

Management Pearls for Traumatic Cataract

Nisha Chauhan MBBS, Richa Jain MBBS, Vishwesh Agarwal MBBS, Snigdha Sen MS

Traumatic cataract is a common cause of monocular visual loss, in children and adults, especially after penetrating injuries. The decision for management in such cases is very challenging and depends on the visual disability caused by the cataract and associated ocular injuries. The ophthalmologist is faced with the following dilemmas when dealing with the case of a traumatic cataract.

- Whether cataract removal should be done simultaneously with corneal tear repair in cases of penetrating injury or should be done as a secondary procedure?
- Even if the cataract is removed, whether or not to implant the IOL in same sitting?
- The type of IOL

Also in young children, unlike the adult patients, management of the associated amblyopia can be, at times, frustrating. But the problem of amblyopia is encountered less in traumatic cataract compared to congenital or developmental cataract because patients present early in cases of trauma.

DECISION OF SURGERY

Timing of cataract surgery and IOL implantation in the setting of trauma is still debated worldwide. Primary surgical management is often dictated by the extent of corneal and scleral injury in addition to the injury to the lens. Certain lacerating injuries of the anterior segment are particularly amenable to cataract extraction and IOL implantation at the time of primary laceration

repair. This approach obviates additional operative and anesthetic risks, while affording timely visual rehabilitation.

Secondary lens removal may be indicated in cases of severe corneal injury and marked edema, which may interfere with intraocular visualization. Advantages of secondary cataract removal are better visibility, better intraocular lens calculation, anterior segment reconstruction, and stabilization of a hemato-ocular barrier.

When the lens alone is injured, delayed removal has been favored historically, but according to a recent study on traumatic cataract, the visual outcome did not differ between primary and secondary cataract extraction and between primary and secondary IOL implantation in adults, but in the amblyogenic age, primary surgery with IOL implantation should be preferred.¹

Indications for immediate cataract removal are:

- dislocation of the lens/ lens fragments into the anterior chamber with corneal touch.
- pupillary block due to anterior lens displacement.
- angle closure secondary to an intumescent lens.
- uncontrollable inflammation.
- elevation of IOP secondary to lens-particle release.

DECISION FOR IOL IMPLANTATION

If primary IOL implantation is planned, biometry should be done on non-injured eye. In-the-bag fixation of the IOL is the preferred choice if the lens capsule and zonular support are intact. Multifocal IOLs are a

Department of Ophthalmology
Sarojini Naidu Medical College, Agra

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better alternative to monofocal pseudophakia, as they provide better uncorrected near visual acuity, stereopsis and less spectacle dependence in children with and without primary posterior capsulotomy. Acrylic foldable lenses have shown better outcome as compared with PMMA lenses in the studies.² Cases with sectoral zonular weakness are amenable to in the bag PCIOL implantation with haptics placed perpendicular to area of zonular weakness.

Polymethyl methacrylate (PMMA) capsular tension rings (CTR) allow easy implantation of PCIOL in cases of zonular dialysis less than 180 degrees, but the conventional capsular tension ring does not allow effective treatment of large zonular dialysis or decentration of the bag. However, the Cionni modified CTRs with scleral fixation stabilize and recenter the bag, allowing capsular preservation and in the bag implantation of PCIOL in cases of traumatic zonular dialysis.

- Sulcus fixation is safe, if the posterior capsule is compromised but zonular support is maintained.
- In children without adequate capsular support and zonular support, the decision of optimal optical correction methods is very challenging. Aphakia is avoided as there is a risk of amblyopia in these patients, thus rapid optical and visual rehabilitation is very important. Nonsurgical methods with spectacles or contact lenses and surgical methods such as scleral fixation of posterior chamber intraocular lenses (SF-PCIOLs) may also be considered. Unilateral aphakic glasses are generally not suitable for children due to aniseikonia, which may impair binocularity. Contact lenses may cause corneal problems and poor compliance in

pediatric patients as well as amblyopia, due to intermittent correction of refractive error. Also, in traumatized eyes, wearing contact lenses may be intolerable or difficult due to irregular corneal surface or conjunctival scarring from the trauma or multiple operations. In such cases, SF-PCIOL is a safe alternative. There have been reports showing comparable surgically induced astigmatism in sutureless intrascleral haptic fixation with retro-pupillary iris claw fixation. Thus former can be considered in cases where no other implantation technique is possible.

- Anterior chamber placement is always an option in cases of insufficient posterior capsule support, eyes with ciliary body trauma which prevents suture fixation, no advanced glaucoma, good iris support and in adult patients.
- Aphakia may be a better choice in patients with highly inflamed eyes, as they may experience better outcomes if lens implantation is deferred.

