

REVIEW ARTICLE

REVIEW OF OCULAR INJURIES IN MALAYSIA

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ABSTRACT

Ocular injuries or trauma to the eye can be caused by variety of objects resulting in a spectrum of lesions in the eye. We did a Pubmed/Google/Science Direct search to review the spectrum of ocular injuries in Malaysia. In our review, we included 28 papers providing information on ocular injuries which were published from Malaysia during the period 1991-2016 in different medical journals. Prevalence was more among males with an average age of 35 years. Among adults they were more common in the workplace but in children it occurred at home. Few wore protective glasses at work. The mode of injury was due to sharp objects hitting the eye, motor vehicle and domestic accidents, firecrackers, chemicals and rarer causes like superglue and durian fruit. Prognostic factors for outcome were the initial visual acuity, length of the wound, associated factors like hyphaema, intraocular foreign body and vitreous prolapse. Missing the diagnosis of perforation of the eyeball is possible without eliciting a proper history. Protective devices must be worn to prevent injuries. Display of health education charts showing the effect of injuries in the eye and their preventive measures in health centres, private hospitals, schools, factories and sports centres will increase the awareness of public about the ocular injuries. It is important to diagnose the tissues involved in ocular trauma by the general practitioners and primary care physicians and refer the patients to the Ophthalmologist urgently for treatment to salvage vision. Compensation mechanisms should then be put forth in terms of rehabilitation and for monetary loss.

Keywords: Ocular injury, blunt injury of eye, perforating injury of eye, chemical injury of eye.

INTRODUCTION

Eye injuries can range from the very minor such as getting soap in one's eye to the catastrophic resulting in permanent loss of vision or loss of the eye. These types of injuries often occur in the work place (38.5%), during a quarrel (5%), from road accidents (20.5%), or while participating in game/sports (29%). Ocular injuries can be caused by sharp (72.5%) or blunt objects (27.5%) and result in a variety of injuries¹. It can be devastating to the patient and can result in prolonged hospital stay and loss of work days. Apart from that it can be costly due to compensation to be paid. A study in Singapore found that one in every 20 people had a history of eye trauma. Moreover, people's occupation, gender, age, social economic status, alcohol consumption, smoking, and the type of housing were among the risk factors for eye trauma². In order to understand and refer to the same language of terms which had been rather

confusing previously, Birmingham Eye Trauma Terminology (BETT) system was devised referring to globe injuries (Fig.1), with the following definitions³. Laceration -- Full-thickness wound of the eye wall, caused by a sharp object. The wound is at the impact site and is created by an outside-in mechanism. Iris prolapse in injuries of cornea/limbus and vitreous prolapse in injuries of sclera is quite often seen.

Penetrating injury -- An entrance wound is present. If more than one wound is present, each must have been caused by a different object. Perforating injury -- Both an entrance and an exit wound are present. The two wounds caused by the same agent. Intraocular foreign body (IOFB) -- One or more foreign objects are present. Technically a penetrating injury, but grouped separately because of different clinical implications (management, prognosis).

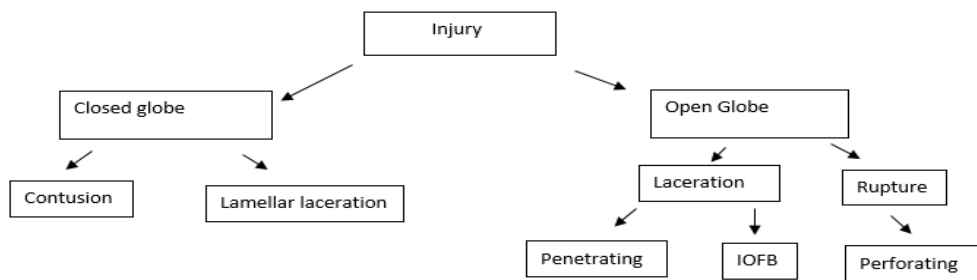


Figure1-Birmingham Eye Trauma Terminology.

The main objective of this review was to create awareness of ocular injuries so that measures can be taken to prevent injuries, thereby preventing blindness. The awareness of ocular injuries will reduce their prevalence, and by taking preventive measures hospitalization, absence from work and compensation claims can also be reduced.

