2. Grade – Based on initial visual acuity – i) >/= 20/40 ii) 20/50 to 20/100 iii)19/100 to 5/200 iv) 4/200 to PL v) No PL
3. Zones – Based on the location of the wound -

I – Cornea and limbus

II – Limbus to 5mm posterior into sclera

III – Beyond 5mm from the limbus

D) Pupil – Depending on the presence or absence of afferent pupillary defect

EVALUATION OF AN OCULAR TRAUMA PATIENT

1. History

Complete history should be taken to elicit details about incidents that lead to ocular trauma.

1. Examination

1) Visual acuity

- Standard charts (Snellen, E.T.D.R.S.) should be used; for illiterate or preliterate children, the E or C charts should be substituted.
- In infants, fixation and pursuit should be tested.
- Hand movements, counting fingers, and light perception should be tested in patients who cannot see in the standard charts.

2) Pupil

- Shape and position of the pupil of the injured eye are noted; Asymmetrical pupil infers an open wound or iris prolapse. Peaking of pupil points towards the site of injury [12]

- The pupil diameter of both eyes should be recorded. Dilation can be caused by iris trauma (sphincter damage) or due to presence of relative afferent pupillary defect (RAPD) [13]

3) Extra ocular motility

- The most important indication of motility testing is suspected orbital injury
- In case of open globe injury, ocular motility testing can further extend the trauma. Hence not recommended
- Severe lid edema and lack of patient cooperation can make it impossible to test

4) Lids and adnexa

- The involvement of the lid and adnexa should be carefully assessed.
- In case of lid laceration, look for whether it is full or partial thickness, lid margin, canthi or canaliculi involved, and any evidence of infection around the lacerated edges.

5) Cornea and sclera

- The presence or absence of corneal and/or scleral involvement is noted.
- Details of corneal laceration, extent, and involvement of visual axis are present; limbus is involved or not, beveled, or perpendicular, associated iris prolapse, or infection around the wound edges.
- In suspected full-thickness laceration, the Seidel test is performed. The eye is instilled with proparacaine, then fluorescein and illuminated by Cobalt blue light. A positive Seidel test shows a clear stream of aqueous humor disrupting the fluorescein dye. The test is contraindicated in apparent open-globe injuries. [12]

6) Anterior chamber

- The depth of A.C. should be carefully examined; Shallow A.C. infers open globe injury, traumatic intumescent cataractous lens, or even occult scleral dehiscence. Deep AC infers angle recession or posterior occult scleral dehiscence.
- A.C. can also show the presence of hyphema, hypopyon, traumatic fibrinous uveitis, or I.O.F.B.
- Loose lens matter in case of ruptured traumatic cataract
- Presence of vitreous strands

7) Lens

- The status of the lens should be looked for in all cases of injury
- The presence of traumatic cataracts with intact or torn anterior capsules can be there

8) Gonioscopy

- Angle status needs to be assessed in all the cases of blunt ocular trauma
- It is indicated to look for signs of trauma to angle such as hemorrhage, angle recession, IOFB at the angle, trabecular meshwork hyperpigmentation [(14)], peripheral anterior synechiae
- In case of open globe injury or if hyphema is there, it is deferred as inadvertent application of pressure can result in extrusion of contents of eyeball and in case of closed globe injury with hyphema, it is done after its absorption.

9) Fundus examination

- Dilated fundus examination should be done as early as possible after ruling out RAPD and angle closure. [(12)]

- It is done to look for retained foreign bodies, vitreous hemorrhage, suprachoroidal hemorrhage, retinal hemorrhage, retinal breaks with or without retinal detachment, choroidal rupture or detachment, macular hole, posterior globe ruptures [12], or commotio retinae
- Asymmetric red reflex can also be detected by ophthalmoscopy in case of blood obscuring the view [12]

IMAGING

1) Ultrasonography B-scan

Information about the presence/ absence of:

- Eye wall discontinuity
- IOFBs (Radiolucent or opaque)
- Lens/ IOL dislocation
- Posterior lens capsule status
- Vitreous hemorrhage and other opacities
- P.V.D.
- Vitreous incarceration into the wound
- Vitreoretinal adhesions
- Retinal breaks and detachments
- Choroidal thickening/ detachment

Contact ultrasonography is risky in case of open globe injury but can be done with most care and under sterile conditions

2) X-RAY

Detects radiopaque intraocular and intraorbital foreign bodies and orbital fractures

3) CT SCAN

Non-contact test to find the presence/absence of:

- Optic nerve damage
- Orbital and facial fracture
- Orbital pathologies like abscess, air, or hemorrhage
- Extra ocular muscle damage
- Intraorbital or intraocular foreign bodies

4) MRI SCAN

MRI provides superior images of all soft tissues. It detects small non-metallic I.O.F.B.s.

MANAGEMENT OF OPEN GLOBE INJURY

OBJECTIVES OF GLOBE REPAIR

1. **Primary**

- To restore the integrity of eye wall structure
- To create watertight closure
- To prevent the spread of infection
- To achieve optically clear refractive surface

1. **Secondary**

- Removal of disrupted lens matter and vitreous
- Removal of IOFB

NON-SURGICAL MANAGEMENT

Considered in self-sealed corneal lacerations or those that can be sealed with the help of tissue adhesives and in case of minor conjunctival lacerations

Cyanoacrylate glue helps provide support lasting for several days to weeks. The cornea's surface is dried after loose or necrotic tissue is removed and adhesive is applied. On exposure to air, it starts getting polymerized. B.C.L. needs to be used over the glue.

SURGICAL MANAGEMENT

Different surgical options depending on a case-to-case basis are:

- Corneal laceration repair
- Corneoscleral laceration repair
- Scleral laceration repair
- Limbal laceration repair
- With or without iris abscission or repositioning
- With or without lens aspiration
- With or without vitrectomy and intraocular antibiotic injections
- With complete pars plana vitrectomy with other vitreoretinal procedures

Anesthesia:

Open globe injury repair in pediatric age group is usually recommended to be done under general anesthesia, as it would provide profound anesthesia and akinesia in uncooperative children.

For minor lacerations in older children, management can be done under local anesthesia.

Physician fitness is taken, and the patient is recommended to remain nil per oral to ensure a minimum of 6 hours of fasting.

Preparing the eye:

The eye should be prepared and draped with care, with no pressure applied.

The eye is irrigated with a sterile balanced salt solution to remove superficial foreign bodies.

Sutures are first applied before wound exploration if the globe appears unstable.

Large corneal and scleral lacerations, displaced wounds, iris, or lens incarcerations should be taken up for immediate primary repair.

Minor corneal lacerations with formed A.C. can be sutured directly with 10-0 nylon without the need to enter the AC

Less stable wound with shallow/flat A.C. Viscoelastic is injected through the side port to form A.C. In the case of a collapsed globe, it can be injected directly through the corneal wound.

Wound repair

Monofilament 10-0 nylon suture is used for corneal suturing

Simple interrupted sutures 90 % deep in the stroma, 1.5mm long and of equal depth on both sides of the wound

Shallow sutures can cause internal wound gape or cheese wiring

Sutures should be tied without undue tension to improve tissue apposition

The peripheral cornea is closed with longer, shallower passes, and the mid and apical cornea is closed using shorter, deeper passes. This approach will promote the healing of the cornea to maintain a prolate contour. For lacerations across the visual axis, sutures are placed in a centripetal, symmetric, and alternating order to reduce the chance of astigmatism.

If central visual axis sutures are unavoidable, 11-0 nylon is preferred.

In the case of corneoscleral laceration, the first limbal suture is put in to ensure anatomical approximation of the wound. An iris or vitreous prolapse is managed at this stage.

In the case of iris prolapse, depending upon tissue viability, it is either abscised or repositioned.

In case of vitreous prolapse, vitrectomy is done.

After the corneal wound is repaired, the scleral wound is explored and secured with interrupted or continuous 7-0 or 8-0 vicryl

The conjunctiva is sutured using 8-0 vicryl suture

A patch or shield is applied to the eye. Postoperatively, careful monitoring for signs of infection should be done.

Postoperative management

After primary repair, topical antibiotics, corticosteroids and cycloplegics are administered

Systemic antibiotics started preoperatively and should be continued for at least 48 hours or even 7 to 10 days.

Follow-up should be done in 1 week, one month, three months, and one year and more if the situation asks for it. During each visit, severe complications like endophthalmitis, retinal detachment, vitreous hemorrhage, and sympathetic ophthalmia must be ruled out.

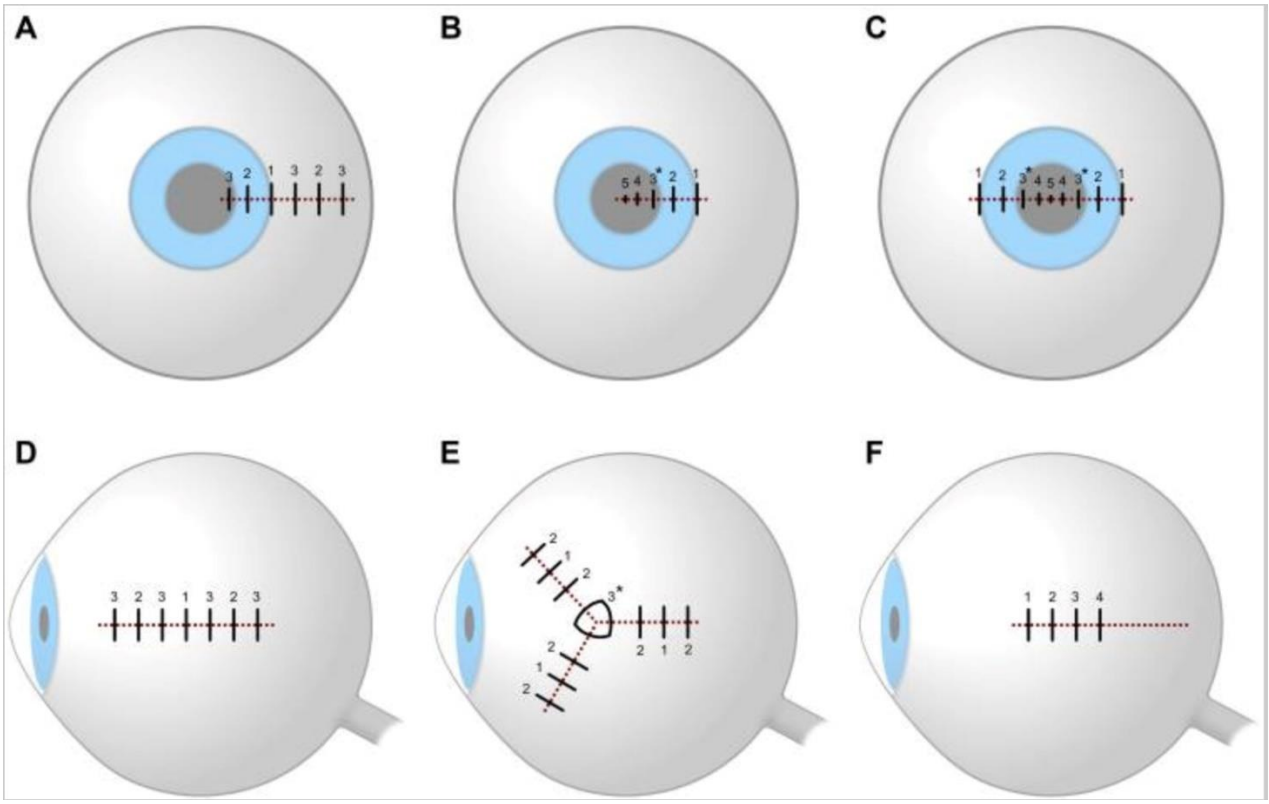


FIGURE 4 – ORDER OF PUTTING SUTURES IN CORNEOSCLERAL TEARS [12]

A – Limbal sutures are put first in corneoscleral wounds

B – Corneal sutures from limbus to central visual axis using shorter, deeper, and more closely spaced sutures towards the center of the cornea

C – Lacerations traversing the corneal diameter are sutured in a centripetal alternating order

D – Sequential bisecting sutures for linear scleral wound

E – Complex and stellate scleral wounds are first sutured, and then intersections are closed using mattress or purse string sutures

F – Scleral wounds extending posteriorly to the equator are sutured in anterior to posterior order until surgical exposure is inadequate

PROGNOSIS

PROGNOSTIC INDICATORS OF ULTIMATE VISUAL OUTCOME [14]

