



“AN OBSERVATIONAL PROSPECTIVE STUDY OF OCULAR BLUNT TRAUMA”

Ophthalmology

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ABSTRACT

Background and Aims: Ocular blunt trauma is one of major causes of visual impairment worldwide ocular trauma can result in wide spectrum of complications. It is a common yet avoidable cause of blindness. So this study will be conducted at our institution to study the etiological factors, demographic pattern and visual prognosis in patients with ocular blunt trauma. **Material and Method:** This study was an observational prospective study and was done at a tertiary care teaching hospital, over a period of 1 and ½ years. During this period data collection was done for 1st year and the data analysis done in next 6 months. During this study, sampling was done by total consecutive sampling of patients who fulfil the inclusion criteria and willingly participated in the study with written informed consent. The sample size was decided at the end of data collection only. Data analysis was performed on the data using appropriate method. **Results:** The study group included 163 Males and 20 females & male to female ratio of 8.1 : 1. Our study also found that involvement of LE was more common than RE, about 122 (66.66%) patients had their LE involved & 42 (22.95 %) RE & 19 (10.38%) with BE involved. Majority of the patients (61 patients, 33.3%) who sustained trauma belonged to the 31–40 years age group. Among the causes of injury, non agricultural injuries were most common amounting to about 98.36% out of which RTA related injuries were (95 patients 51.91 %) followed by assault (46 patients 25.14%) & others like self fall, sports injuries or occupation related injuries were (39 patients 21.31%) with very few agricultural injuries (3 patients 1.64). About 8 patients had VA of <6/60, 100 patients had V.A of 6/60-6/18 & 75 patients with V.A >6/18. **Conclusions:** Ocular blunt trauma is a one of major causes of visual impairment worldwide. The incidence of ocular injuries is on the rise with increased industrialization and modernization. It is a common yet avoidable cause of blindness in developing and developed countries. Early diagnosis and proper management can help in reducing the grave morbidities and can offer good rehabilitation in many such cases.

KEYWORDS

Ocular blunt trauma, Etiology, Demographic Profile, Visual Prognosis.

INTRODUCTION:

Ocular blunt trauma is a one of major causes of visual impairment worldwide. OBT comprises all closed globe injuries in which mechanical deformation and/or direct energy delivery causes ocular damage.^[1] It is one of the common cause of ophthalmic morbidity and monocular blindness in all parts of the world.^[2] The incidence of ocular injuries are on the rise with increased industrialization and modernization. Many ocular traumas are an avoidable cause of blindness and visual impairment.^[3] Early diagnosis and proper management can help in reducing the grave morbidities and can offer good rehabilitation in many such cases. Recognition of the public health importance of ocular trauma has sparked growing interest in studies on eye injuries.^[4] In India the reported incidence of ocular trauma varies from 1% to 5%.^[5]

So the purpose of this study at govt. medical college & hospital was to study the common etiological factors, demographic pattern and visual prognosis in patients with OBT which may help in proper diagnosis and management of such patients with OBT to avoid grave outcomes.

This study was an observational prospective study done at a government medical college & hospital, over a period of 1 and ½ years. During this period, data collection was done for 1st year and the data analysis done in next 6 months. sampling method was by total consecutive sampling of patients who fulfil the inclusion criteria and willing to participate in the study with written informed consent or assent (Guardian's written informed consent)

AIM:

To estimate the Etiology, demographic profile & visual prognosis in ocular blunt trauma.

Settings and Design

Study design: An Observational prospective study.

Place of study: Department of Ophthalmology, Government medical college & Hospital Miraj.

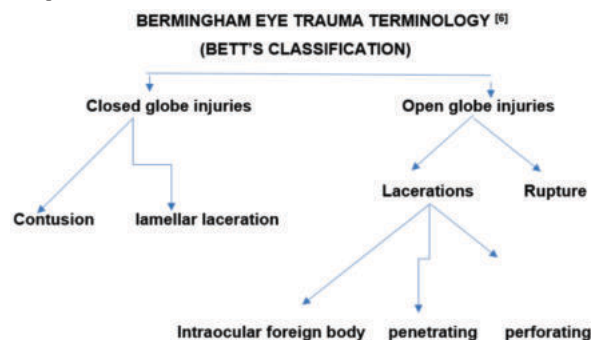
Duration of study: One and half years.