METHOD

We did a Pub Med, Science Direct and Google Scholar search for all the studies and case reports on ocular injuries reported from Malaysia for the past two and half decades (1991 - 2016). The key words for search were perforating injuries of eye in Malaysia, blunt injuries of eye in Malaysia, chemical injuries of eye in Malaysia, ocular injuries, ocular trauma, hyphaema, intraocular foreign body, visual outcome in ocular injuries in Malaysia. There were 28 papers published on ocular injuries from Malaysia over a period of 25 years. We looked at all the papers on ocular injuries published in different journals to study about their prevalence, place of injury, mechanism of injury, determinants of visual outcome, pitfalls of diagnosis, prevention of injuries and treatment modalities and analyzed into these groups. We did not do any systematic analysis as many studies were retrospective and descriptive in nature. We excluded unpublished and ongoing studies. The names of journals and number of papers on ocular injuries published from Malaysia are shown in Table 1.

RESULTS AND DISCUSSION

The details of different retrospective and prospective studies on ocular injuries (design, place of study, participants, sample size, main findings and comments are shown in Table 2. Examples of different types of ocular injuries are shown in the figures 2, 3,4.

Prevalence of ocular injuries

In a cross-sectional prospective study of 1081 new patients, examined over a period of six months in the eye clinic in Temerloh district

hospital, Pahang state, Thevi et al reported the prevalence of ocular injuries as 9.8%¹⁷.

Place of ocular injuries

Soong et al ⁹ from University of Malaya Medical Centre, Kuala Lumpur reported that majority of ocular injuries were work-related (43.6%) and only 2.5% reported to having used eye protective device at time of their work-related injuries. In contrast, Madhusudhan et al ¹⁵ from Hospital university Sains Malaysia, KubangKerian, Kelantan, found the most common place of ocular injury was home (51.8%), followed by the workplace (23.4%). Tan et al ¹² from Kuching reported that most of the injuries in children took place at home (75.2%), followed by at street (13.7%), at school (8.5%) and at recreational places (2.6%). Mallika et al ⁷ found home (34.3%) and industrial premises (31.8%) were the common locations for ocular injuries in adults in Kuching.

Table 1. The names of journals and number of papers on ocular injuries published from Malaysia during 1991-2016.

Name of the Journal	No. of papers
Medical JMalaysia	6
Malaysian family physician	4
International J Ophthalmology	4
BMJ case reports	2
Graefes Arch ClinExperOphthal	1
Nepal J Ophthalmology	1
Clinical Ophthalmology	1
Singapore Medical J	1
Burns	1
Orbit	1
Asia Pacific J Ophthalmol (Phila)	1
Injury	1
Rawalpindi Medical J	1
J Emergency Trauma Shock	1
International J Ophthalmol (GuojiYankeZazhi)	1
ClinExper Ophthalmology	1

Mode of occurrence of ocular injuries

Khairudin et al¹⁸ reported a case of extensive ocular injury secondary to an electronic cigarette (e-cigarette) related explosion. The explosion was the result of modifications made to a heating element of the e-cigarette device by a non-professional. A river crab claw injury caused a full thickness corneal laceration and hypopyon which was missed due to a corneal ulcer¹⁹.

Domestic injuries were predominant in those aged below 12 years (75.2%)¹² while assault-related injuries were seen mostly among young men in the age between 20-30 years (7.7%)⁷. The common sources of eye trauma in patients presenting at a University Hospital, Kuala Lumpur were the use of high-powered tools (30.8%), motor vehicle accident (23.1%), and domestic accidents (17.7%)¹⁰. Majority of traumatic cataract in pediatric age group had perforating injury and the most common cause was an organic foreign body (24.14%)¹⁴. Health education and awareness are essential tools that can prevent avoidable blindness due to traumatic cataract in the pediatric population. The importance of rehabilitation programs for these patients should be emphasized.