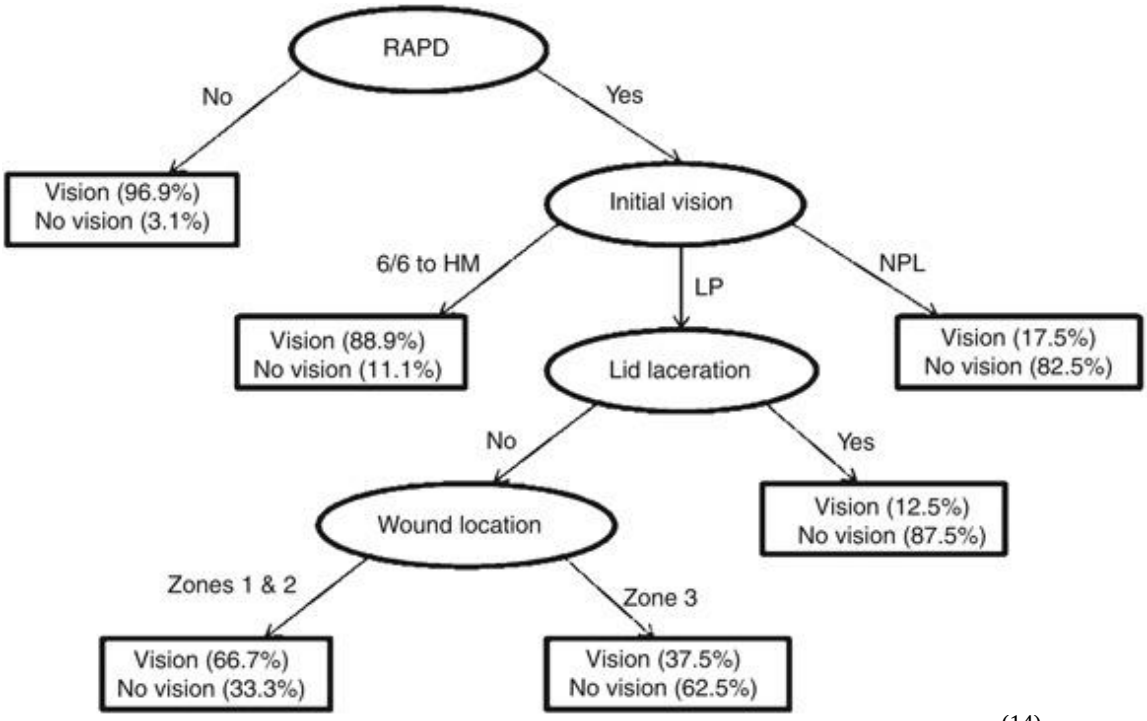


FIGURE 5 – Classification and Regression Tree (CART) [14]

SCORING SYSTEMS USED OCULAR TRAUMA

Two widely accepted trauma scores used in prognostic assessment of pediatric ocular trauma are :

- OCULAR TRAUMA SCORE (OTS)
- PEDIATTRIC OCULAR TRAUMA SCORE (POTS)

OCULAR TRAUMA SCORE (OTS) [15]

- It was developed to predict final visual outcome and to aid in triage. [15]
- Two criteria in OTS, presenting visual acuity and presence of RAPD are challenging to assess in pediatric population [15]

Variables	Raw Points
Initial visual acuity	
No light perception	60
Light perception/hand motions	70
1/200 to 19/200	80
20/200 to 20/50	90
⩾ 20/40	100
Rupture	-23
Endophthalmitis	-17
Perforating injury	-14
Retinal detachment	-11
Afferent pupillary defect	-10

FIGURE 6

PEDIATRIC OCULAR TRAUMA SCORE (POTS)

- The challenges faced in OTS system in pediatric age group paved the way to the development of another well accepted scoring system, POTS
- POTS, in addition to initial visual acuity also include parameters like age and location of injury.
- The system also provides an equation that can be used when initial visual acuity is not available; 2 x (Age + Location of injury) - Corresponding pathologies [(15)]
- POTS score predicts final visual outcome more accurately compared to the OTS scoring system [(15)]

TABLE 1 - **Paediatrics Ocular Trauma Score (POTS)** [16]

VARIABLES	RAW POINTS
A. Initial visual acuity	
NLP	10
PL/HM	20
Counting fingers	30
0.1 - 0.5	40
0.6 - 1.0	50
B. Age of paediatric patients (yrs)	
0 - 5	10
6 - 10	15
11 - 15	25
C. Wound location	
Zone I	25
Zone II	15
Zone III	10
D. Concomitant eye pathologies	
Iris prolapse	-5
Hyphema	-5
Organic/unclean injury	-5
Delay of surgery (> 48 hrs)	-5
Traumatic cataract	-10
Vitreous haemorrhage	-20
Retinal detachment	-20
Endophthalmitis	-30

TABLE 2

Estimated probability of final visual acuity after 6 months: [16]

Raw score sum	POTS score	NPL	PL/HM	1/200 to 19/200	20/200 to 20/50	>/=20/40
0 - 45	1	73	17	7	2	1
46 - 64	2	28	26	18	13	15
65 - 79	3	2	11	15	28	44
80 - 89	4	1	2	2	21	74
90 - 100	5	0	0	2	5	92

AIMS AND OBJECTIVES

1. To evaluate the epidemiology and demographic profile of open globe injuries in pediatric age group attending the tertiary hospital of Vijayapura.
2. To assess the prognosis, and predict the final visual outcome using the POTS scoring system.

REVIEW OF LITERATURE

Multiple research projects about open globe injuries in the pediatric age group have been conducted in developed countries to study the demographical profile and predictors of final visual outcomes. However, in developing countries like India, comparatively few studies are available.

Sebastian Lesniak et al. studied the demographic characteristics and outcomes of delayed open globe repair in 2017. He and his team concluded that early and exact diagnosis and proper referral for surgical procedures decrease the risk of endophthalmitis. 3 cases out of 36 patients they studied ended up with endophthalmitis due to a delay in surgical intervention for more than three days. They also concluded that the visual prognosis of open globe injury would be poor even after best surgical intervention. However, being a retrospective study, prognostic assessment was impossible as many clinical variables were difficult to assess from the charts. (17)

Dr Marushka Aguiar et al. conducted a retrospective study in 2018 by reviewing the hospital records of all the patients under 18 who underwent primary repair surgery at Goa Medical College Hospital from May 2016 to May 2017. Severe injuries are presented early, while delay in presentation is due to the use of home remedies, seeking primary health care from the staff with a lack of experience and the poor socioeconomic and educational status of parents. The study concluded that parents and caregivers should be adequately aware to prevent open globe injury. They also found that though Zone I injuries were the most common, Zone III injuries had the worst prognosis due to their greater extent. (18)

Shazia Qayum et al. studied the epidemiological profile of pediatric open globe injuries in a tertiary hospital in North India by conducting a retrospective study in 2018 in patients attending the institution from June 2014 to July 2015.

The study included both closed and open-globe injuries. Various epidemiological parameters like age, sex, mode, and type of injury were analyzed. (1)

A retrospective review of medical records of patients with open globe injury from 2012 to 2020 in a single institution was done by **Adam Jacobson et al.** to find the predictors of visual outcomes of open globe injury in the pediatric age group. In multivariate linear regression analysis, he found that only initial visual acuity at presentation and retinal detachment were independent predictors of visual outcome. When initial visual acuity was not available, age at presentation, lens status, and retinal detachment were found to be associated with the final visual outcome. (19)

Dr Rajesh Kumar Saini et al. did a retrospective interventional study in 2020 to find the prognostic factors of open globe injury in patients attending J.L.N. Medical College. The predictors of final visual acuity were found to be initial acuity, type and zone of injury, timing of presentation, anterior segmental or posterior segmental involvement, timing of surgery and number of prior operative procedures. They also concluded that these predicting factors help educate about the prognosis and decide the management line. (20)

Ashok Hukumchand Madan et al. studied demographical profile and final visual outcome of pediatric ocular injury through a prospective interventional study at a Tertiary Eye care center in Central Maharashtra. They concluded that sports related activities were a common cause of ocular injury in children in study. Idea of setting a rapid action ocular trauma team for prevention of childhood blindness occurring due to trauma was proposed. (21)

Xin Liu et al. studied 48 pediatric patients in 2021 to describe the surgical treatment and show the visual outcome of open globe injury in vitrectomy-requiring subjects. Patients with secondary vitreoretinal complications

benefitted more from early vitrectomy in terms of better final visual outcome and less proliferative vitreoretinopathy. Mechanisms of injury, iris or lens prolapse, hyphema, I.O.F.B., vitreous hemorrhage, retinal detachment, and total time from injury to pars Plana vitrectomy more than two weeks were essential predictors of visual prognosis. [22]

Meera Lakshmi Prajna et al. conducted a prospective observational study in 2021 in patients from June to December 2019 to assess the health-seeking behavior and cost of initial treatment of open globe injury among patients attending tertiary eye care centers in South India. They showed the need for an integrated program implementation to provide economic support and workplace safety for the vulnerable and the legal protection of the primary eye care provider. [23]

In 2022, **Sucheta Parija et al.** conducted a retrospective, observational study at a Tertiary academic hospital in Eastern India to analyze the clinical profile and final visual acuity predictors in pediatric ocular injury patients. They concluded that early diagnosis followed by intervention and awareness activities for prevention with focused planning is the key to a successful final visual outcome. [24]

Yue Guo et al. conducted a retrospective study in 2022 in China to describe the character of the open globe injury and preschool children were found to be the majority. Hyphema, iris prolapse, vitreous hemorrhage and retinal detachment were the factors responsible for poor visual outcomes. [5]

MATERIALS AND METHODS

A prospective interventional study was carried out at the Department of Ophthalmology of BLDE (Deemed to be University)'s Shri B M Patil Medical College Hospital and Research Centre from 2022 to 2023, spanning 18 months.

Ethical considerations:

The study aimed to evaluate the epidemiology and demographic profile and to understand the most common causative factors associated with open globe injuries in the pediatric age group attending the tertiary hospital of Vijayapura, assess the prognosis, and predict the final visual outcome using the POTS scoring system. The research adhered to the principles outlined in the Declaration of Helsinki and received approval from the institutional ethical committee of BLDE (Deemed to be University) before participation; all individuals provided written and informed consent, having been thoroughly briefed on the potential implications of the study.

Inclusion Criteria:

All open globe injury patients who are less than 15 years of age and who give consent were considered as the study subjects.

Exclusion Criteria:

1. Uncooperative, unconscious, and comatose or those surviving on life-saving equipment.

2. Injury in already blind or atrophied eye

3. Patients with already surgically manipulated eyes under study [19]

4. Congenital abnormalities in the eye under study.

Sample size

With the expected prevalence of pediatric open globe injuries in India, the study enrolled a sample size of 45 patients, aiming for a 95% confidence level and 5% absolute precision. The formula used for finding the sample size was:

$$n = ZPq/d^2$$

Where:

- n is the desired sample size (45 in this case).
- Z is the Z statistic at the α level of significance.
- d stands for the absolute error (5% absolute precision)
- P is the proportion rate.
- q is calculated as (100 – p)

The study aimed for a sample size of 45 participants to achieve a 95% confidence level with a 5% absolute precision, guided by the estimated prevalence of pediatric open globe injuries in India.

Method of data collection

All pediatric open globe injury patients in the Casualty, Outpatient, and Inpatient department of ophthalmology, BLDE's Shri B.M. Patil Medical College, Hospital and Research Centre during a period of 18 months were enrolled in the study.

After obtaining consent from the reliable informant, a detailed history was taken, and epidemiological parameters like age, sex, type, mode, and place of injury were evaluated.

Visual acuity was assessed during the presentation using the Snellen or illiterate E chart for school-going children. Pictures and letter matching were used for young children. Color vision was evaluated using Ishihara's chart to see any abnormality, whether present or not.

The patient was then subjected to a detailed ocular examination, including slit-lamp bio microscopy, to see if any abnormal findings were found in the anterior segment. A fundus examination using a direct or indirect ophthalmoscope was also performed to evaluate posterior segment abnormalities.

Whenever corneal abrasions or injuries were suspected, a fluorescein Dye test was done after instilling local anesthetic drops, asking the patient to look up and swiping the dye-impregnated strip over the lower part of the conjunctiva. Intraocular pressure was measured using non-contact tonometry in cooperative subjects and wherever possible.

Investigations like B scan, CT, or M.R.I Brain were advised wherever indicated.

In unstable and uncooperative patients, the best possible torch light examination, fundus examination and bedside visual acuity testing were done. A detailed analysis was done once the patient's condition was stabilized.

After the entire history taking and examination were over, data was entered in the Performa created for the study purpose, and the signature was obtained from the informant of the respective patients.