Sampling method and sample size: Total consecutive sampling of the patients satisfying the inclusion criteria, Duration based (Aug 2019 to Jan 2020)

Sample size: 183

MATERIAL & METHOD

This study included 183 cases of OBT (according to BETT'S classification) who attended the OPD & casualty Department of Ophthalmology of our institution for a period of six months. All patients underwent a comprehensive ocular examination along with complete ophthalmic history with detailed radiological examination whenever required. All the cases were appropriately treated and followed at regular intervals to assess the visual outcome and complications.



Inclusion criteria:

All patients of both sexes with ocular blunt trauma (according to BETT'S classification) who are willing to participate in the study with written informed consent or assent (Guardian's written informed consent) and who followed up at least upto 1 month post trauma.

Exclusion criteria:

1. Perforating, penetrating and/or chemical injuries of eye.
2. Intraocular foreign bodies.

- Globe rupture and firearm injuries.
- Patients with preexisting traumatic cataracts or optic neuropathies or preexisting ocular co morbidities.

Detailed procedure of study conduct:

The study was conducted at Department of ophthalmology, at government medical college & hospital. The cases were taken from patients fulfilling the inclusion criteria of the study plan and attending the ophthalmology department during the study period. Written and informed consent of all patients included in the study were taken after fully explaining the procedure and purpose of study to patients., in case patient is incompetent consent of guardian or authorised representatives were taken. A detailed proforma devised containing all essential details for each individual. The patients were asked about their age, sex, occupation and address, complaints and other co morbid conditions like Hypertension, Diabetes Mellitus, etc will be taken for medical records. Patients were asked in detail about their trauma, like mode of injury, agents causing injury, presentation time since the trauma etc.

After all the detailed history a comprehensive clinical ophthalmic examination done, details of which given below;

In our study after the detailed history the patients with OBT are managed in the following way:

- Snellen visual acuity measurement
- External examination under torch light & slit lamp
- Examination of posterior segment with ophthalmoscope (direct & indirect)
- X-ray orbit
- CT scan brain + orbit
- USG- B scan orbit
- OCT

After taking detailed history, anterior segment is thoroughly examined with torch light & slit lamp .then visual acuity of the patient is tested. Following which detailed examination of the posterior segment is done using direct & Indirect ophthalmoscope. Following this baseline examination patient is given proper 1st line of management which is possible and achievable at our institute. Further ,for appropriate an apt diagnosis investigations like X- ray orbit, USG- B scan orbit, CT scan brain + orbit and OCT which are available in the institute are advised whenever required .

After the 1st line of treatment the patients are asked to follow up after 7 days and following is tested:

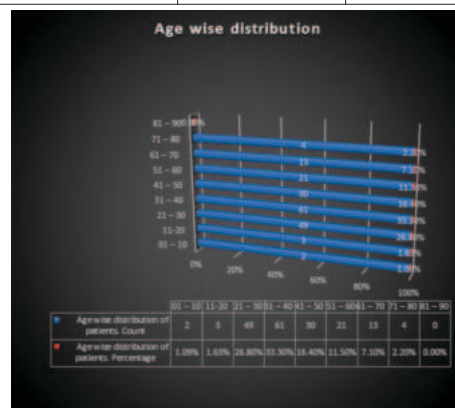
- Snellen visual acuity measurement
- External examination under torch light & slit lamp
- Examination of posterior segment with ophthalmoscope (direct & indirect)
- X-ray orbit
- CT scan brain + orbit(whenever required according to the clinical profile)
- USG B-scan orbit
- OCT
- Similarly, patients were asked to follow up 15 days & 30 days after the 1st visit and following assessment is done:
 - Snellen visual acuity measurement
 - External examination under torch light and slit lamp.
 - Examination of posterior segment with ophthalmoscope (direct & indirect)
 - X-ray orbit
 - CT scan brain + orbit (whenever required according to the clinical profile)
 - USG- B scan orbit
 - OCT

RESULTS:

Total Patients, Eye Involvement and Population Involved.

Total Patients		
Particular	Count	Percentage
Male	163	89.07 %
Female	20	10.92 %
Eye Involvement		
Right Eye	42	22.95
Left Eye	122	66.66
Both Eyes	19	10.38
Population Involved		

Urban	128	69.94
Rural	55	30.05



Age wise distribution of patients

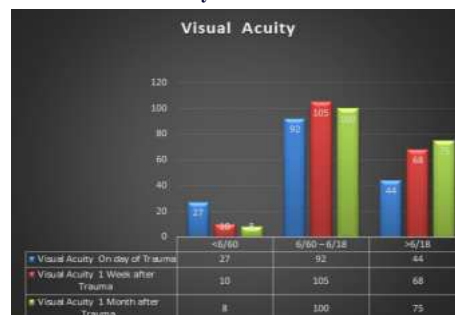
Occupation, Mode of injury, Agents causing Injuries.

