Case Report

Ocular Injury & its medico legal implications

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Abstract
Forensic Medicine is fast growing and important branch of medicine. Some sub division of this subject like Thanatology, Toxicology are taking their shape separately. Forensic Ophthalmology is one of the newly emerging dimension of the subject. A series of four case reports of medico legal implication are presented herewith.

Keywords : Ocular Injury, RTA, Alkali burn.

Review of literature
Application of knowledge of Ophthalmology to clarify or solve legal problem or issues constitutes Forensic Ophthalmology and medicolegal ophthalmic examination of living or dead is a major component of it. The examination of eye opens up plethora of information to an Ophthalmologist with reference to ocular disease. But for various medicolegal purposes examination of eye is also of significant quantum in itself. Condition of pupils, Strabismus, Nystagmus, play important role in case of poisoning and help the treating physician in excluding or including various differential diagnosis.1

Postmortem changes in cornea and retinal vessels are also relied upon for determining time since death, of course it is limited to few hours after death.2 Many of the recent work include analysis vitreous humor in estimating time since death. One such recent work comprising of 492 samples indicates that in 153 cases the prescribed value was found and in 339 cases there was over estimation.3

Behra et al in the study of 120 cases has drawn useful conclusion that for estimation of age detail examination of the eyes is helpful, postmortem time interval can be estimated from IOT, reaction to meiotic and mydriasis in the early periods and SGOT level of the vitreous in the late periods after death and eye injuries can predict different types of head injuries.4 Broadly the ocular injuries can be divided on the basis of type of structure involved as below.5

<table>
<thead>
<tr>
<th>ANTERIOR SEGMENT INJURY</th>
<th>POSTERIOR SEGMENT INJURY</th>
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<tr>
<td>1. Lid</td>
<td>1. Traumatic macular mole/macular cyst</td>
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<td>2. Conjunctiva</td>
<td>2. Traumatic retinal dialysis or detachment</td>
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<td>3. Cornea</td>
<td>3. Choroidal tears</td>
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<td>4. Traumatic angle recession</td>
<td>4. Avulsion of optic nerve</td>
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<td>5. Traumatic mydriasis and iridodialysis</td>
<td>5. Indirect traumatic optic Neuropathy</td>
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In addition, secondary glaucoma, Hypopion, Iridodialysis, traumatic cataract, dislocation of lens, choroidal rupture, retinal injury, Putscher retinopathy, retrolateral fibroplasias etc. has been exhaustively described in medical literature.6 Impaired vision, abnormality of ocular muscle, impaired sensation over forehead due to sharp force, known as orbital apex syndrome has also been reported.7 The victims of RTA also show a reasonable number of variety of ocular trauma in form of abrasion, laceration, black eye associated with maxillo-facial trauma.8

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Case History

Case -1

This is the case of a 13-year-old boy who met with a road traffic accident and suffered transient loss of consciousness. On examination, subconjunctival hemorrhage and hematoma or orbit (black eye) was present. CT scan and vision was normal. Black eye is the commonest of all eye injuries (42.22%) without visual disturbance, in road traffic accidents. It takes up to one and half to two months to resolve hematoma. They usually do not cause visual disturbances (simple injury) but must be thoroughly examined. Even in slightest doubt, x-ray and / or CT scan to be done to look into any underlying fracture of orbital wall or compression of optic nerve etc. This changes category of the injury to grievous one.

Case -2

A 10-year-old boy while playing with his brother with bow and arrow, accidentally sustained arrow impact at sclera-corneal and caused perforation of globe (Figure-1). Perforated wound was sutured and in spite of intra vitreal broad-spectrum antibiotics, endophthalmitis ensued. Perforated wound on the globe, if this gets infected may lead endophthalmitis or panophthalmitis. (Figure-2) This further may lead to meningitis which may be dangerous to life. Perforation of globe if not treated properly and well in time eventually leads to phthisis bulbi (shrunked eye).