Calculate the Pediatrics Ocular Trauma Score (POTS) and convert the total raw points into a per cent chance of visual outcomes.

After six months of follow-up, patients would be asked to review in Ophthalmology OPD for visual acuity checkup.

STATISTICAL ANALYSIS

Data collected was entered in a Microsoft Excel sheet, and statistical analysis was performed using a statistical package for the social sciences (SPSS) Version 20.

Results were presented as Mean ± SD, or Median and Interquartile range, frequency, percentages, and diagrams

$P < 0.05$ would be considered statically significant.

RESULTS

45 eyes of 45 paediatric patients with open globe injuries were included in the study for a period of 18 months. The mean age of patients was 10.13 years ranging from 4 to 15 years

Among the 45 patients, 36 were males (80%) and 9 were females (20%).

AGE DISTRIBUTION

Age wise distribution of paediatric patients with open globe injury who were enrolled in the study

TABLE 3

Age (Years)	No. of patients	Percentage (%)
0 - 5	6	13.33
6 - 10	16	35.55
11 - 15	23	51.11

CHART 1

AGE DISTRIBUTION

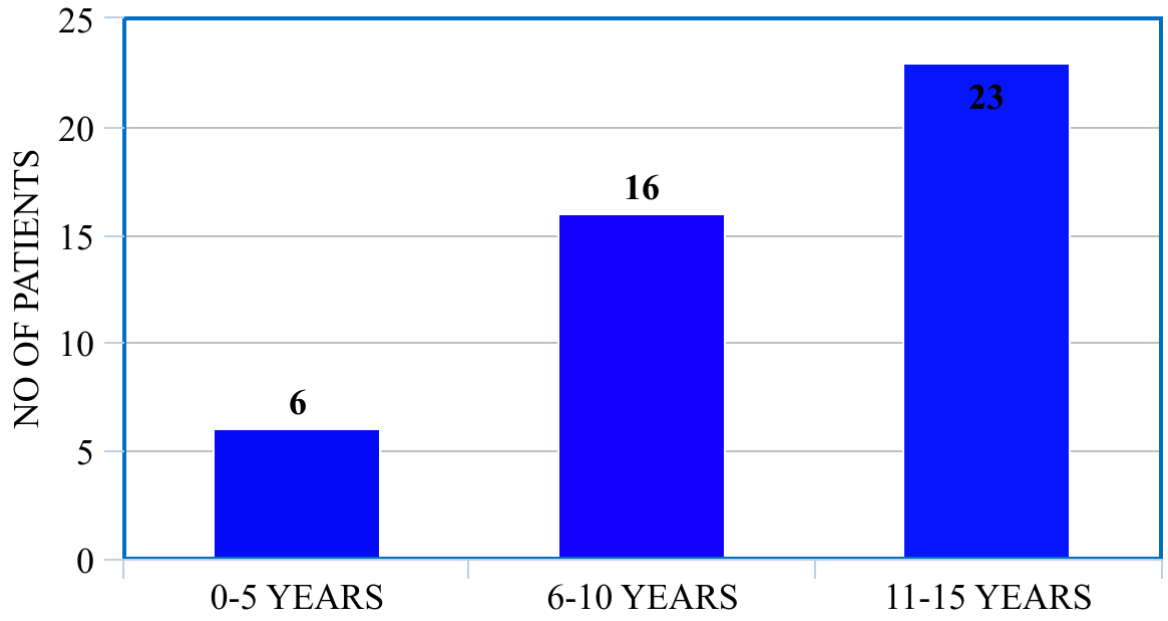


Table 3 shows that majority of open globe injuries (51.11%) happen in the age

group of 11 – 15 years and least in 0-5 years (13.33%). This can be attributed to the fact that outdoor playing habits are more in 11 – 15 years age group.

SEX DISTRIBUTION

Sex distribution of paediatric patients with open globe injuries

TABLE 4

Sex	No of patients	Percentage (%)
Male	36	80
Female	9	20
Total	45	100

CHART 2

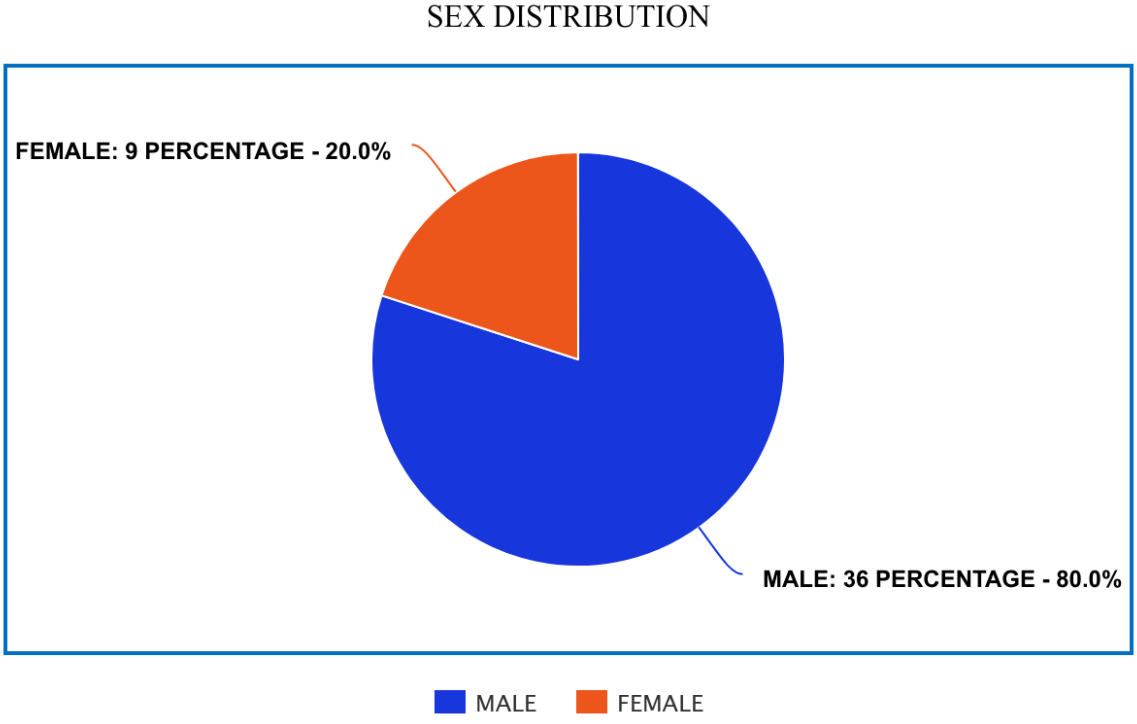


Table 4 shows that boys involved in open globe injuries (80%) far outnumbered girls (20%)

LATERALITY

TABLE 5

Eye affected	No of patients	Percentage (%)
Right	19	42.2
Left	26	57.8

CHART 3

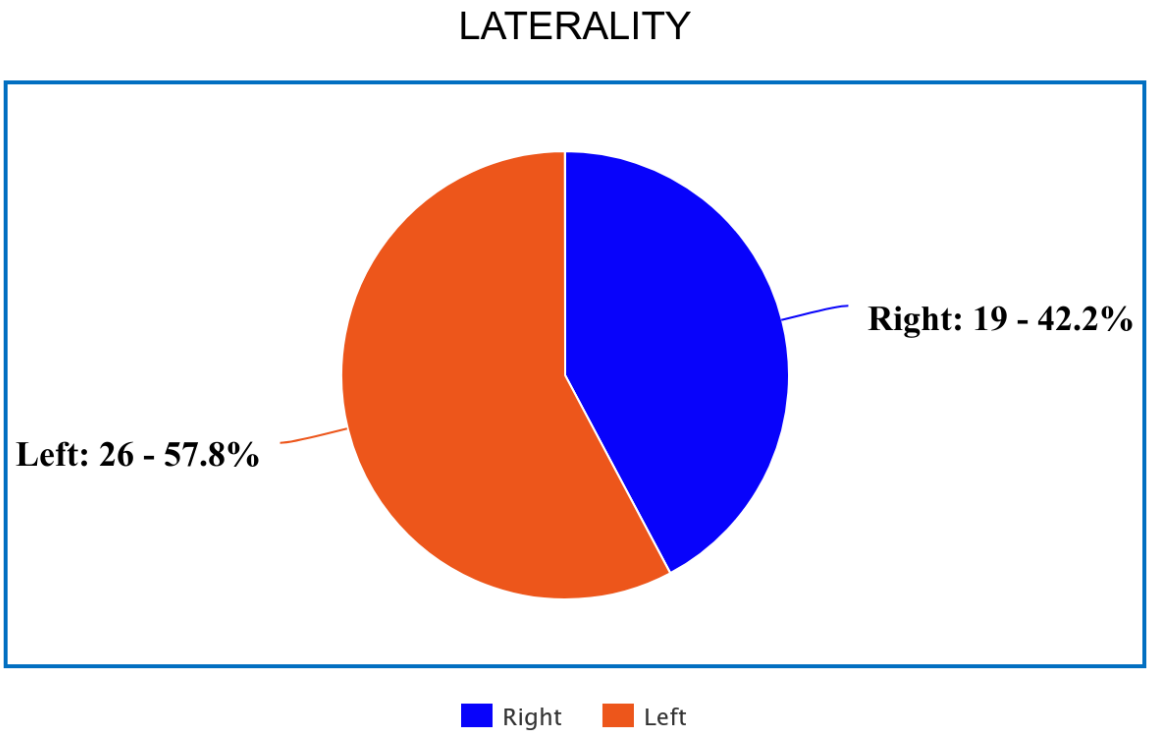


Table 5 shows that left eye was involved in 57.8 % and right eye in 42.2 % of patients

MODE OF INJURY

TABLE 6

Mode of injury	No of patients	Percentage (%)
Wooden stick	21	46.66
Stone	7	15.55
Metal scale	4	8.88
Cracker burst	3	6.66
Plant stem	3	6.66
Sugarcane stick	2	4.44
Pen	2	4.44
Blast of light bulb	1	2.22
Bull's horn	1	2.22
Metal exhaust pipe	1	2.22

CHART 4

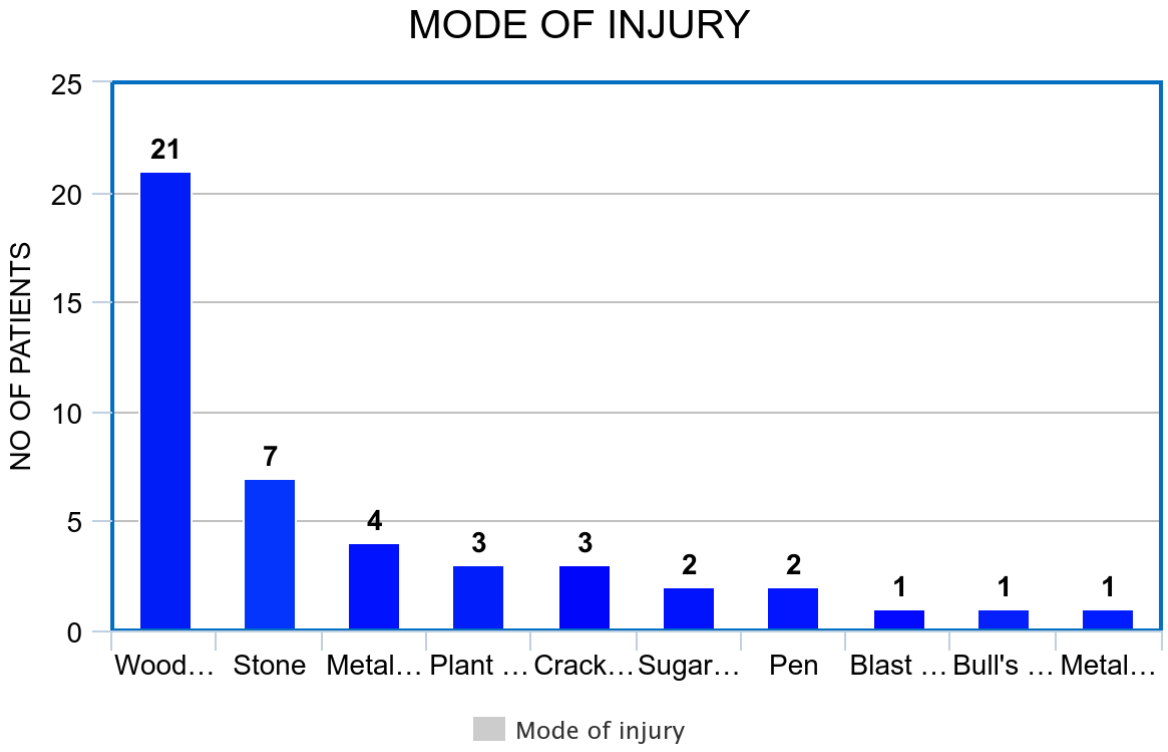


Table 6 shows most open globe injuries in this study was caused by wooden stick (46.66%) and least by blast of light bulb, bull's horn, and metal exhaust pipe (each 2.22 %).