Accidental fall of superglue in the eye causing sticking of eyelashes and eyelids without any injury to other structures in the anterior segment in two children, and corneal abrasion without any morbidity in eight months old baby was reported by Reddy²⁰. Durian fruit falling on the face has caused a variety of injuries ranging from contusion to penetrating injury and angle recession glaucoma^{21,22}. Pseudophacocoele which is extrusion of an intraocular lens (IOL) occurred a month after extracapsular cataract extraction due to an accidental hit on the eye by an elbow. The patient had to undergo vitrectomy and exchange of IOL²³. Ang reported 2 cases of fish hook injury-one in a 48 year old woman who had to undergo evisceration and another in a 13 year old boy who recovered to 6/9 after corneal wound suturing, lens aspiration with intraocular lens implant²⁴.

In a review of 118 patients of hyphaema due to blunt injury, Ulagantheran et al⁹ reported that sports related injury was the most common cause of hyphaema (38%); the other associated findings in the iris were traumatic mydriasis, sphincter tears, iridodialysis. In fireworks injuries during Hari Raya festival time, thermal injuries accounted for 60.0% of the injuries whereas 40.0% were due to exploding fireworks¹¹.

Ocular perforating injuries

(66.67%) and ocular contusions (33.33%) were the commonest among industrial workers in Kuala Lumpur. Work-related ocular injuries occurred among the SOCSO workers in 2004 revealed that 50% of injuries occurred in the services and construction industries (50%), 25% in manufacturing industries, 16.7% in financial and insurance industries and 8.3% in commercial industries²⁵.

Chemical injuries or burns can occur in a number of ways but is most often the result of a liquid splashing into the eye. Many chemicals, such as soap, sunscreen, and even tear gas, are merely irritants to the eye and do not usually cause permanent damage. However, strong acids and alkalis are highly caustic and may cause severe and permanent damage to the ocular surface. Acids (such as sulfuric acid found in car batteries) or alkaline substances (such as lye found in drain cleaner and ammonia) can splash into the eyes.

Rubbing the eye when working with chemicals may transfer substances from the skin on the hands to the eye. Aerosol exposure is another method of potential chemical injury and includes such substances as Mace, tear gas, pepper spray, or hairspray.

In a retrospective study of 75 patients treated in University of Malaya Medical Centre, Kuala Lumpur, Reddy and Tajunisah⁸ reported that 84% were in the working age group (21-50 years) and 65.4% were factory/construction workers. Complications such as dry eye, vascularization of cornea, corneal opacity, complicated cataract, secondary glaucoma etc occurred in 19.55 of the affected eyes. Final outcome of vision 6/18 or better was achieved in 92% of eyes; blindness was noted in 6.2% of the affected eyes.



Figure 2. Hyphaema in closed globe ocular injury, common in blunt trauma.