Case -3

A 15-year-old boy met with fireworks (crackers) injury during the Diwali festival (Figure-3). On examination multiple foreign bodies (carbon particles) were present on the cornea, sclera and fornix and corneal epithelial burn with edema. In due course of time even with treatment cornea got infected, ulcerated then sloughed out. There was no vision hence patient's eye was enucleated.

Case -4

A 16-year-old boy splashed fused calcium carbonate paste intentionally contained in squeezable plastic tube to an 11-year-old girl. On examination there was severe burning, redness, profuse watering. (Figure-4) There was corneal epithelial erosion, edema and more than half limbal necrosis. Eventually patient's eye became practically blind due to corneal opacity and secondary glaucoma following alkali burn by jurda and chuna (tobacco powder and fused calcium carbonate paste). Intoxication by chewing of powdered tobacco mixed with chuna is very common in North India specifically in Rajasthan. Chuna (semisolid fused calcium carbonate paste which is available in soft plastic tube) and jurda is freely available in every smallest shop of North India and are kept in the house within the reach of children. (Figure-5) While playing children may squeeze the tube and it comes out of all sudden and gets splushed into the eye. This lead to severe alkali burn leading to blindness and eventually phthisis bulbi.

Discussion

The therapeutic modality in case of ocular trauma depends on the type and extent of structure damaged in either anterior or posterior segment and hence is domain of ophthalmologist. However, any ocular injury can be categorized in three groups namely 1. Simple eye injuries, 2. Grievous eye injuries & 3. Eye injuries those are dangerous to life for all medicolegal purposes. In case of assault the severity of ocular injury contribute in the exercise of application of section of IPC. If the ocular injury in question false within ambit of subsection 2 of Section 320 IPC and in turn depending on type of weapon section 325 or section 326 is applied in a case. All injuries that cause privation of any part of the eyes (with exception, the eye lashes) and joints for example dislocation of lens and breaking of zonules and stripping away of lid or small part of it. Permanent disfigurement of face, for example, injuries that cause residual defect after healing, i.e. ptosis, entropion and squint etc even if the vision is normal (6/6) & amounts to grievous injury.

Here, it may be important to note that we should give opinion after complete healing which may take 6 weeks or 6 months or more on an average, then only we can judge whether the disability or disfigurement is permanent or not because anatomical healing usually never correlate with physiological healing (i.e. vision).
Any ophthalmic injury can be considered grievous which cause suffer to be, during the space of 20 days in serve body pain or unable to follow his ordinary pursuits.

Certain ocular injuries involving the cranium may prove fatal immediately and few delayed complications like meningitis, endophthalmitis, pan-opthalmitis and sympathetic opthalmitis have been reported to cause death of injured. Thus by using medical knowledge especially in case of homicide opinion about possibility of death under ordinary cause of nature, bears importance, when ocular injuries extend deeper.

In case of visual disability the Snellen's chart forms a basis to assess loss of vision and loss of earning capacity. Such exercise is necessary in civil matters where the patient claims compensation under Motor Vehicle Accident and the Workmen's Compensation Act.

Conclusion

Though eye is a bilateral member; its involvement by injury has medico-legal implication, both of civil and criminal nature. Basic knowledge of Ophthalmology and available medical literature are important dimensions in offering a medicolegal opinion. Further similar or better work by various scientists who practically deal with such cases will definitively enrich the relevant literature.

References

1. Pillay V V. Comprehensive Medical Toxicology, Chapter 2, Paras Publishing 2003, pp. 8-10.
Figure 1: Perforation of globe by bow and arrow injury, followed by endophthalmitis.

Figure 2: Collection of thick fluid (pus) with retinal detachment in B-scan USG of figure 1 patient. (Case No. 2)

Figure 3: Enucleation of eye after perforation of globe due to corneal sloughing in fireworks (Crackers) injury. (Case No. 3)

Figure 4: Alkali burn with corneal opacity and secondary glaucoma. (Case No. 4)

Figure 5: Calcium carbonate Paste-Real hazard to vision through alkali burn. (Case No. 4)