PLACE OF INJURY

TABLE 7

Place of injury	No of patients	Percentage (%)
Home	34	75.6
School	6	13.3
Farm	5	11.1

CHART 5

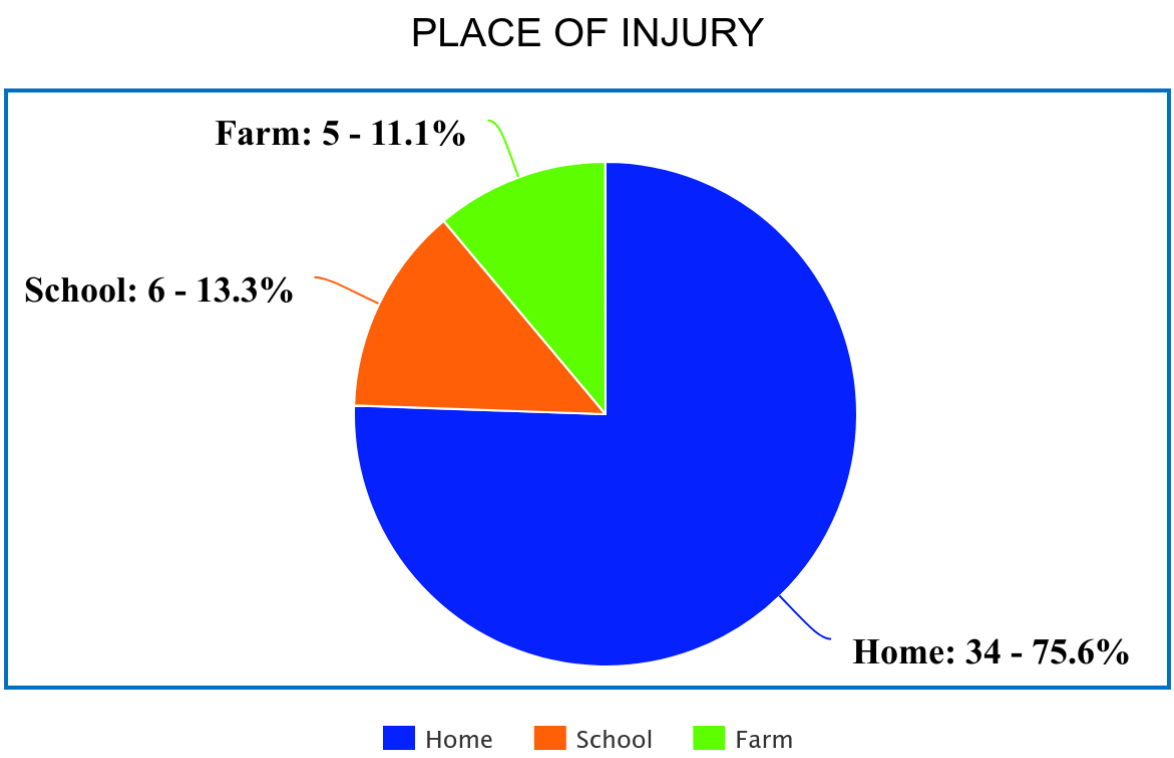


Table 7 shows that most of the open globe injuries in the study were domestic (75.6%), and less in school and farm (13.3% and 11.1% respectively).

ZONES OF INJURY

TABLE 8

Zones of injury	No of patients	Percentage (%)
I	30	66.7
II	6	13.3
III	9	20.0

CHART 6

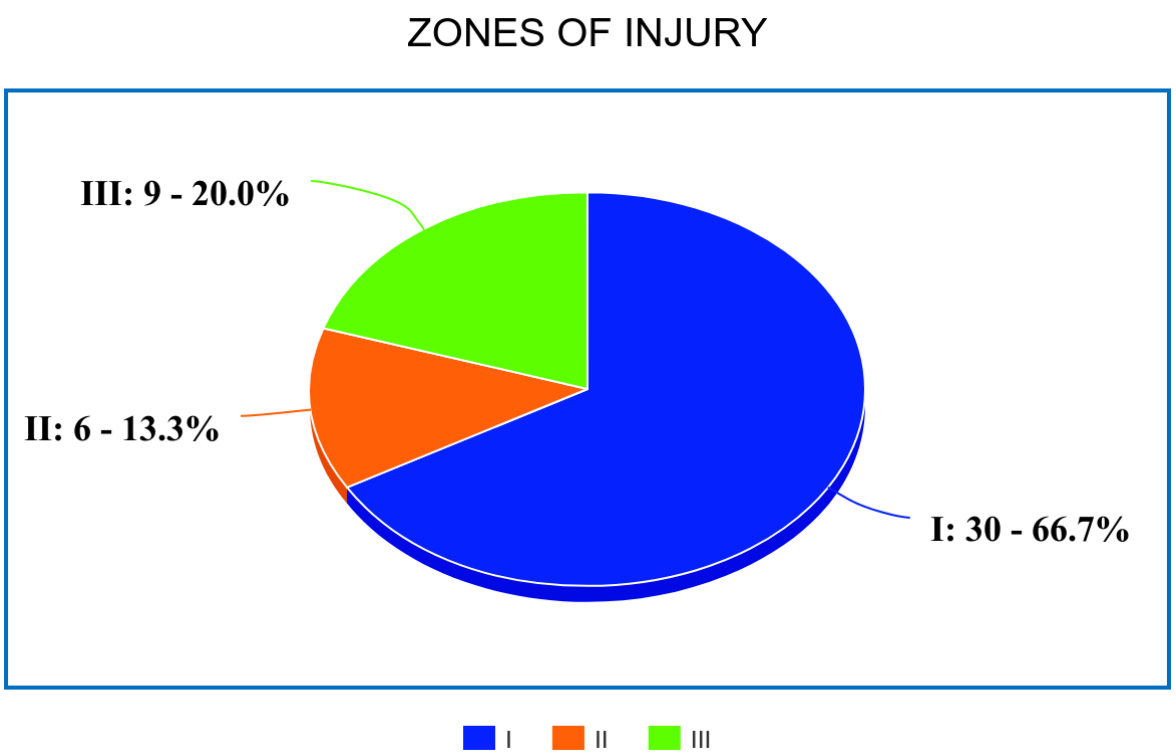


Table 8 shows most open globe injuries in this study happened in Zone I (66.7%), and least in Zone II (13.3%). Zone III injuries make up 20 %

INITIAL VISUAL ACUITY

TABLE 9

Initial visual acuity	No of patients	Percentage (%)
No PL	3	6.66
PL +	9	20
Hand Movement	15	33.33
Counting fingers	12	26.66
6/24	1	2.22
6/12	3	6.66
6/9	2	4.44

CHART 7

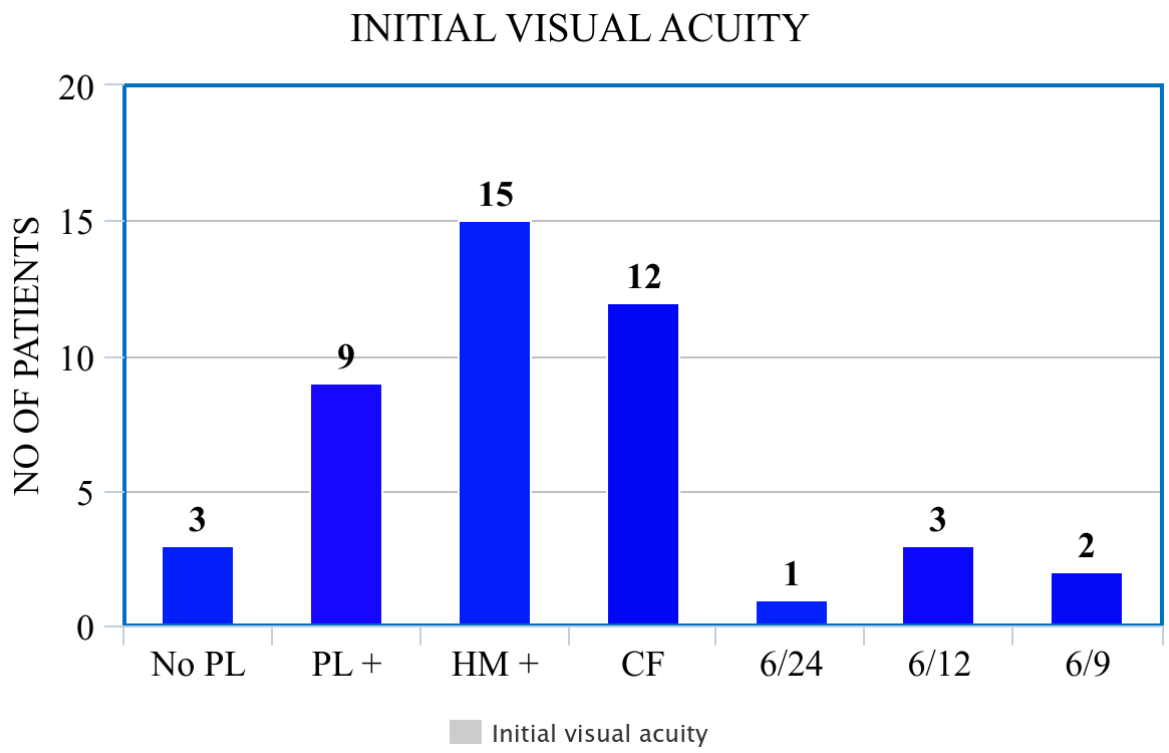


Table 9 shows that majority of the patients presented with initial visual acuity of Hand movements (33.33%) and less patients presented with 6/24, 6/12 and 6/9.

COMPLICATIONS ASSOCIATED WITH OPEN GLOBE INJURIES

TABLE 10

OPEN GLOBE INJURIES	NO OF PATIENTS	PERCENTAGE (%)
UNCOMPLICATED	17	37.8
COMPLICATED	28	62.2

TABLE 11 – INDIVIDUAL COMPLICATIONS

Complications	No of patients
Iris incarceration	2
Iris prolapse	12
Hyphema	16
Hypopyon	1
Vitreous haemorrhage	3
Traumatic cataract	6
Delay in surgery > 48 hrs	5
Organic/ unclean wound	5
Foreign body	1

