

**Original article:**

## **Visual outcome in traumatic optic neuropathy in road traffic accident after steroid treatment**

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### **Abstract:**

**Introduction:** Optic neuropathy is a potential blinding complication of head or orbital trauma. The most common form of traumatic optic neuropathy is indirect damage to the optic nerve

**Aim:** Aim of this study to assess the visual outcome in traumatic optic neuropathy in Road Traffic Accident after Steroid treatment.

**Methods:** Prospective study of RTA cases in a tertiary care hospital to find the visual outcome in traumatic optic neuropathy. Patients were clinically examined, vision was checked and steroids were administered.

**Results:** Maximum of RTA in 21 to 30 years, 34.02%, maximum number of ocular injuries happened in two wheeler accidents. 28.5% of patients vision were improved after injury with steroid treatment, 4.7% had no change in vision.

**Conclusion:** Ocular injury as and when occurred has to be tackled urgently and methodically if the final visual outcome is to be improved.

**Keywords:** trauma, optic neuropathy, vision outcome, corticosteroids

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### **Introduction**

The eyeball is a fairly well protected structure in our body. The eye is protected from direct injury by the lids, eyelashes, and the protecting margins of the orbit. Physiologically, it is protected by the blink reflex, head turning reflex, and lacrimation which follows intrusion of any irritant material. Despite these protective mechanisms, injuries to the eye are commonly found<sup>1</sup>. Mechanical injuries to eye can occur in a variety of ways and produce myriad clinical sequelae. Like any other part of the body eyes are also not exempt from these injuries, in spite of being protected by lids, projected margins of orbit, the nose and the cushion of fat from behind. Ocular injury due to mechanical trauma is one of the major health problems in India. The majority of injuries are sustained by active and productive individuals<sup>2</sup>. Unfortunately these injuries are often vision threatening and the lifestyle and future of the injured individual is irrevocably altered.

### **Aim**

Aim of this study to assess the visual outcome in traumatic optic neuropathy in Road Traffic Accident after Steroid treatment.

### **Materials and methods**

This was a prospective study conducted on 144 cases of ocular trauma in road traffic accident attending tertiary care hospital were studied. Institutional Ethics committee and Informed consent from selected patients were obtained. Patients with ocular injury were randomly included in the study. Patients of all ages, both males and females irrespective of economic status, who are co-operative, were included in the study. Patients who were unconscious, not co-operative and terminally ill were excluded. Patients with ocular injuries other than road traffic accidents are excluded from the study. Detailed work up was done of the patients with ocular trauma in road traffic accidents, which included a detailed trauma history, whenever

possible from the patient himself and if necessary from the relatives. History of preexisting ocular and medical trauma was also recorded. Paraform was drawn up and following details were recorded for each patient with ocular trauma; age and sex, type of vehicle the patient was travelling in, presence or absence of protective eye wear and sign and symptom following the injury.

**Results**

In 144 cases, maximum number of RTA cases in 21 to 30 age group 34.02% followed by 43 cases 29.84% in 31 to 40 age group. Out of 144 patients, 130 patients (90.3%) who sustained ocular injury were males and 14 patients (9.7%) were females.

**Table 1 Type of Vehicle involved in ocular injuries**

Type of vehicle	Number of Cases	Percentage
2 Wheeler	123	85.4
3 Wheeler	4	2.8
4 Wheeler	13	9.0
Pedestrians	4	2.8

Maximum incidence of ocular injuries was seen among those traveling by two wheelers, 123 patients (85.4%) sustained injuries while traveling in 2 wheelers, 4 patients (2.8%) in 3 wheelers, 13 patients (9.0%) in 4 wheelers and 4 patients (2.8%) were pedestrians.

**Type 2 Eye Involved**

Eye involved	Number of Cases	Percentage
Unilateral	130	90.2
Bilateral	14	9.72

130 patients (90.2%) had unilateral involvement and 14 patients (9.72%) had bilateral involvement. In our study unilateral injuries were seen in 90.3% and bilateral in 9.7%. In the study done by Kriedl et al (2003)<sup>3</sup>, unilateral injuries were seen in 95.1% of patients and bilateral in 4.9%.

**Type 3 Ocular Involvement**

Ocular involvement	Number of Cases	Percentage
Orbital	33	22.91
Lids	117	81.25
Conjunctiva	92	63.8
Cornea	12	8.33
Sclera	5	3.47
Anterior chamber	8	5.55
Pupil	31	21.52
Lens	6	4.16
Posterior segment	15	10.41
Cranial nerves	25	17.36

**Table 4 Cranial Nerve Involvement**

Cranial nerve	Number of Cases	Percentage
Optic Nerve	21	14.5%
Oculomotor nerve	4	2.77%

Out of 144 patients, Cranial nerves were involved in 25 patients (17.36%). Traumatic optic neuropathy was seen in 21 patients (14.5%), Oculomotor nerve was involved in 4 patients (2.77%).

**Table 5 Vision Outcome**

Nerve Involved	Vision			P value*
	Improved	Static	Worsened	
Optic Nerve	6	1	14	<0.0001
Oculomotor Nerve	0	4	0	

\*Pearson chi square test

Out of 21 patients there is improvement in vision in 6 patients who were presented to us early and they were treated with injection methylprednisolone 500 mg intravenous twice a day for three days followed by tablet prednisolone 1mg/ kg body weight for 11 days. The rest 15 patients were also treated with steroids but they presented late and hence there is no improvement in vision. The national acute spinal cord injury study established the current treatment protocol for the

management, which indicates that treatment should be started within 8 hours of injury.

**Discussion**

This study of 144 patients with ocular injuries following road traffic accidents, demonstrates a wide spectrum of serious ocular injuries. Traumatic optic neuropathy can cause optic nerve morbidity such as loss of vision, deficits in visual fields, colour perception and an afferent pupillary defect. The

diagnostic features of traumatic optic neuropathy are visual loss that occurs in the presence of relative afferent pupillary defect following trauma. The commonest site of indirect optic nerve injury is the optic canal. Chou et al<sup>4</sup> has proposed that the damage of optic nerve at microscopic level, including contusion necrosis, nerve fibre tears and nerve infarction secondary to closed space edema, hemorrhage, thrombosis, vasospasm, impingement by bone spicules and shearing of dural vessels in the optic canal. All our patients with traumatic optic neuropathy were young male, mostly at the age of 20-30 years old which is consistent with other studies. Motor vehicle accidents were the main cause of traumatic optic neuropathy in our study. Similar findings were showed in Sadeghi-Tari<sup>5</sup> study. The treatment of traumatic optic neuropathy includes keeping patients under

observation, administering corticosteroid therapy, or performing optic nerve decompression with or without steroid therapy. In our study no surgical optic canal decompression was performed because none of our patients had optic canal fracture or optic nerve impingement in radiological investigation. Methylprednisolone therapy was advocated as the initial treatment of choice because of its neuroprotective mechanism.

#### **Conclusion**

Common mode of ocular injury in road traffic accidents is two wheelers. Poor visual outcome was seen in traumatic optic neuropathy with late presentation and poor vision at presentation. We could also found that patients with at least perception of light vision on presentation improved with treatment.

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