Table 2. The details of the studies on ocular injuries in Malaysia

Author, place of study	Study design, duration of study period	Participants, sample size	Main findings and comments
Lai & Moussa ⁴ , Hospital University of Malaya, Kuala Lumpur	Retrospective study, 10 years.	Intraocular foreign bodies (IOFB), 64 cases.	70% of cases were under the age of 35 years, males predominant (95.3%), work related 86%. IOFB were from hand hammer (64.1 %) and grass cutting (20.3%). The size of the IOFB, poor initial visual acuity, and the presence of preoperative complications (cataract, iris damage and vitreous haemorrhage) had significant effect on the final visual outcome.
Zainal et al ⁵ , Hospital Kebangsaan Malaysia, Kuala Lumpur	Retrospective study, 3 years	Perforating eye injuries, 159 patients (167 eyes).	Most patients were less than 40 years age. Males were predominant (83.2%). Occupational injuries were 35%, motor vehicle accidents 29%, domestic accidents 23%. At initial presentation, 64% of eyes had vision of 3/60 or worse; 55% eyes were blind. Age, time of interval and mechanism of injury were not significant factors. Extent of injury was the only significant associated factor.
Hooi & Hooi ⁶ , Hospital Sultanah Aminah, Johar Bahru.	Retrospective study, 2 years	Open globe injuries, 152 patients (156 eyes).	Majority were males (88.2%); 116 patients (76.3%) were within the economically active 15 to 64 year age range. Most injuries were work related. Lens injury (40.4%), retinal detachment (15.4%), endophthalmitis (14.7%), IOFB (12.2%) were common injuries. Prognostic factors for visual outcome were presenting visual acuity, afferent pupillary defect, wound location, lens injury, retinal detachment and endophthalmitis.
Mallika et al ⁷ , Sarawak General Hospital, Kuching.	Prospective hospital based study, 1 year	Ocular injury patients seen for the first time in eye department, 233 patients (257 eyes).	The predominant age group was between 21-30 years, 26.2 % . Eye injuries related to work were seen in 36.9% ; there was a gross negligence in the use of personal protective devices in these patients. The common settings in which the injuries occurred included home 34.3% and industrial premises 31.8% . Assault-related injuries 7.7% were seen mostly among young men in the age between 20-30 years. The initial presenting visual acuity of the patients with blunt ocular trauma was better than penetrating injury. Health education and preventive strategies both in the working place and at home will help to decrease the occurrence of ocular injuries.
Reddy and Tajunisah ⁸ , University Malaya Medical Centre, Kuala Lumpur	Retrospective study, 10 years	Patients with chemical injuries in the eyes, 75 patients	Majority were males (90.3%). Site at which injuries occurred were factory related (42.7%), construction site (22.7%) and the rest at miscellaneous places. Injury with alkalis were in 52% of patients, acids in 29.3% and the others were miscellaneous solutions. Complications such as dry eye, vascularization of cornea, corneal opacity, complicated cataract, secondary glaucoma developed in 19.5% of the affected eyes. Final outcome of vision 6/18 or better was achieved in 92% of eyes; blindness was noted in 6.2% of the affected eyes.
Ulagantheran et al ⁹ , University of Malaya Medical Centre, Kuala Lumpur	Retrospective study, 10 years	Traumatic hyphema due to blunt injury, 118 patients.	Males were predominant (93.2%); 67.8% were aged below 30 years. Sports related injury (38.1%) was the most common cause for hyphema. Hyphema disappeared within 5 days in 66.9% of patients. Iris injuries were very commonly associated in the form of mydriasis, sphincter tear and iridodialysis. The best corrected vision of 6/18 or better was noted in 85.4% of patients at the last follow-up. Moderate blood staining of cornea occurred in 0.8% of patients. Sports related injury is the most common cause of hyphema in Malaysia. Good visual recovery, without serious