CHART 8

COMPLICATIONS ASSOCIATED WITH OPEN GLOBE INJURIES

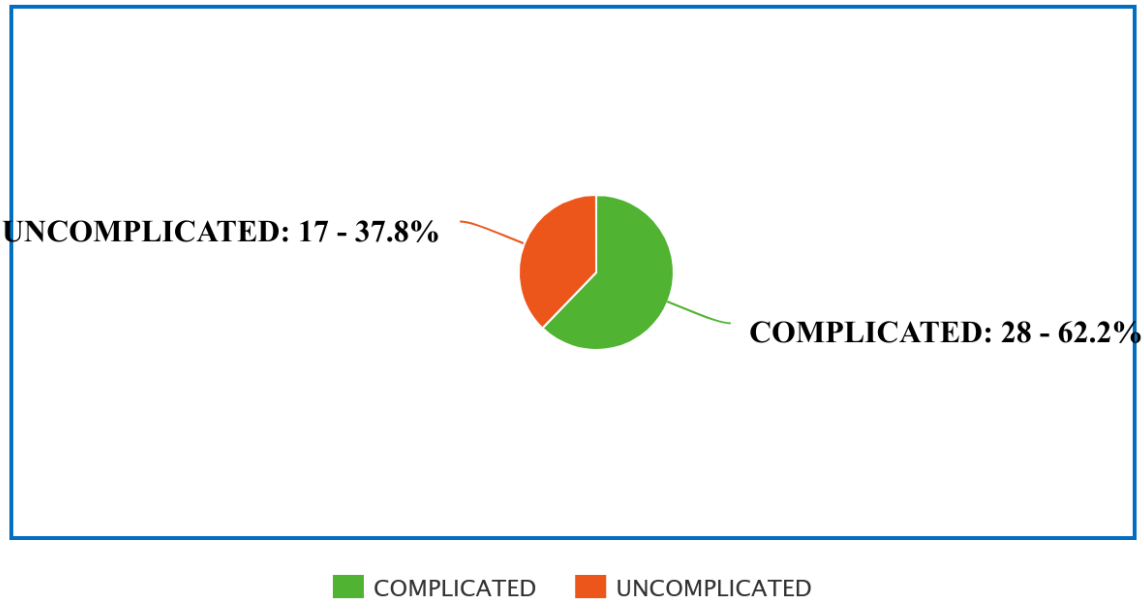
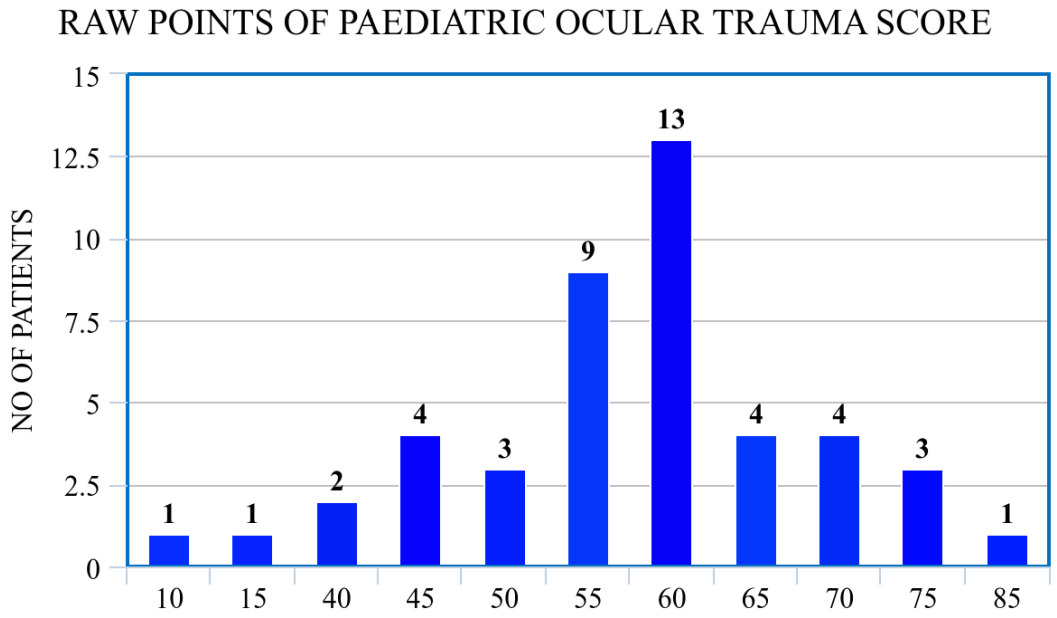


Table 10 shows that out of 45 patients, 28 (62.2%) had one or more complications and 17 (37.8%) had none.

Table 11 shows different complications that are associated with open globe injuries. More than one complication overlapped in some of them. Most of them had hyphema, followed by iris prolapse as the complication at presentation. Only 1 patient had foreign body associated with the trauma.

RAW POINTS OF PAEDIATRIC OCULAR TRAUMA SCORE

CHART 9



POTS **1** **2** **3** **4**

Calculating POTS at the time of presentation will give us lots of information about the final visual prognosis and surgical outcome. For example, in this study 8 patients have POTS 1 (17.8%), they have 73 % chance of getting a final visual acuity of NPL and 17 % chance of getting PL/HM. Similarly, 25 patients have POTS 2 (55.6%), they have 54 % chance of getting a final visual acuity between NPL and HM (28% chance of NPL + 26 % chance of PL/HM)

POTS

TABLE 12

POTS	No of patients	Percentage (%)
1	8	17.8
2	25	55.6
3	11	24.4
4	1	2.2

CHART 10

POTS

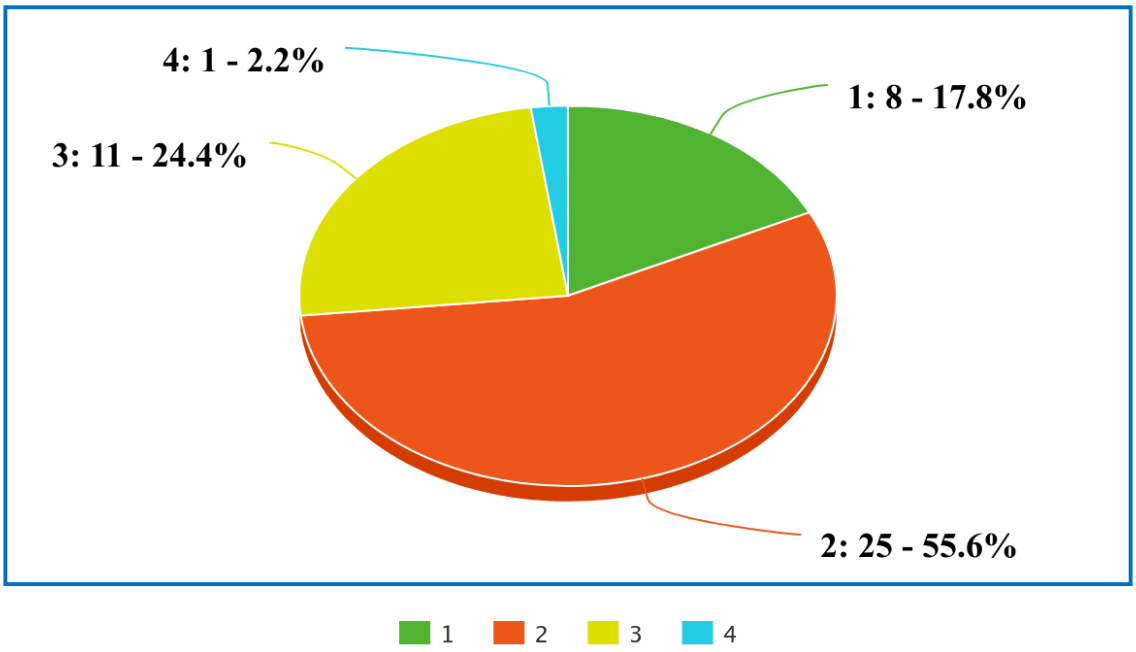


Table 11 shows that most of the patients fall under a POTS of 2 (55.6%) and least number in POTS 1 (2.2%) as the later cases had presentations which were complicated with vitreous haemorrhage, iris prolapse, hyphema etc and delay in seeking emergency consultation.

TABLE 13 – FINAL VISUAL OUTCOME BASED ON POTS 2

POTS	No of Eyes (n=45)	NLP	PL	HM	CF	0.1 - 0.5	=/>0.6
1	8	5	2	1	-	-	-
2	25	-	1	23	-	-	1
3	11	-	-	-	1	1	9
4	1	-	-	-	-	-	1

- POTS 1 – 73 % chance to have No PL, 17 % chance to have PL/HM
  5 out of 8 patients have NPL
- POTS 2 – 54 % chance to have between No PL & HM – 24 out of 25 patients have between No PL & HM
- POTS 3 – 44 % chance to have > 6/9 - 9 out of 11 patients have >/=0.6
- POTS 4 – 74 % chance to have > 6/9 - 1 patient – has vision >/=0.6

- Out of 45 patients, final visual outcome of patients is as per prediction in 39 patients (86.7 %)
- In rest of the 6 patients, POTS prediction went wrong on the final visual outcome (13.3 %)

TABLE 14 – **Initial visual acuity vs Final visual acuity** [26]

VA	INITIAL (n = 45)	FINAL (n=45)
NPL	3 (6.66%)	5 (11.11 %)
PL	9 (20 %)	3 (6.66%)
HM	15 (33.33%)	24 (53.33 %)
CF	12 (26.66%)	1 (2.22 %)
0.1 - 0.5	4 (8.88%)	1 (2.22 %)
>/= 0.6	2 (4.44%)	11 (24.44%)

The proportion of patients with initial visual acuity of NPL is 6.66 % which increased to 11.11 % at 6 months follow-up. Patients with IVA of PL is 20 % and reduced to 6.66 % at follow up. Patients with an IVA of HM is 33.33 %, which increased up to 53.33 % at follow up. Patients with IVA of Counting fingers increased from 26.66 % to 2.22 % at follow up. Patients with 0.1 - 0.5 IVA in 8.88 % reduced to 2.22 % at follow up. Patients with IVA of >/= 0.6 increased from 4.44 % to 24.44 %

TABLE 15 – FINAL VISUAL OUTCOME VS INITIAL VISUAL ACUITY [(26)]

FVA → / IVA ↓	NPL	PL	HM	CF	6/24	6/9	6/6
NPL	**3**	**-**	**-**	**-**	**-**	**-**	**-**
PL	**2**	**-**	**1**	**-**	**-**	**-**	**-**
HM	**-**	**3**	**11**	**-**	**-**	**1**	**-**
CF	**-**	**-**	**5**	**1**	**1**	**5**	**-**
6/24	**-**	**-**	**1**	**-**	**-**	**-**	**-**
6/12	**-**	**-**	**-**	**-**	**-**	**3**	**-**
6/9	**-**	**-**	**-**	**-**	**-**	**1**	**1**

- NPL (3 patients) - 3 Patients with NPL remained NPL after 6 months
- PL (9 patients) - 7 patients improved to HM

  2 deteriorated to NPL
- HM (15 patients) - 1 patient improved to 6/9

  11 patients remained HM

  3 patients deteriorated to PL
- CF (12 patients) - Improved to 0.1 - 0.5 1 patient

  Improved to >/= 0.6 5 patients

CF-CF Improved to CF 1m 1 patient

Deteriorated to HM 5 patients

- 6/24 (1 patient) - Deteriorated to HM
- 6/12 (3 patients) - Improved to 6/9
- 6/9 (2 patients) -1 patient Improved to 6/6p

  1 patient remained 6/9

Out of 45 patients, 19 patients (42.22 %) had improvement in final visual outcome after 6 months follow-up. 15 patients (33.35%) had a FVA that remained unchanged. 11 patients (24.44%) had deteriorated FVA

DISCUSSION

Open globe injuries continue to be a significant cause of hospitalization. The current generation of children, especially in cities, is more confined indoors and is unlikely to be affected by ocular traumas. However, in rural areas, children are still engaged in native games outside the home and are more likely to contract open globe injuries. An attempt has been made here to study the epidemiological profile, including age and sex distribution, mode, place, and type of injuries. Also, prognostic assessment using Pediatric ocular trauma score has been done.

AGE DISTRIBUTION

According to this study, more than 50 % of open globe injuries in children occur in the age group of 11-15 years and comparatively less in the age group of 6-10 years and least in the 0-5 years of age group, but no age is immune. Children in the 11-15 years of age group are more proactive in outdoor activities and are school-going, so naturally, they are more vulnerable to trauma, while children in the 0-5 years of age group will be more in the protective hands of their parents and mostly confined indoors. In a study by **Ali Azmi et al.** from South Iran, 49.1 % of open globe injuries happened in the age group < 7 years (Preschool children). [(26)] Another study by **Satyendra Singh et al.** had children of 6-10 years of age group as most affected [(27)]

SEX DISTRIBUTION

In this study, 80 % of patients are boys and 20 % are girls. i.e. a ratio of 5:1. The vigorous boys tend to live with more dangerous activities and games using all sorts of objects, and it is no surprise that they are the ones involved in trauma

most often. Girls engage in household chores, helping their mothers and are less likely to contract such trauma comparatively. This massive gap in the incidence of trauma between the two sexes is more marked in rural areas like the one in this study.

LATERALITY

In this study, the left eye was involved in 57.8 % of cases and the right eye in 42.2 %. This shows that there is no significant difference between the two eyes regarding open globe injury.

MODE OF INJURY

Wooden sticks are the most common causative agent (46.66 %) of open globe injury in this study, followed by stones (15.55%). This shows the nature of games played by rural children compared to the city dwellers. Other less common causes are metal scale (8.88%), cracker burst (6.66%), plant stem (6.66 %), sugar cane stick (4.44%), and pen (4.44%). There was one case each of a blast of light bulbs, bulls' horns, and metal exhaust pipes (2.22% each). Most of these causative agents are unique to rural areas. In a study by **Shreya M Shah et al.** Wooden objects and stones were the most common (49.3 % and 16.4 % respectively) causative agent responsible for pediatric open globe injuries. [(28)] This result is like that of present study

PLACE OF INJURY

Most open globe injuries in this study (75.6%) happened on domestic premises.

A small percentage of cases occurred at school and farm (13.33 % and 11.1% respectively).

