

Ocular Trauma Management: A VR Surgeon's Perspective

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In our routine eye care practice, most of us frequently see patients with ocular trauma. It may vary from a small foreign body on the cornea causing discomfort, redness and pain with no significant visual complaints to a totally ruptured globe causing complete loss of vision or only the presence of light perception in the injured eye. These patients get treated differently in proportion to different parts of the country and the availability of medical support. All of us have a different level of contribution in treating them.¹ Ocular trauma is found to be a leading cause of preventable blindness worldwide. The prevalence of ocular trauma varies considerably depending upon the age group, mainly affecting children and workers, which has significant implications in terms of long-term prognosis, morbidity, economic cost, geographic location, occupation, and cultural practices such as firework celebrations. Ocular injuries are a chief and under-recognized cause of disabling ocular morbidity. Ocular trauma represents a multifaceted and heterogeneous entity showing high variability both in terms of etiology and clinical expression.^{2,3}

Worldwide, more than 500,000 blinding injuries occur every year. Roughly 1.6 million people are blind due to ocular trauma, 2.3 million are visually impaired, and 19 million have unilateral visual loss.⁴⁻⁶ Developing countries often lack adequate infrastructure for persons with eye injuries to reach a primary care center, when one exists, and the dearth of awareness of protective measures and immediate actions increases the risk for complications and resultant visual disability.^{2,4,6} Traumatic eye and facial injuries involves a significant proportion of all patients presenting to emergency departments. In most instances, emergency care units are not able to deal with such events, thus making it obligatory to refer the patient to specialized ophthalmic facilities. A multidisciplinary ophthalmic intervention may be required to manage and treat these complex and difficult cases. Ophthalmologists should never surrender and give up on seriously injured eyes just because their reconstruction is tougher but less rewarding than elective

surgery. In trauma management, there are no randomized, prospective, multicenter, placebo-controlled studies to show that one intervention type is greater than another. No evidence-based medicine level of proof demonstrates that one type of treatment gives superior results.⁷

Neither prevention nor treatment can be optimized unless data on eye injury incidence and management are collected.

This data collection is best carried out in the context of a broad surveillance system that is standardized and long-term. The capability to forecast and anticipate results in patients with ocular trauma is critical for developing eye injury prevention strategies and appropriate treatment plans and assisting and counseling patients. For a better prognostication of ocular trauma, many classification systems were developed such as the Birmingham Eye Trauma Terminology System (BETTS) and Ocular Trauma Score (OTS) which have been widely adopted internationally since they were published. The BETTS and OTS classifications can be tough in clinical practice as not all data is collected.⁸ Patients and ophthalmologists have long desired to be able to reliably predict the long-term outcome of a serious eye injury at the time of the initial evaluation/surgery. Such prognostic data is of benefit in triage, counseling and management. The OTS finally allows such a prediction and it is built into the USEIR data collection system; upon case entry, the OTS is automatically provided. The OTS was developed on an extensive analysis of over 2500 cases.



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However, as time passes and new developments occur, a subsequent reanalysis, possibly separating closed and open globe injuries, is expected.⁹

The International globe and adnexal trauma epidemiology study (IGATES) is a collective effort by the Asia Pacific Ophthalmic Trauma Society (APOTS), International Society of Ocular Trauma (ISOT), Ocular Trauma Society of India (OTSI), Chinese Ocular Trauma Society (COTS), PAN American Association of Ocular Trauma, All India Ophthalmological Society and American Society of Ophthalmic Trauma. This study aims to identify the factors affecting the outcome of open globe and adnexal injury, develop a prognostic classification system for ophthalmic trauma and conduct a large multicenter chart review of ophthalmic trauma utilizing the revised "Ophthalmic Trauma Score" (OTS-2). Despite of numerous articles on ocular trauma, we still do not have any assessment of the actual prevalence of ocular trauma in India. The International Society of Ocular Trauma has a World Eye Injury Registry and the American Society of Ocular Trauma has the United States Eye Injury Registry. The Ocular Trauma Society of India has projected an India Eye Injury Registry for the same. A registry would enable us to measure epidemiology, standardize and evaluate protocols, data collection for treatment outcomes, propose clinical trials, and disseminate information.

Strategic planning in ocular trauma management is a prime concern for an ophthalmologist. Precise history taking and initial evaluations such as slit lamp examination, fundus examination, ultrasonography, CT scan, plain X-ray and MRI may offer important clues about the nature and extent of the ocular damage. Assessment for endophthalmitis or intraocular foreign body (IOFB) is also essential for preoperative planning. Surgical repair is indicated as soon as the patient's circumstances allow it. Vitrectomy is an important treatment for severe mechanical ocular trauma. Immediate vitrectomy is indicated for post-traumatic endophthalmitis or IOFB with high risk of infection.^{11,15} Vitrectomy can restore certain visual acuity of the injured eye by restoring the transparency of the refractive media and repositioning the retina. Ideally, if there's an IOFB you should remove it at the time of the primary surgery. Main goal of the initial surgery is to have a watertight closure of all the wounds in a manner that will allow you to complete a secondary vitrectomy, if necessary. The optimal timing for repairing an open globe injury is within 24 hours of the injury to decrease the risk of endophthalmitis. The best timing of vitrectomy for severe mechanical ocular trauma is 8–14 days upon injury.¹³ Surgery within 7 to 14 days allows adequate time for healing of the primary wounds; spontaneous posterior vitreous detachment (PVD) in 10–14 day enables easy vitrectomy, and also decreases the chance of encountering significant membrane proliferation during the surgery.¹⁴ In spite of poor visual prognosis, surgical

intervention should be considered. My philosophy is, injured eyes even with no perception of light should also undergo a primary repair even when the anatomical success is estimated to be less than 1%.

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