<p>Soong et al ¹⁰, University Malaya Medical Centre, Kuala Lumpur</p>	<p>Prospective study, 1 year</p>	<p>Ocular trauma cases, 546 patients (643 eyes)</p>	<p>complications, is possible with appropriate and in-time treatment in hyphema patients due to blunt injury. Majority were males (88.1%); 75.5% were Malaysian nationality. The average age was 31.5 years (range 1-81 years). Work-related injuries were 43.6%. The common sources of eye trauma include the use of high-powered tools (30.8%), motor vehicle accident (23.1%), and domestic accidents (17.7%). Only six patients (2.5%) reported to having used eye protective device at time of their work-related injuries. Ocular injuries can be reduced by the use of eye protection devices and the implementation of appropriate preventive strategies. Effective training in this aspect should be made mandatory at the workplace. In addition, there should be a continual assessment of safety and health issues at the workplace.</p>
<p>Rashid et al ¹¹, Hospital University Sains Malaysia, Kubang Kerian, Kelantan</p>	<p>Prospective study, 5 weeks</p>	<p>Patients with ocular burns and related injuries due to fire works during Aidil Fitri, 30 patients (34 eyes)</p>	<p>Majority were male (96.7%). Age of patients was 2 to 43 years; 70% were 12 years and below. Thermal injuries were 60% whereas 40% were due to exploding firework. Burns to the eyelid and cornea (35.29%) were the most common injuries noted. Majority of patients (96.7%) had no eye protection; 50% were bystanders. At presentation, 44.1% of eyes had a visual acuity of 6/6 to 6/9 in the injured eyes. Fireworks cause serious preventable ocular burns and related injuries especially in children who are the most affected age group. Health education, public awareness and tighter legislation are essential preventive measures to limit the effect of fireworks to the public.</p>
<p>Tan et al ¹², Hospital Umum Sarawak, Kuching</p>	<p>Retrospective study, 3 years</p>	<p>Ocular injuries in children aged 12 and below, 117 patients (118 eyes)</p>	<p>Boys were 65.8%; 58.2% were pre-school children, 41.9% school- aged children. Mean age was 6.1 years. Most of the injuries took place at home (75.2%); 8.5% were at school, 13.7% at streets and 2.6% at recreational places. Majority (81.2%) of injuries occurred when the children were alone, 18.8% during play with other children (p<0.05). The majority of cases (87.3%) were considered preventable. Sharp objects were responsible for 38.1%, blunt objects 26.3% and fall 12.7%. The frequency of open and closed globe injury was similar. Hyphema was more common in closed globe injury compared to open globe injury (p<0.05). Other associated injuries such as cataract, vitreous hemorrhage and retinal hemorrhage are similar between the two groups. Visual outcome is generally poor with only 28.8% had no visual impairment. Prevention through education is the best approach to reduce the frequency and ocular morbidity in pediatric patients.</p>
<p>Thevi et al ¹³, Tengku Ampuan Rahimah Hospital, Klang</p>	<p>Prospective study, 3 years</p>	<p>Penetrating injuries of eye, 52 patients</p>	<p>The mean age of patients was 27.3 years (range 9-73 years). Work place injuries were 36.5% followed by road accidents 32.7%. Pencils/toys were responsible for 36.5% of injuries followed by glass and nail (each 15.4%). Corneal lacerations were 61.5% followed by corneoscleral lacerations (26.9%) and scleral lacerations (11.5%). Hyphema, cataract and intraocular foreign body were the frequent other injuries in these eyes. Predictors of good visual outcome are good initial visual acuity, a corneal laceration wound of less than 5mm, a deep anterior chamber, and simple lacerations. Age, gender, place of injury, object causing injury, presence of hyphema or intraocular foreign body, and the use of safety</p>

<p>Adlina et al ¹⁴, Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan</p>	<p>Retrospective study, 11 years</p>	<p>29 patients below 17 years age, with traumatic cataract</p>	<p>precautions did not affect the visual outcome. Majority were boys (82.7%); 62.1% were due to penetrating injury. Eye injuries were due to organic foreign bodies (24.14%), followed by falls (10.34%), metal foreign bodies (10.34%) and fishing tool injuries (10.34%). Unknown causes of injury were noted in 13.80% of eyes in children aged less than five years. Only 34.48% of patients had a final corrected visual acuity of 6/12 and better. Corneal opacity (52.63%) and amblyopia (26.32%) were the most common causes of poor final visual acuity. Health education and awareness are essential tools that can prevent avoidable blindness due to traumatic cataract in the paediatric population.</p>
<p>Madhusudhan et al ¹⁵, Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan</p>	<p>Retrospective study, 10 years</p>	<p>Open globe eye injury, 220 patients (222 eyes)</p>	<p>Males were predominant (78.8%); Malays were 93.2%. site of injury was home (51.8%) followed by work place (23.4%), street (18.5%) and school (2.7%). Cause of injury was domestic related (37.4%), occupational injury (23.4%), motor vehicle accident (17.6%) and animal/agriculture related (12.6%). Metal was the most common object (27.5%) followed by glass (15.8%) and sticks (10.4%). Significant prognostic factors for final visual outcome in patients with open globe injury are initial visual acuity, posterior extent and length of wound, presence of hyphaema and presence of vitreous prolapse. Awareness of the factors predicting a poor visual outcome may be helpful during counselling of patients with open globe injuries.</p>
<p>Yang et al ¹⁶, Sibu Hospital, Sarawak</p>	<p>Retrospective study, 1 year</p>	<p>Ocular trauma cases, 168 patients (179 eyes)</p>	<p>Forty four percent injuries were work related; only 23.1% used eye protective devices. Open globe injuries constituted a higher percentage of impaired visual acuity (84.6%) during the first visit, compared with 18.1% for closed globe injuries; 61.5% of open globe injuries worsened or showed no improvement in vision after 3 months compared with closed globe injuries (28.9%). Open globe injuries and a delay in seeking treatment resulted in significantly poorer visual outcome.</p>