ZONES OF INJURY

66.7 % of open globe injuries in this study affected Zone I of the eye. 13.3 % affected Zone II and 20 % in Zone III. Zone I is the most exposed area of the eye, which is attributed to the fact that maximum injuries are found there. In a study by **Marina Berquo Peleja et al.** most common location of injury was Zone I (53.9 %) followed by Zone II (24.4 %) and least number of cases in Zone III (20.8 %) [(29)]

INITIAL VISUAL ACUITY

33.33 % of patients had an initial visual acuity of Hand movements (HM+), which makes up the majority. 26.66 % had Counting fingers (CF) as their initial visual acuity. This is followed by PL + at 20 %, No PL at 6.66 %, 6/12 at 6.66 %, 6/9 at 4.44 % and 6/24 at 2.22 %. In a study conducted by **Yunia Irawati et al.** initial visual acuity was obtained in 62 children. Out of 62, 29 children had a visual acuity better than 20/40 (34.5%), followed by PL/HM in 19 %. Only 2.4 % of them had NPL as their initial visual acuity. [(30)]

COMPLICATIONS ASSOCIATED WITH OGI

62.2 % of patients had one or more complications following the open globe injury, and 37.8 % were uncomplicated. The most typical complication was hyphema (16 patients), followed by iris prolapse in 12 patients. Other complications were iris incarceration (2 patients), hypopyon (1 patient), vitreous hemorrhage (3 patients), traumatic cataract (6 patients), delay in surgery > 48

hrs (5 patients), organic and unclean wound (5 patients) and foreign body (1 patient). In a study by **Piangporn Saksiriwutto et al.** From Thailand, most common complication associated with open globe injury was found to be traumatic cataract (45.7%), followed by hyphema (30%), VH (13%), RD (7%), and endophthalmitis (9%) [7]

POTS

55.6 % of patients had a score of POTS 2, followed by 22.4 % with POTS 3, 17.8 % with POTS 1 and 2.2 % with POTS 4. Prognosis improves from POTS 1 to 4. POTS 1 case presented with most of the complications like vitreous hemorrhage, retinal detachment, and delay in seeking emergency consultation.

Out of 45 patients, the final visual outcome of patients is as predicted in 39 patients (86.7 %). In the rest of the six patients, POTS prediction went wrong on the final visual outcome (13.3 %). POTS can thus be considered a valuable tool for prognostic assessment of pediatric open globe injuries. In a study by **Gilvan Vilarinho Silva-Filho et al**. he compared the predictive value of POTS with another system called Infant/Toddler Ocular Trauma Score (TOTS) in a group of Brazilian children with OGIs. He and his team found that POTS had better accuracy in predicting FVA after treatment. [31]

Out of 45 patients, 19 patients (42.22 %) had improvement in final visual outcome after 6 months follow-up. FVA in 15 patients (33.35%) remained unchanged, and FVA in 11 patients (24.44%) deteriorated. With proper surgical care, we can offer a good prognosis to the patients. Despite efforts, some patients worsened in the final visual outcome, indicating that FVA is a multifactorial entity.

CONCLUSION

The present study, 'Epidemiological profile and prognostic assessment of pediatric open globe injuries in tertiary hospital of Vijayapura' was carried out in 18 months from September 2022 to February 2023 in patients who had attended the outpatient, inpatient and casualty of Shri B M Patil Medical College Hospital and Research Centre, BLDE (DU).

The conclusions reached at the end of the study are as follows:

- Open globe injuries continue to be a significant cause of hospitalization, especially in rural children.
- More than 50 % of OGI in children occur in the age group of 11-15 years, comparatively less in the age group of 6-10 years, and most minor in 0-5 years.
- 80 % of patients are boys and 20 % girls
- There is no significant difference between the two eyes as far as OGI is concerned.
- Wooden sticks are the most common causative agent of open globe injury, followed by stones. A few cases were due to metal scales, crackers, plant stems, sugarcane sticks, pen etc.,
- Most of the OGI in this study happened in a domestic environment, in Zone 1 of the eye.
- Around 1/3rd of patients had an initial visual acuity of Hand movements, which makes up the majority.
- More than 60% of patients had one or more complications like hyphema, iris prolapse, traumatic cataract, vitreous hemorrhage, etc., following open globe injuries.
- Delays in seeking medical advice negatively affected final visual outcomes in some patients.

- Uncomplicated cases had a better prognosis.
- More than 50 % of patients had a score of POTS 2. 8 patients had a score of POTS 1.
- The final visual outcome was predicted by POTS in more than 85 % of patients, reiterating its usefulness as a great tool in the prognostic assessment of pediatric OGI.
- Getting the child for follow-up at six months was the most challenging task of this study. At six months, with or without improvement in the final visual outcome, coming back for follow-up is unlikely as most patients are from rural areas of Vijayapura and have poor socioeconomic backgrounds.

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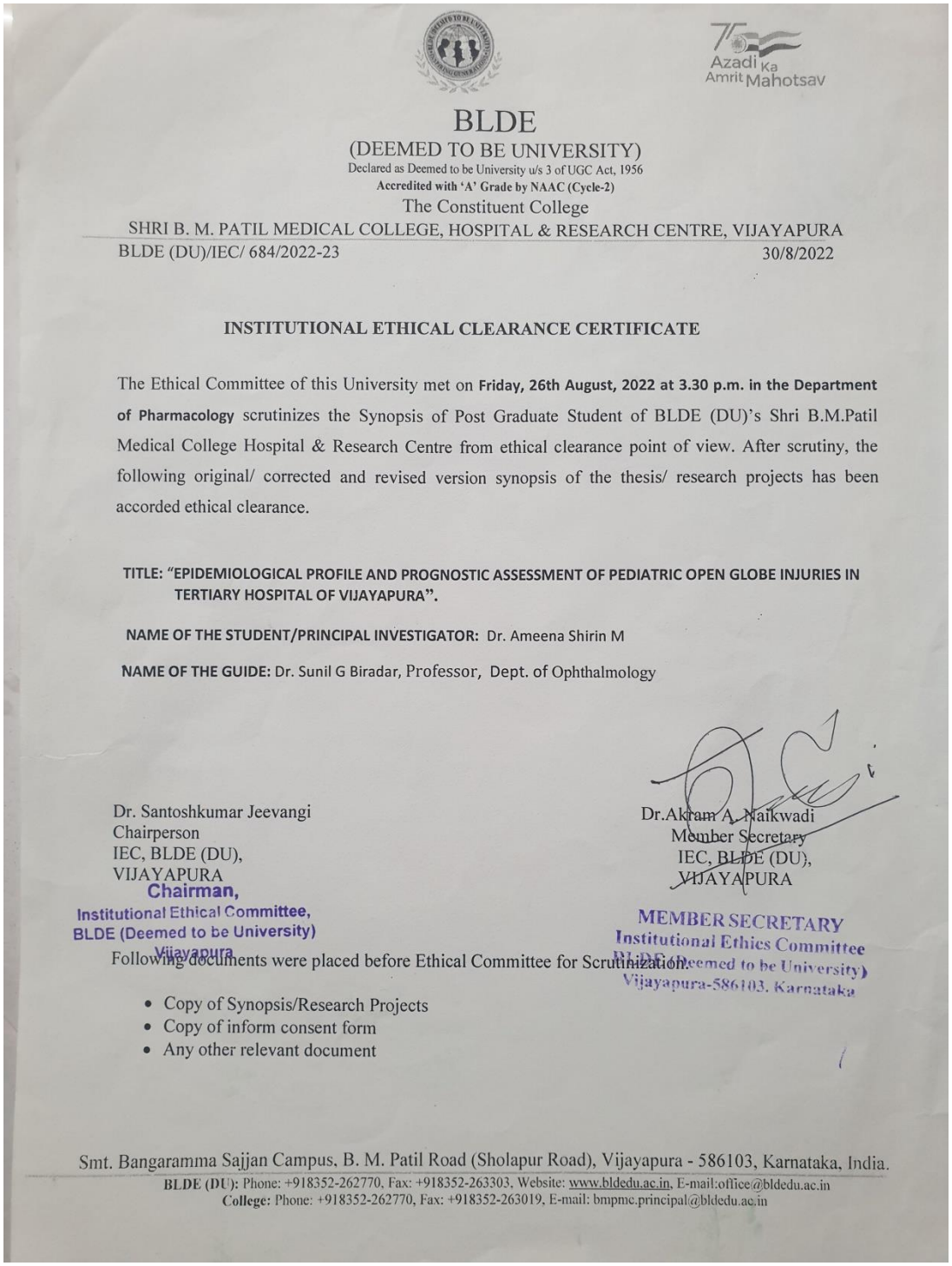
ANNEXURES

I) ETHICAL CLEARANCE



BLDE
(DEEMED TO BE UNIVERSITY)
Declared as Deemed to be University u/s 3 of UGC Act, 1956
Accredited with 'A' Grade by NAAC (Cycle-2)
The Constituent College
SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

BLDE (DU)/IEC/ 684/2022-23 30/8/2022

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this University met on **Friday, 26th August, 2022 at 3.30 p.m. in the Department of Pharmacology** scrutinizes the Synopsis of Post Graduate Student of BLDE (DU)'s Shri B.M.Patil Medical College Hospital & Research Centre from ethical clearance point of view. After scrutiny, the following original/ corrected and revised version synopsis of the thesis/ research projects has been accorded ethical clearance.

TITLE: "EPIDEMIOLOGICAL PROFILE AND PROGNOSTIC ASSESSMENT OF PEDIATRIC OPEN GLOBE INJURIES IN TERTIARY HOSPITAL OF VIJAYAPURA".

NAME OF THE STUDENT/PRINCIPAL INVESTIGATOR: Dr. Ameena Shirin M

NAME OF THE GUIDE: Dr. Sunil G Biradar, Professor, Dept. of Ophthalmology

Dr. Santoshkumar Jeevangi
Chairperson
IEC, BLDE (DU),
VIJAYAPURA

Chairman,
Institutional Ethical Committee,
BLDE (Deemed to be University)
Vijayapura

Dr.Akram A. Naikwadi
Member Secretary
IEC, BLDE (DU),
VIJAYAPURA

MEMBER SECRETARY
Institutional Ethics Committee
BLDE (Deemed to be University)
Vijayapura-586103, Karnataka

Following documents were placed before Ethical Committee for Scrutinization.

- Copy of Synopsis/Research Projects
- Copy of inform consent form
- Any other relevant document

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.
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College: Phone: +918352-262770, Fax: +918352-263019, E-mail: bmpmc.principal@bldedu.ac.in

II) STUDY SUBJECT CONSENT

STUDY SUBJECT CONSENT FORM

I confirm that Dr AMEENA SHIRIN M has explained the research purpose, the study procedure, the benefits, and the possible discomfort I may experience in the language best understood by me. Therefore, I agree to participate as a subject in this research project and willfully consent for the same.

________________________ __________________

(Participant) (Date)

______________________________ _________________

(Witness to above signature) (Date)

RISK AND DISCOMFORTS:

I understand that my ward may undergo some pain and discomfort during the examination or the treatment. This study's procedures are not expected to amplify these feelings associated with the usual course of treatment.

BENEFITS:

I know that my ward's participation in the study of the epidemiological profile of pediatric ocular trauma would give data about the burden in this area and helps in concentrating on the preventive aspects

I understand and accept the benefits, risks, and costs involved. I willingly give consent for my ward to take part in the study.

CONFIDENTIALITY:

I understand that this study's medical information will be subject to the privacy and become part of hospital records.

Suppose the data is used for teaching or medical literature publication. No name will be used in that case, and other identifiers, such as photographic images, will be used only with written permission.

REQUEST FOR MORE INFORMATION:

I understand that I may ask more questions about the study to DR. SUNIL BIRADAR in the Department of Ophthalmology, who will answer my queries or worries. I know that I will be well informed of any significant new findings discovered during the study, which might influence my ward's continued participation. A copy of this consent form is given to me for careful reading.

REFUSAL FOR WITHDRAWAL OF PARTICIPATION:

I understand that I am voluntarily allowing my ward to take part in this study and may withdraw consent or refuse to take part and discontinue participation at any time without prejudice. I also appreciate that DR. AMEENA SHIRIN M may terminate my wards' involvement in the study after explaining the reasons.

INJURY STATEMENT:

I understand that any unlikely event of injury to my ward resulting directly from my ward's participation in the study if such damage were reported promptly, my ward would be treated appropriately. But no further compensation or reimbursement would be provided by the doctor or hospital. I understand my agreement to take part in this study and not waive any legal rights.

_____ _ _____

(Guardian's signature) (Date)

I have explained to the guardian of the patient name _____the purpose of the research, the procedures needed and the possible risks to the best of my ability.

