



SECULAR TRENDS OF OPHTHALMIC MANIFESTATIONS IN CLOSED HEAD INJURY PATIENTS.

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ABSTRACT

Introduction – Ocular morbidities are frequently associated with closed head injury. These injuries are often ignored or treatment is delayed resulting in permanent visual loss.

Aim- This study aimed to find out the various Ophthalmic manifestation in patients of closed head injury and find out an association between them.

Method- A Prospective observational study was conducted with a total of 120 closed head injury patients in a tertiary care hospital for a period of 4 months. The initial ophthalmic examination was done within 12 hrs of admission and was reviewed daily. GCS was applied to grade the head injury and analysis was done to find out the association.

Results- Out of 120 enrolled patients, 88 cases were male and 32 were female patients in age group of 6 to 70 years. Most common cause of sustaining head injury was road traffic accident followed by assault. Periorbital edema and ecchymosis was most common manifestation. RAPD was encountered as most common neuro-ophthalmic manifestation followed by disc edema and extraocular muscle restriction. Poor GCS is associated with frequent pupillary involvement.

Conclusion – Young adult males are more vulnerable in sustaining ocular injury associated with head injury followed by road traffic accident. Poor GCS frequently involves pupil abnormality.

KEYWORDS : Closed head injury, Ophthalmic manifestation, RAPD.

INTRODUCTION-

Head injuries are one among major cause of hospitalization now a days owing to increase in number of accidental trauma. Ocular trauma associated with head injury leads to unilateral or bilateral loss of vision particularly in developing nation like India. Many a times ophthalmic work up is delayed in hospital resulting in permanent vision loss. Such outcomes make the patient handicapped and dependant on others for the rest of their lives.

Therefore prompt ophthalmic examination is of utmost **Glasgow coma scale**

importance in assessing the prognosis and reducing the ocular morbidities (1).

METHOD AND MATERIAL-

The study included prospective analysis of 120 cases of closed head injury and hospitalized at our centre. The patients were enrolled from a period of December 2019 to March 2020. The surgical team diagnosed the cases as closed head injury and applied the Glasgow Coma Scale to assess the severity of injury and for prognosis.

| Glasgow Coma Scale | | | | | | | |
|--------------------|-------------------------------|--------------------|--------------------------------|-------------------------------------|---|------------------------------|----------------|
| | Not Testable (NT) | 1 | 2 | 3 | 4 | 5 | 6 |
| Eye | Ex: severe trauma to the eyes | Does not open eyes | Opens eyes in response to pain | Opens eyes in response to voice | Opens eyes spontaneously | N/A | N/A |
| Verbal | Ex: Intubation | Makes no sounds | Makes sounds | Words | Confused, disoriented | Oriented, converses normally | N/A |
| Motor | Ex: Paralysis | Makes no movements | Extension to painful stimuli | Abnormal flexion to painful stimuli | Flexion / Withdrawal to painful stimuli | Localizes to painful stimuli | Obeys commands |

Patient is categorized into mild (13-15), moderate (9-12) , severe (<8) according to score.

Initial Ophthalmic assessment was done within 12hrs of hospitalization. The Ophthalmic team daily reviewed the patients until they were discharged from hospital.

Ophthalmic assessment included visual acuity(whenever possible),torch light examination, slit lamp examination (whenever possible) for anterior segment evaluation, pupillary response, ocular movement assessment, fundus examination, gonioscopy, diplopia charting, IOP measurement, Xray, CT Scan was done (whenever indicated).

Ocular and visual injuries were broadly divided into three groups

- 1) Soft tissue injury to globe and adnexa
- 2) Neurophthalmic injuries
- 3) Injury to bony orbit

Patients were appropriately managed by surgical and ophthalmic units.

RESULT-

Out of 120 cases 88 cases were male and 32 were female (Table-1). Age of the cases ranged from 6 years to 70 years with maximum number of cases between 20-30 years. This shows majority of the cases included young adult males.

Road traffic accident (RTA) was most common mode of sustaining head injury followed by assault (Table-2). 80 cases

(66.6%) were due to RTA and 27 cases (22.5%) were due to assault. Other causes of sustaining head injury included fall from height, pedestrian hit, hit by cattles.

The right, left and both eye combined were injured in ratio of 1:1:2 respectively.

Table -3 shows the frequency of ophthalmic manifestations. They included soft tissue injury to the globe and adnexa, neurophthalmic manifestation, fracture of orbit. The most frequent soft tissue injuries were periorbital ecchymosis(36 cases), subconjunctival hemorrhage(24cases). Among neurophthalmic manifestation most common was RAPD (15 cases) followed by disc edema(5 cases). Other studies have reported fracture of bony skull. 16 cases were reported by Anu Malik et al, 11 cases by Rashmi Kumari et al, 5cases by NSD Raju.

CT findings of head suggested 30% patients had linear undisplaced fracture of skull bone. 22% had haemorrhagic contusion, 16% had subdural hematoma. Other CT findings include subarchnoid hemorrhage, Extradural hemorrhage, hemosinus.

Upon analysis of GCS with ophthalmic manifestation, it was found that 80% of patients with GCS < 10 were associated with pupillary involvement.

DISCUSSION -

Road traffic accident being the leading cause of trauma in young working generation in developing country like India. Head injuries constitute major morbidity and eyes are frequently involved. So it should be ensured that prompt ophthalmic assessment and treatment should be delivered as soon as possible to prevent permanent vision loss. Incidence of RTA is around 10% worldwide (2). According to our study high velocity impact due to RTA is the commonest cause of head injury.