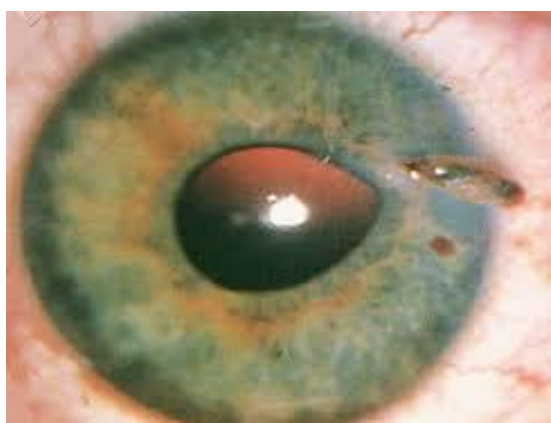


Figure 3. Peaked pupil with prolapsed iris in lacerating injury of cornea.



Figure 4. Foreign body embedded in the eye projecting outside the sclera.

Determinants of visual outcome in ocular injuries

Open globe injuries (61.5%) showed worse or no improvement in visual acuity compared to closed globe injuries (28.9%) after 3 months ($P = 0.015$) in a study conducted in Sibu hospital, Sarawak¹⁶. The study in Hospital USM showed that the visual outcome was found to be significantly associated with the initial visual acuity ($P < 0.005$), posterior extent of wound ($P < 0.001$), length of wound ($P < 0.001$), presence of hyphaema ($P < 0.001$) and presence of vitreous prolapse ($P < 0.005$)¹⁵. In an analysis of 167 perforating eye injuries from Hospital UKM, only 45% of eyes had improved vision to 6/36 or better at six months of follow-up and the rest (55%) of eyes were blind. The only significant associated factor identified was the extent of injury. Age, time interval and mechanism of injury were not significant factors⁵. In a study of 156 eyes with open-globe eye injuries treated in the Hospital Sultanah Aminah, Hooi and Hooi⁶ found that prognostic factors included initial visual acuity, relative afferent pupillary defect, wound location, lens injury, endophthalmitis and retinal detachment⁶. In a study of perforating injuries with intraocular foreign bodies (IOFB) in University Hospital Lai et al found that size of the IOFB, poor initial visual acuity, and the presence of the following complications: cataract, iris damage and vitreous haemorrhage affected the outcomes²⁵. Corneal opacity and amblyopia were the most common cause of poor outcomes among 29 children with traumatic cataracts⁴.

Pitfalls in Diagnosis of ocular injuries

White eye blow out fractures can present with persistent diplopia and the diagnosis can be missed²⁶. Sympathetic ophthalmia was diagnosed in a teenaged girl in East Malaysia without history of ocular trauma or surgery. The patient who presented with a 6-month history of left eye redness associated with 1-week history of decreased vision and photophobia. Her mother had also noticed recurrent eyelid swelling and a black lesion on the left eye. Anterior segment in the left eye showed prolapsed iris tissue with healed perforation involving the left cornea associated with vascularization, pupillary distortion and shallow anterior chamber infero temporally. Left eye fundal examination was hazy with presence of yellow, subretinal nodules involving the inferior fundus and a hyperaemic optic disc. The right eye fundal view showed a serous detachment involving the right superotemporal arcade with multiple smaller areas of serous detachment. After the treatment with intravenous methyl prednisolone, oral corticosteroids, her visual acuity improved to 6/9 in both eyes with reduction in size of the nodules, reduction in vitreous cells and resolution of the exudative detachments²⁷. A case of blunt injury of left eye with plastic gun

pellets resulting in total hyphaema in a 10 year old boy (which was missed by a general practitioner) was reported from Hospital UKM. After two days he developed secondary glaucoma was treated with topical glaucoma medications, and anterior chamber wash of the blood clot. Persistent raised intraocular pressure resulted in pale optic disc with visual acuity of 6/36²⁸.