_____ _____

DR. AMEENA SHIRIN M (Investigator) Date

III) PROFORMA

PROFORMA FOR CASE TAKING

DEPARTMENT OF OPHTHALMOLOGY

BLDE DEEMED TO BE UNIVERSITY's SHRI B M PATIL MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE, VIJAYAPURA - 586103

CASE NO: DATE:

NAME OF PATIENT: AGE: SEX:

OPD/IPD NO:

NAME OF INFORMANT:

RELATION TO THE PATIENT:

ADDRESS:

MODE OF INJURY:

PLACE OF INJURY:

GENERAL PHYSICAL EXAMINATION

OCULAR EXAMINATION	RIGHT EYE	LEFT EYE
EXTERNAL APPEARANCE		
OCULAR MOTILITY		
CONJUNCTIVA		
CORNEA		
ANTERIOR CHAMBER		
PUPIL		
LENS		
VISUAL ACUITY		
INTRAOCULAR PRESSURE		

FUNDUS

a) Media

b) Disc

c) Background

d) Blood vessels

e) Macula

POTS SCORING SYSTEM

RAW POINTS: POTS SCORE:

At 6 months follow up

ACTUAL VISUAL ACUITY:

PREDICTED VISUAL ACUITY:

SIGNATURE OF THE GUIDE

IV) COLOUR PLATES

ILLUSTRATIONS OF SOME CASES

CASE 10 – At presentation – Zone 1 full thickness corneal tear from 12 to 8 o clock with iris prolapse and full chamber hyphema.

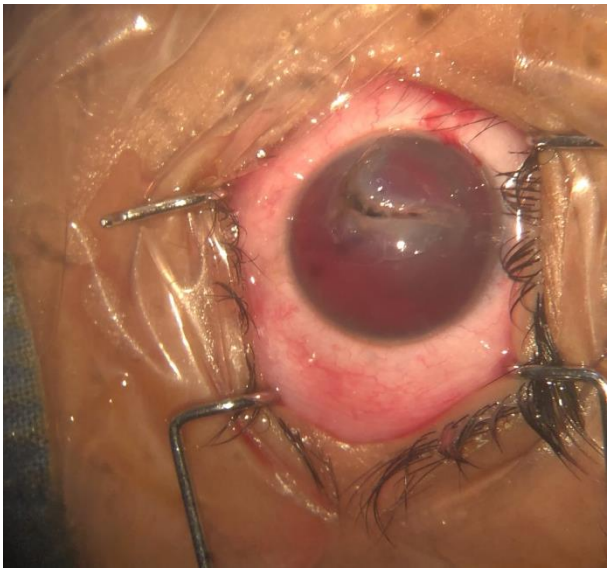

FIGURE 7

AC wash is done to remove hyphema and remaining blood clots. Corneal tear suturing using ethilon 10.0. Air bubble injected to form AC.

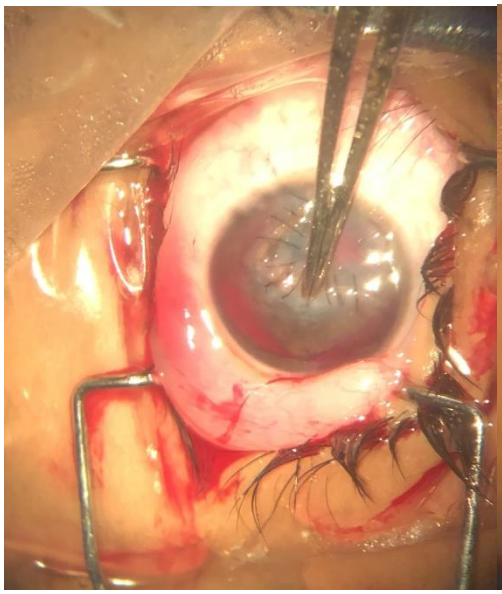

FIGURE 8

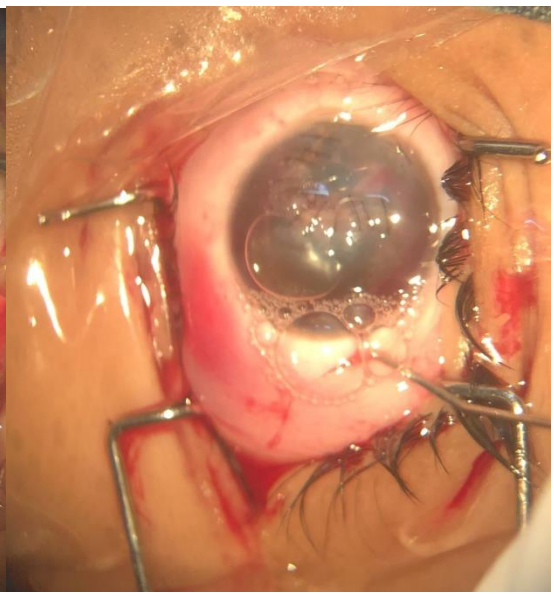

FIGURE 9

CASE 12 – At presentation – Zone I full thickness horizontal corneal laceration measuring 8 mm with iris prolapse throughout the wound. Presented 8 days after the trauma

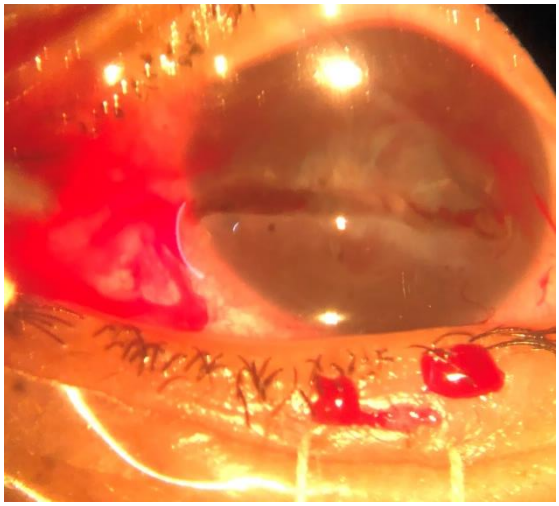

FIGURE 10

Necrosed part of prolapsed iris tissue is abscised and remaining is repositioned back into the eye. Corneal laceration is sutured with 10.0 ethilon

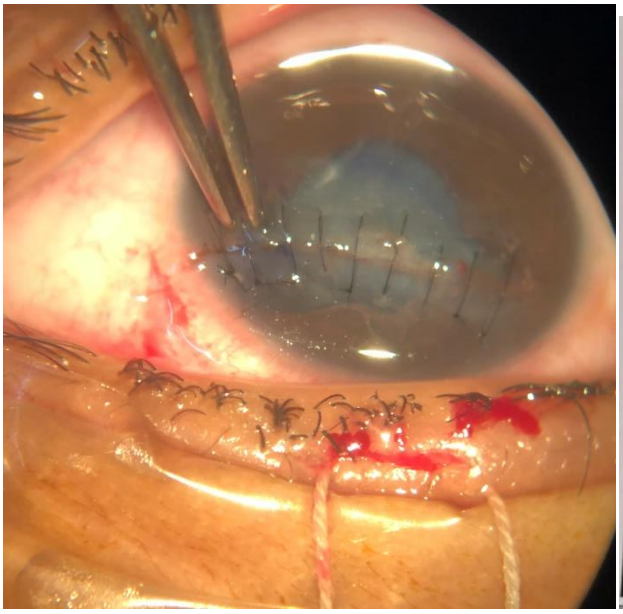

FIGURE 11

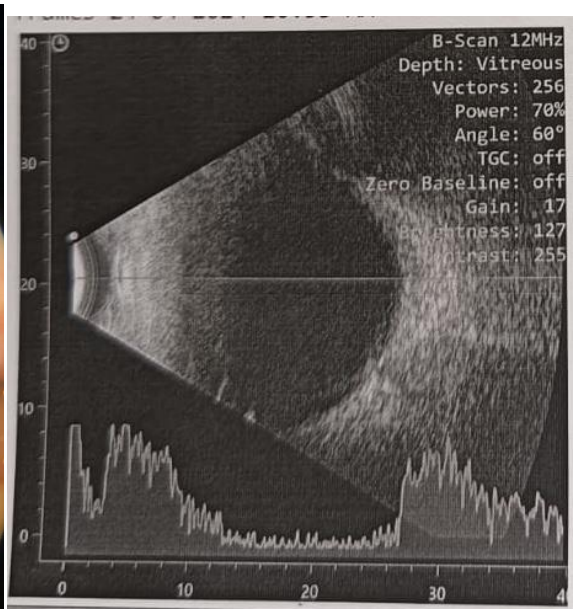

FIGURE 12

B SCAN – Normal vitreous echo

CASE 17 - Zone III scleral tear 5mm x 1mm with foreign body presented 1 day after trauma

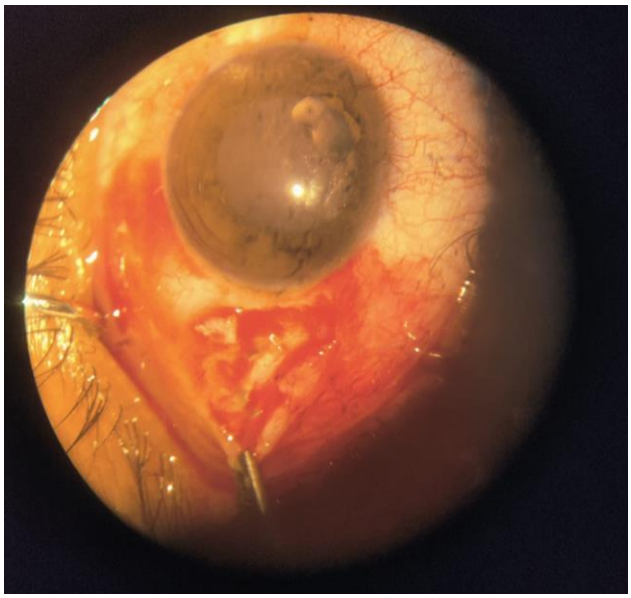

FIGURE 13

After removing foreign body, wound is sutured

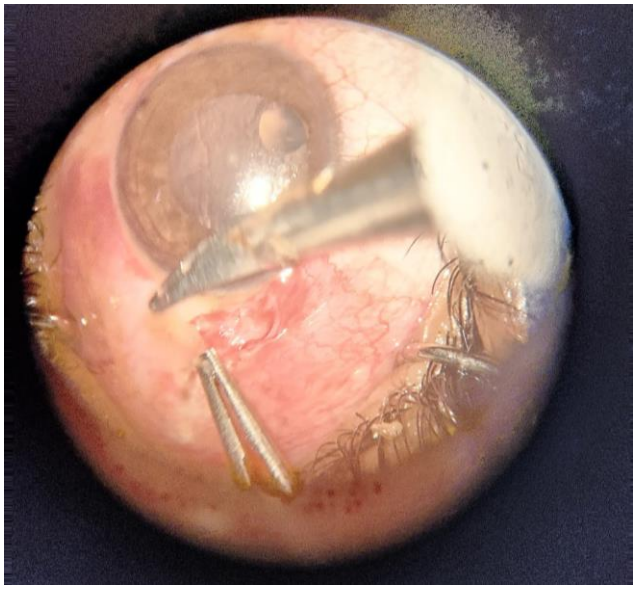

FIGURE 14

CASE 13 – Zone I full thickness corneal tear measuring 4mm x 1mm with half chamber hyphema

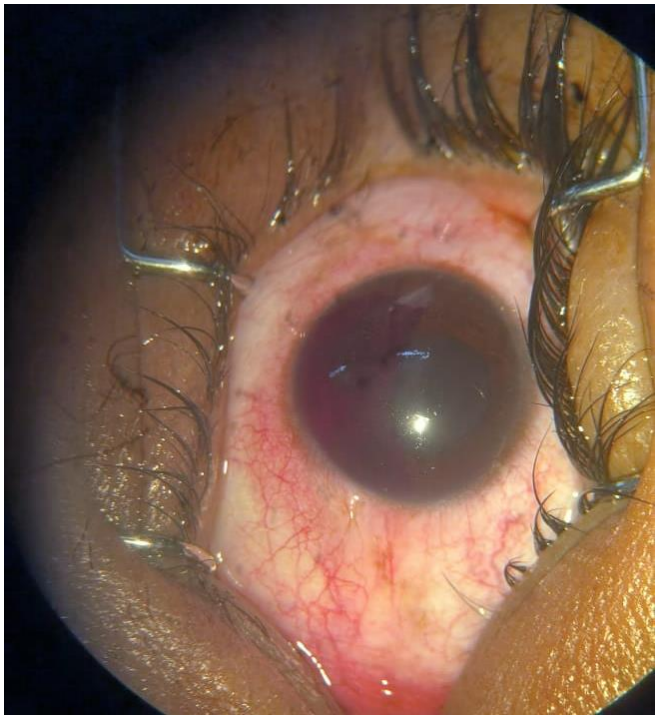

FIGURE 15

After repairing corneal tear, side port is made at 10 o'clock and hyphema is removed by AC wash