Our study was done in 120 patients of closed head injury admitted in casualty ward with ophthalmic findings. In our study the age of patients ranged from 6 years to 70 years with mean age of around 30 years. Males are affected more (73.3%) than females (36.67%). Other study showed similar pattern with predominant male population (Table-1).

Out of 120cases, 80 cases were due to road traffic accident. 27 cases were due to assault and 13 cases were due to other causes like fall from height, pedestrian hit. However study by Anu malik et al showed 130 cases due to road traffic accident, 34 cases due to assault. Similar pattern was noticed by Rashmi Kumari et al with 52 cases of road traffic accident, 19cases of assault (Table-2). Study done by Damayanti M et al showed 108 cases (60%) due to RTA and 44 cases (24.44) due to assault (3).

Periorbital ecchymosis was found in 36 cases out of 120 cases in our study making it the most common ophthalmic (overall) and soft tissue and adnexal injury. Similar results were found in other studies by Anu Malik et al (39 cases), Rashmi Kumari et al (39 cases), NSD Raju (12 cases) (Table -3).

The incidence of subconjunctival haemorrhage was 20% (24 cases). Other studies showed the incidence of 10.5%, 23.25%, 12.5% by Anu Malik et al, Rashmi kumari et al and NSD Raju respectively. The subconjunctival haemorrhage and periorbital edema/ecchymosis combined was found in 40 cases.

Out of 15 cases which showed neurological involvement in the form of RAPD, 8 patients recovered vision 6/6. Only 3patients were left with vision < 6/60 and 4 patients had recovered vision in the range of 6/60-6/9. Out of these poor vision patient 5

patients had RAPD on follow up, implying RAPD is not always associated with poor visual outcome in head injury patients (p=0.5). The grading of pupillary reaction in different grades of RAPD is as follows

- Grade 1- Weak initial constriction and redilatation.
- Grade 2- Initial stall and redilatation.
- Grade3- Immediate pupillary dilatation.
- Grade4- Immediate pupillary dilatation following prolonged illumination of the good eye for 6 second.
- Grade 5- Immediate pupillary dilation with no secondary constriction.

International optic nerve trauma study showed visual acuity improvement of >3 lines in 57% of untreated group, 52% of the group that received steroid alone and 32% of the group that underwent surgery. This difference among groups was not statistically significant(4).

In unconscious and comatose patient ocular movement assessment within first few hours of head injury was not possible. Also 3rd nerve misdirection manifests few month after trauma. Subtle optic neuropathy might have been missed due to impaired cognitive function of patient in immediate posttraumatic phase while performing contrast sensitivity, colour vision, visual field testing.

Study done by kulkarni et al (5) showed higher incidence of ocular finding when ophthalmologist participate in the examination of head injury patient.

In our study, there were 5 patients with lateral rectus palsy. Exotropia and esotropia are common sequelae following head injury. Squint occur either due to nerve palsy or entrapment of muscle at fracture site. Cinfrede et al(6) found strabismus in 25% of cases.

Out of 15 patients with poor GCS,80% (12 cases) of patients had neurophthalmic findings suggesting strong association with severe head injury. Similarly Masila et al concluded that a positive correlation was seen between severe head injury (GCS<8) and occurrence of ocular signs(7).

Table-1

| | OUR STUDY | ANU MALIK et al | RASHMI et al | NSD Raju |
|--------|------------|-----------------|--------------|-----------|
| MALE | 88(73.33%) | 172(91%) | 74(86.04%) | 33(82.5%) |
| FEMALE | 32(26.67%) | 17(9%) | 12(13.41%) | 7(17.5%) |

Table-2

| | OUR STUDY | ANU MALIK et al | RASHMI et al | NSD Raju |
|---|------------|-----------------|--------------|-----------|
| RTA | 80(66.67%) | 130(68.8%) | 52(60.46%) | 19(47.5%) |
| ASSAULT | 27(22.5%) | 34(18%) | 19(22.09%) | --- |
| OTHERS (Fall from height, pedestrian hit) | 13(10.83%) | 25(13.2%) | 15(17.44%) | 13(32.5%) |

Table-3

| Type of Injury | | OUR STUDY | ANU MALIK et al | ANU MALIK et al | NSD Raju |
|-------------------------|---------------------------------|-----------|-----------------|-----------------|----------|
| Soft tissue injury | Edema/ ecchymosis | 36 | 39 | 39 | 12 |
| | Subconjunctival haemorrhage | 24 | 20 | 20 | 5 |
| | Lid tear | 21 | 6 | 6 | ---- |
| Neuro-ophthalmic injury | RAPD | 8 | 27 | ---- | 8 |
| | Extra Ocular Muscle restriction | 5 | 16 | 28 | ---- |
| | Disc edema | 5 | ---- | 11 | ---- |

| | | | | | |
|------------------------|--|------|------|------|---|
| Fracture to bony orbit | | ---- | ---- | ---- | 5 |
|------------------------|--|------|------|------|---|

CONCLUSION –

The most common manifestation in eye was lid ecchymosis and subconjunctival hemorrhage. RAPD is the most common neurophthalmic manifestation but it is not always associated with poor outcome. We emphasis on integrating ophthalmic assessment in head injury patents to reduce the late/missed diagnosis. Ophthalmic assessment with GCS helps in prognosticating the outcome.

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