Particular	Count	Percentage
Occupation		
Farmer	19	10.38 %
Home maker	16	8.74 %
Students	34	18.58 %
Private Job	58	31.69 %
Other	56	30.60 %
Mode of injury		
Agricultural	03	1.64 %
Non – Agricultural		
01. Assault	46	25.14 %
02. RTA	95	51.91 %
03. Others	39	21.31 %
Agents causing Injuries		
Stick	13	7.10 %
Stone	04	2.19 %
Ball	02	1.09 %
Fist	25	13.66 %
Metal	06	3.28 %
Fall	127	69.40 %
Glass	01	0.55 %

[RTA – Road Traffic Accident]



Presentation time in our study:



Visual Acuity

Ocular manifestations of blunt trauma seen in our study:

Ocular Structures involved	Findings	Count	Percentage	Treatment Given
Lids and adnexa	01. Lid oedema / Ecchymosis	128	69.95	M
	02. Abrasions	36	19.67	M+S
	03. Lid Lacerations	74	40.44	M+S
Conjunctiva	01. Sub Conjunctival Hemorrhage	54	29.51	M
	02. Conjunctival tear	02	1.09	S
Cornea	01. Abrasions or Opacities	04	2.19	M
	01. Lacerations	01	0.55	M+S
Iris	01. Iris avulsions	06	3.28	O
	02. Hyphema	03	1.64	M+R
	03. Traumatic uveitis	02	1.09	M+O
	01. Traumatic Mydriasis	55	30.05	O
Lens	01. Lens Subluxations	02	1.09	R
	02. Traumatic cataract	01	0.55	O+R
Posterior Segment	01. Retinal detachment	02	1.09	R
	02. Vitreous Hemorrhage	03	1.64	O+R
	03. Optic atrophy	06	3.28	M
	04. Secondary Glaucoma	00	0.00	-

[M- medical Management , S -Surgical Repair , R – Referral to higher centre, O– Observation]

DISCUSSION;

According to estimates of world health organization (WHO), the global annual incidence of ocular trauma is around 55 million^[7] and worldwide blindness in 1.6 million people is due to ocular trauma^[8], of which 7,50,00 cases require hospitalization each year.^[9] Socio-economic burden of ocular trauma is high involving a huge cost in human unhappiness, economic inefficiency and monetary loss^[10]. Its direct and indirect costs are known to run into millions of dollars annually^[7]. The age distribution for the occurrence of serious ocular trauma is bimodal with the maximum incidence in young adults and second peak in elderly.^[11] It has been reported that incidence of eye injury decrease with increasing age.^[12]

In our study total of 183 patients with OBT who fulfilled the inclusion criteria were studied, and the following observations were made: The study group included 163 Males and 20 females (male to female ratio of 8.1 :1) it has been seen Worldwide also the typical male to female ratio of closed globe injuries is 4:1^[13] Out of these about 122 (66.66%) patients had their LE involved & 42 (22.95 %) RE & 19 (10.38%) with BE involved [Table 1]. The age distribution of the patients is shown in Table 2.

Majority of the patients (61 patients, 33.3%) who sustained trauma belonged to the 31–40 years age group [Table 3].

In our study, 137 patients (74.86%) presented within 48 hours of the trauma likewise in Nigeria and Pakistan (Lahore) similar numbers of patients (38%) were presented for ocular trauma within 24 hours and also in Uttarakhand, India 52.27% patients were reported within 24 hours^[7,14,15], 35 (19.12%) presented after 48 hours but before 7 days, but in Nigeria 32.5% patients had reported in the same period^[7,10] while 11 patients (6.01%) after 7 days of injury. After 7 days, 6%, 12.7%, patients had reported in Egypt, India respectively^[7,10]. The variations in presentation time might be due to the most of the patients who visited late to the hospital were from rural areas and reasons may be i. Poor access to health care services in rural areas
ii. Lack of awareness about the importance of early diagnosis and treatment of ocular injuries among the rural population.
iii. Difference in economic well being of the different population across the state.