FIGURE 16

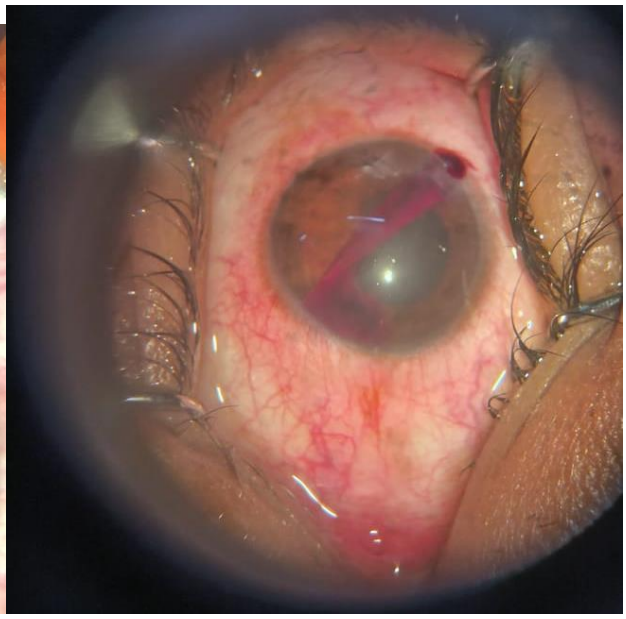

FIGURE 17

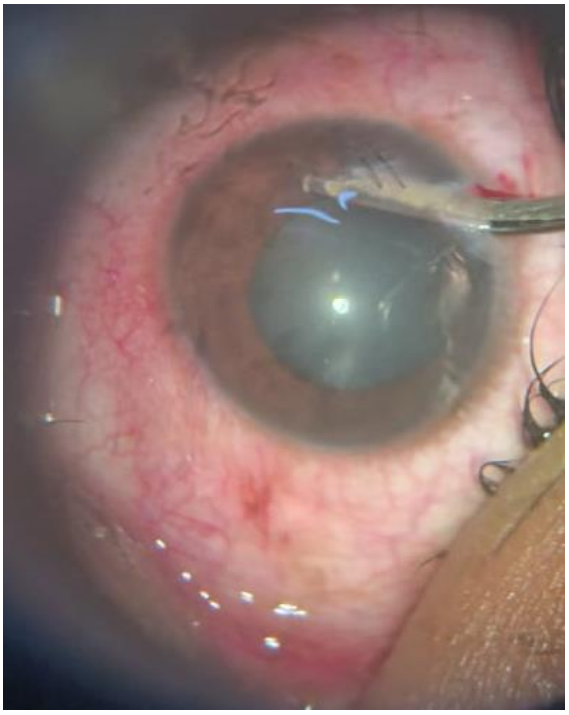

FIGURE 18 – After complete removal of hyphema

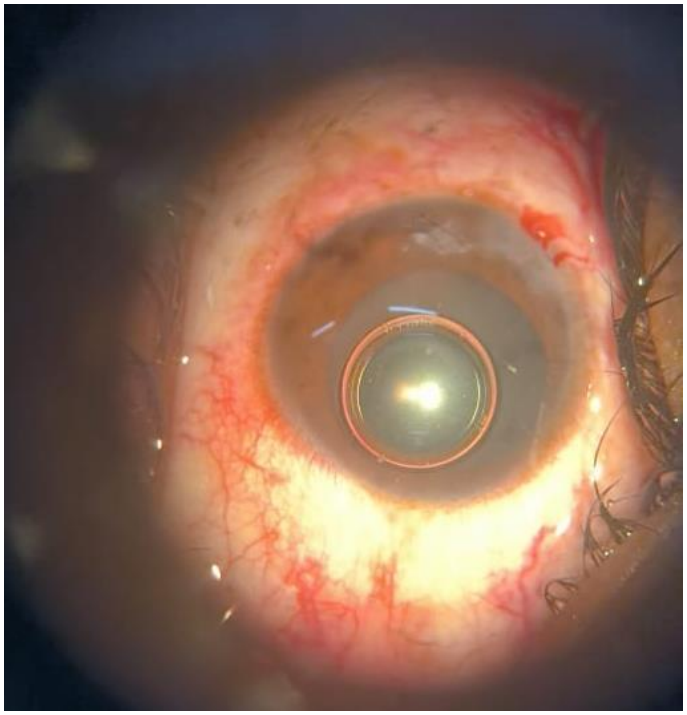

FIGURE 19 - Air bubble injected to form AC

CASE 11 – Zone I full thickness corneal perforation extending from 1 o' clock to 4 o'clock limbus with iris incarceration, cataractous lens and blood clots in shallow AC

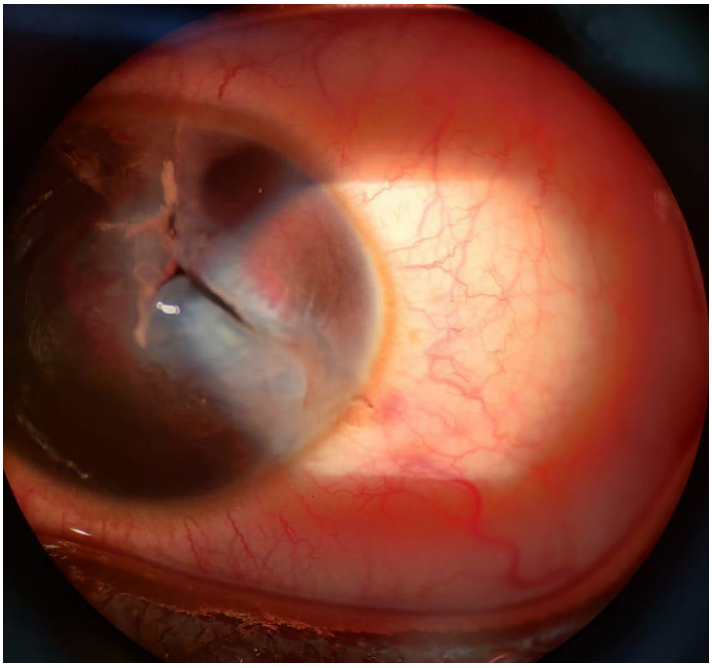

FIGURE 20

CASE 41 – Zone 1 full thickness vertical corneal tear from limbus to limbus extending from 11 o' clock to 5 o'clock with hyphema presented 3 days after trauma.

FIGURE 21

V) KEY TO MASTERCHART

M – Male

F – Female

R – Right

L – Left

WS – Wooden stick

STN - Stone

PLS – Plant stem

SC – Sugarcane stick

BILB – Blast injury of light bulb

CRK - Crackers

BH – Bull's horn

MEP – Metal exhaust pipe

MS – Metal scale

FRM – farm

H – Home

SCL – School

NPL – No perception of light

PL – Perception of light

HM – Hand movements

CF CF – Counting finger close to face

CF 2M – Counting fingers at 2 meters

CF 3M – Counting fingers at 3 meters

CF 1.5 M – Counting fingers at 1.5 meters

VA – Visual acuity

FVA – Final visual acuity

SD – Same day

IP – Iris prolapse

HPM - Hyphema

HP - Hypopyon

II – Iris incarceration

VH – Vitreous haemorrhage

VP – Vitreous prolapse

RD – Retinal detachment

UC - Uncomplicated

C - Complicated

CTRT - Cataract

IPLG – Iris plugging

FB – Foreign body

VI) MASTER CHART

Sl No	NAME	AGE	SEX	SIDE	MODE	PLACE	ZONE	INITIAL VA	C/UC	TIME DELAY	COMPLICATIONS	RAW POINTS	POTS	FVA
1	BSN	14	M	R	WS	FRM	I	HM	C	SD	CTRT, IPLG, HP	55	2	HM
2	KVS	5	M	R	WS	H	I	PL	C	SD	IP	50	2	HM
3	BGA	7	M	L	MS	SCL	I	CF2M	UC	SD	NO	60	2	HM
4	SMR	5	F	R	WS	H	I	HM	C	SD	CTRT	45	1	HM
5	DVM	6	M	L	WS	H	III	6/12	UC	SD	NO	65	3	6/9
6	KSN	14	M	R	WS	H	II	HM	C	SD	HPM, IP, VH, RD	10	1	PL
7	CDV	8	F	R	WS	H	III	CF3M	UC	1 DAY	NO	50	2	HM
8	JVK	13	M	R	CRK	H	III	CF2M	C	SD	HPM	60	2	HM
9	HHG	13	M	L	BILB	H	II	PL	C	SD	HPM	55	2	HM
10	SSDR	5	M	L	STN	H	I	NPL	C	SD	HPM, IP	15	1	NPL
11	ABSK	15	M	L	CRK	H	I	PL	C	1 DAY	HPM, II, CTRT	50	2	HM
12	PRK	11	M	L	MEP	H	I	CF-CF	C	8 DAYS	IP	70	3	CF 1M
13	VNY	14	M	L	WS	H	I	CF2M	C	1 DAY	HPM	75	3	6/24
14	SGM	14	M	L	CRK	H	III	6/9	UC	1 DAY	NO	85	4	6/6P
15	HMP	14	M	L	WS	H	I	HM	C	3 DAYS	HPM, IP	55	2	HM
16	SVT	10	F	R	MS	SCL	I	CF 3M	C	SD	IP	65	3	6/9
17	ML	12	F	L	WS	H	III	6/24	C	1 DAY	VP.VH. FB	55	2	HM

	V													
18	KNR	4	F	L	WS	H	I	NPL	UC	SD	NO	45	1	NPL
19	YHP	13	M	L	WS	H	III	6/12	UC	SD	NO	75	3	6/9
20	PSK	9	M	R	WS	H	I	PL	C	SD	HPM	55	2	HM
21	PRV	15	M	R	WS	H	I	HM	UC	SD	NO	70	3	6/9
22	RLK	11	F	L	PEN	SCL	II	HM	C	SD	HPM	55	2	HM
23	RTB	9	F	L	PLS	FRM	I	HM	UC	SD	NO	55	2	PL
24	SVR	10	M	R	BH	H	I	NPL	C	SD	IP, HPM	40	1	NPL
25	DSR	7	F	R	SC	FRM	I	PL	C	SD	IP, HPM	45	1	NPL
26	ISA	12	M	L	PLS	FRM	II	CF3M	UC	SD	NO	65	3	6/9
27	PRK	10	F	R	STN	H	III	6/9	UC	SD	NO	75	3	6/9
28	STB	5	M	R	WS	H	II	PL	C	SD	HPM	40	1	NPL
29	SVP	14	M	L	WS	H	II	PL	C	SD	HPM	55	2	HM
30	MKA	12	M	L	STN	H	I	PL	C	SD	HPM, IP	60	2	HM
31	SRT	8	M	R	SC	FRM	I	PL	UC	SD	NO	55	2	HM
32	VSP	12	M	R	WS	H	III	CF 2M	UC	4 DAYS	NO	60	2	6/9
33	NHR	9	M	L	STN	H	I	CFCF	UC	SD	NO	70	3	6/9
34	BSR	11	M	L	WS	H	I	CF CF	C	SD	VH	60	2	HM
35	SVK	7	M	L	WS	H	I	CFCF	C	SD	IP.HPM	60	2	HM
36	NRV	9	M	L	MS	SCL	I	HM	UC	SD	NO	60	2	HM

37	VVT	13	M	L	STN	H	I	CF 1.5	C	SD	CTRT	70	3	6/9
38	IRK	8	M	L	PEN	SCL	I	HM	UC	SD	NO	60	2	HM
39	SKR	14	M	L	STN	H	I	HM	C	SD	CTRT	60	2	HM
40	RGS	6	M	R	STN	H	III	6/12	UC	SD	NO	65	3	6/9
41	ACN	11	M	R	WS	H	I	HM	C	3 DAYS	HPM	60	2	HM
42	MJB	13	M	R	PLS	FRM	I	HM	C	SD	IP	60	2	HM
43	APS	12	M	L	WS	H	I	HM	C	SD	CTRT	60	2	HM
44	YVJ	4	M	R	WS	H	I	HM	C	5 DAYS	IP	45	1	PL
45	SPJ	8	M	L	MS	SCL	I	HM	UC	SD	NO	60	2	HM

VII) PLAGIARISM

iThenticate

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- Bibliographic material
- Quoted material
- Cited material
- Methods and Materials
- Small Matches (Less then 14 words)