Innovative Techniques

A cut- it- out technique was reported by Ahmad et al²⁹, to remove a fish-hook embedded in the cornea and deeper structures of an 11 year old boy. Vairavan et al³⁰ successfully attempted a minimally invasive approach to remove a retrobulbar foreign body under computer-assisted image guidance in a 19-year-old man involved in an industrial mishap.

Prevention of ocular injuries

The most important thing in the prevention of ocular injuries is to make the public aware about the effect of trauma resulting various lesions in the eye which if not treated in time will result in blindness. This can be achieved by display of health education charts showing the effect of injuries in the eye and their preventive measures in health centers, private hospitals, schools, factories and sports centers. Compulsory wearing of protective glasses should be made in all the places and factories dealing with chemicals and mechanical work. Parents should supervise children during festivals when they are dealing with fire crackers. It is important to diagnose the tissues involved in ocular trauma by the general practitioners and primary care physicians and refer the patients to the Ophthalmologist urgently for treatment to salvage vision. Only six patients (2.5%) were protective device during work related injuries¹⁰. Facial and eye protective devices are recommended while plucking durians and one should avoid sleeping under the durian tree^{22,21}.

Treatment of ocular injuries

The most common lesions in the eye due to blunt injury are ecchymosis of eyelids (black eye), subconjunctival haemorrhage, hyphema, traumatic cataract, while vitreous haemorrhage, retinal edema with haemorrhages occur rarely. In black eye, there is accumulation of blood under the eyelids. It is treated with ice cold packs if the patients comes within few hours after injury, followed by nonsteroidal anti-inflammatory drug (mephenemic acid 500mg tds) to reduce inflammation due to blood stasis. Subconjunctival haemorrhage does not need any special treatment except reassurance that the blood will be absorbed slowly over a period of 1-2 weeks depending on the size of haemorrhage. Hyphema is accumulation of blood in the anterior chamber. If the blood is filled more than half of anterior chamber, it causes diminution of vision and raised intraocular pressure (IOP). Therefore,

an important examination of eye in patients with blunt injury is to measure the visual acuity and IOP. If IOP is more than 21 mm Hg, it should be treated with glaucoma medication (timolol 0.5% eye drops bd and tablet acetazolamide 250 mg tds). Traumatic cataract is due to concussion effect of the injury and cataract extraction with intraocular lens implantation will improve vision in such cases. Any patient with diminution of vision needs referral to the eye specialist for further treatment.

In cases of perforating injuries of eye, urgent referral to the eye specialist is needed for further surgical treatment of the laceration of the tissues in the eye. Similarly, chemical injuries of eye also need urgent referral to the eye specialist. Most often, chemical injuries involve both eyes. Immediate copious irrigation of the eye will help in reducing the severity of chemical injury. Appropriate emergency treatment with broad spectrum antibiotic eye drops, corticosteroid eye drops, artificial tears eye drops, tablet acetazolamide, capsule doxycycline and tablet vitamin C will reduce the long-term complications (sympblepharon, corneal ulceration, corneal opacification, neovascularization, dry eye). The visual improvement depends upon the early treatment and treatment of complications. Corneal transplantation may be needed to improve vision in cases of corneal opacity. However, severe chemical burns can result in blindness in some cases.

In a commentary of ocular injuries and severe ocular surface diseases, Tan and Paul³¹ have reminded that documentation of the vision in blind eyes secondary to trauma should be practiced preferably by more than one Ophthalmologist. Unless it is life threatening, any procedure for enucleation/ evisceration should not be advised till the patient is fully conscious and proper vision is documented in the injured eye.

CONCLUSION

Ocular injuries can occur in children and adults and are more common in males than females. They occur at different locations (home, school, street, recreational places, work place, playground etc) by different modes (motor vehicle accidents, occupational injuries, chemical injuries in factories and at home, assaults during quarrel). They occur with sharp objects, blunt objects, chemicals, fireworks. Penetrating injuries are more serious than blunt injuries. In majority of the eyes, visual recovery is good. But in severe cases, the eyes may become blind in spite of treatment due to involvement of many ocular tissues due to injury. Public awareness about preventive measures can be achieved by health education posters in

schools, health centers, hospitals, major commercial centers.

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