Our study also found that involvement of LE was more common than RE involvement. About 122(66.66%) patients had their LE involved & 42 (22.95 %) RE & 19 (10.38%) with BE involved [Table 1]. This predominance of the left eye injuries may be explained by the fact that most people are right handed, their left cerebral hemisphere is dominant so by reflex action involuntarily brain tries to protect the right side of the body in any alarming situation so that the dominant side is protected, also in assaults the left eye of the victim is the one which is more vulnerable to attack from a right handed person.

Among the causes of injury, non agricultural injuries were most common amounting to about 98.36% out of which RTA related injuries were 95 patients 51.91 %) followed by assault (46 patients 25.14%) & others like self fall, sports injuries or occupation related injuries were (39 patients 21.31%) with very few agricultural injuries only (3 patients 1.64%). Out of these fall was the most common mode of injury noted (127 patients 69.40%). In a study named Study JUDO showed the most common causes of injury were violence related in 37.2% of the documented cases^[16] This may differ state to state country to country due to the differences in culture /work pattern /availability of health care etc.

Blunt trauma can affect any ocular structure. In this study, we found that eyelid was the most commonly involved ocular structure with almost 128 patients (69.95%) with lid edema /ecchymosis, 36 patients (19.67%) with lid abrasions & 74 patients (40.44%) having lid lacerations these were neither grave nor site threatening & were managed conservatively & surgically whenever & wherever required. After eyelids subconjunctival hemorrhage was the next common finding noted in about 54 patients (29.51%), it also didn't require any intervention all were resolved on their own & Given supportive treatment wherever required.

In this study on blunt trauma, it was found that patients with traumatic mydriasis were quite in number measuring to 55 patients (30.05%). Other ocular manifestations were very few like iris avulsion 6 patients (3.28%), hyphema 3 patients (1.64%) Hyphema which were treated with Conservative management with bed rest, pressure bandage and topical steroids, cycloplegics and antiglaucoma therapy only 1 patient required AC wash to clear the hyphema, Traumatic lens subluxation in 2 patients were referred to higher center.

In our study, only one patient showed evidence of traumatic cataract during their follow-up visit. They were managed conservatively and advised regular follow-up visits to plan cataract surgery if the vision gets impaired. As OBT affected anterior segment it also damaged posterior segment likewise in few patients, where traumatic optic atrophy which has the most dreadful visual prognosis was seen in 6 patients with absolute loss of vision (no perception of light) in 3 patients, Vitreous hemorrhage was noted in 3 patients in our study, which was diagnosed on B-scan and managed conservatively & referred to higher center. Although most causes of vitreous haemorrhage are non-traumatic (diabetic retinopathy, sickle cell disease, posterior vitreous detachment, retinal vein occlusion, leukemia), trauma accounts for 12%–31% (in various studies) and is the most common cause of vitreous hemorrhage in younger patients^[17,18], also traumatic R.D was noted in 2 patients diagnosed on B-scan were referred to VR surgeon.

OBT is one of major causes of visual impairment worldwide. Ocular trauma can result in wide spectrum of complications. it is a common yet avoidable cause of blindness.

We found that in our study the patients who presented early and had only mild ocular involvement such as [lid edema /ecchymosis, Abrasions, Lid Lacerations, corneal abrasion /opacities/lacerations, SCH conjunctival tears] with mild visual impairment like in injuries lid edema due to the trauma had a good visual prognosis after 1 month of the treatment like seen but patients who presented late or had severe ocular injuries [hyphema, traumatic uveitis/traumatic optic atrophy/traumatic subluxation/vitreous. Hemorrhage/retinal detachment]. With severe visual impairment had poor visual prognosis after 1 month of treatment. Such that about 8 patients had VA of <6/60, 100 patients had V.A of 6/60-6/18 & 75 patients with V.A >6/18. In a study conducted in Dhulikhel hospital, Nepal, 83.92% patients presented with VA of better than 6/12 and only 2.67% patients were under blindness category^[19]. This might be due to discrepancies on the severity & mode of ocular trauma & certain other indirect factors.

[OBT – Ocular blunt trauma, RE – Right Eye, LE – Left Eye, BE – Both eyes, RTA – Road Traffic Accident, AC -Anterior chamber, R.D- Retinal Detachment, VR- Vitreo-Retinal, SCH – Subconjunctival hemorrhage, V.A-visual acuity]



Fig.1 Subconjunctival hemorrhage



Fig. 2. Traumatic Mydriasis with Traumatic cataract



Fig. 3. Ecchymosis



Fig. 4. Lid laceration

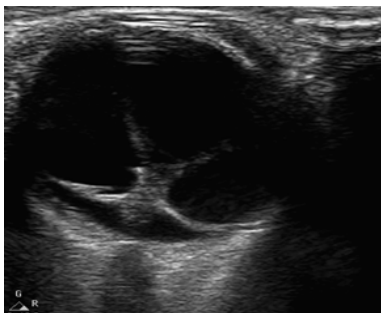


Fig.5. B-scan Retinal Detachment



Fig.6. Contused Lacerated Wound

CONCLUSIONS:

So our study shows that OBT in the Indian population involves mainly young males & were RTA related and associated with involvement of multiple ocular structures more commonly involving LE. If its mild and treated properly & in time it has Good chance of complete recovery and good visual prognosis. But few complications like retinal detachment and traumatic optic neuropathy, vitreous haemorrhages require referral to tertiary care centres for surgical management and have a poor visual prognosis. Thus, in patients with ocular trauma early diagnosis and proper timely treatment of ocular injuries can reduce the ocular morbidity and can aid in having Good visual prognosis. Creating awareness for eye protection is important. Better road traffic rules and educating the public regards protection of eye at work places. Creating awareness among school children regarding eye protection during sports activity is also important

Financial support and sponsorship

Nil

Conflicts of interest

There are no conflicts of interest.

Summary

The study on 183 patients with blunt injury to the eye had 163 male patients and 20 female patients. Out of which 128 patients were urban population & 55 were rural population.

Male: Female ratio was 8.1: 1 Age group with more incidence of blunt trauma was 31 - 40 years. Road traffic accidents had highest incidence among all injuries. Among non-RTA patients assault related injuries were more common. Most common agent causing injury was fall. Eye most commonly involved in our study is left eye. In our study, 137 patients (74.86%) presented within 48 hours of trauma.

Vision on presentation was from no perception of light to 6/6. Most of the patients about 92 presented without Good vision of 6/60 – 6/18 which on further follow up had improvement. Few patients had no perception of light due to optic nerve injury. On follow up few patients worsened due to delayed optic nerve injury or retinal detachment/ vitreous hemorrhage. All the patients received proper medical or surgical management and referred to higher center whenever required.

Lid edema / ecchymosis were the most common about 128 patients (69.95%) and all patients managed with medically.

Patients with lid laceration and abrasions managed with surgical repair out of which 16 patients were referred to higher center for further management.

Sub conjunctival hemorrhage and chemosis subsided completely. conjunctival tear healed without any complication.

4 patients had corneal abrasion out of which 2 healed completely & 2 developed corneal opacities in subsequent follow up.

We found 3 patients with hyphema, of which 2 responded to medical management and 1 patients needed paracentesis so was referred to higher center. None of the patient developed corneal blood staining or optic nerve head damage.

Only 2 patients showed traumatic uveitis on their follow up visits & responded poor to topical steroids & developed chronic uveitis probably due to poor compliance of patients to the treatment.

Traumatic mydriasis was managed conservatively. None of them required sphincter tear suturing.

1 patient with traumatic cataract with zonular dehiscence had visual acuity of < 6/60 which was observed for few follow ups & then referred to higher center for cataract extraction and PCIOL implantation.

2 patients with subluxated lens had lens removal and were advised Secondary IOL implantation.

3 patients presented with vitreous hemorrhage. All the patients were kept under observation had poor visual prognosis & referred to higher center.

2 patients with retinal detachment referred immediately higher center for surgical management out of which 1 patient showed Good & functional Anatomical reapposition of retina & improvement in visual acuity in subsequent visits while the other patient didn't respond & the visual outcome was very poor of about HMCf to CFCF only.

2 patients had optic nerve avulsion following severe RTA and had no perception of light on presentation.

4 patients had indirect optic neuropathy they were treated with intravenous methyl-prednisolone. None of them showed visual improvement. Vision deteriorated to no perception of light. We didn't find any patient of secondary glaucoma in our study.

[PCIOL – Posterior chamber intraocular lens, IOL - intraocular lens, HMCf – Hand movement close to face, CFCF – Counting. Finger close to face, RTA- Road traffic accident]

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