PRE-OPERATIVE EVALUATION

Proper diagnosis and appropriate management of traumatic cataract/subluxation/ dislocation is necessary to restore vision and prevent sight threatening complications. The methods used to evaluate the visual outcome in eyes managed for traumatic cataracts and senile cataracts are similar, but these two cataracts are different as there are associated ocular morbidity which alter the prognosis in traumatic cataract.

History:

In the setting of ocular trauma, the mechanism of injury is a critical determinant

of the type of the ocular damage sustained and is, therefore, the cornerstone of the medical history. Mechanism of injury should be noted whether blunt or perforating injury.

A perforating injury most often brings about immediate attention, many patients who have sustained blunt trauma to the globe and develop contusion cataract or lens subluxation do not seek immediate medical care. They may later develop inflammation or experience a delayed onset of fluctuating or decreased vision from subluxation of the lens or progressive cataract.

A past medical history should be obtained to establish any preexisting ocular or systemic conditions, such as glaucoma, previous ocular surgery, or diabetes, that may affect visual outcome.

Counsel Properly:

The patient and the family should be informed well about

- Possibility of uncertain visual outcome
- Challenges faced during surgery in eyes with other associated ocular injuries
- Postoperative suboptimal visual recovery
- Probability of secondary intervention

Ophthalmic Examination:

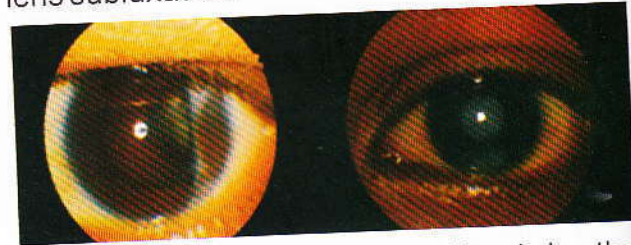
Birmingham eye trauma terminology system (BETTS) should be used to standardize the documentation of clinical findings in cases of ocular trauma.³ The eye examination begins with assessment of the vision. In many cases of ocular trauma, the visual acuity on presentation is a predictor of visual outcome. Pupillary reaction is noted to rule out afferent pupillary defect which is indicative of optic neuropathy.

A low IOP is potentially helpful in determining

the presence of a ruptured globe, whereas an elevated pressure can indicate subluxation of the lens with pupillary blockade, disruption of the angle, the inflammatory effects of lens particles, or angle closure secondary to an intumescent lens.

Imaging Techniques

Slit lamp biomicroscopy: Examination of anterior segment is done systematically both before and after pupillary dilatation and note any corneal scar, anterior chamber depth, presence of any abnormal content in anterior chamber, posterior synechiae, morphology of cataract (total / membranous / soft white / rosette) or any other abnormal finding. A subtle subluxation may only be identifiable using a retroillumination biomicroscopic view after wide pupillary dilatation. A deep anterior chamber and iridodonesis may be suggestive of subluxation, and a narrowing of the angle may indicate forward displacement of the lens. Prolapse of vitreous into the anterior chamber confirms the presence of lens subluxation.



B-scan: If corneal edema, blood in the anterior chamber or lenticular opacification precludes visualization of the lens or posterior segment, ultrasound can be useful in determining lens position, retained intraocular foreign body, vitreous hemorrhage or retinal detachment. Ultrasound biomicroscopy can also be used to avoid intraoperative surprises regarding posterior capsule integrity and lens support structures. This helps the surgeon preoperatively to modify his surgical plan regarding wound location, method of cataract

removal and possible use of capsular tension ring or vitrectomy.

Anterior segment OCT: Its a non invasive alternative to ultrasound biomicroscopy for anterior segment evaluation. It can be utilized to identify traumatic damage to lens capsule, cortex, zonules and anterior hyaloid phase.

X-ray orbit: Can be used to localize retained foreign body in cases of penetrating / perforating injuries.

CT-scan: Computed tomography (CT) scan is ideal for defining bony anatomy of the orbit in cases with head or facial trauma and offers a greater deal of precision in foreign body localization. A CT scan can also provide information about the state of lens opacification. Signal attenuation may be seen in a lens that is cataractous, even before clinical lens opacification.

Electro-physiological tests: (ERG, EOG, VER): Can be used in higher centres to assess the co-morbidities associated with opaque lens in cases of trauma to help in the prediction of prognosis after traumatic cataract surgery.

SURGICAL MANAGEMENT

To maximize surgical outcome and minimize complications, a decision must be made between an anterior (limbal) and a posterior (pars plana) surgical approach.

Anterior (Limbal) Approach:

It is indicated in the following situations:

- No apparent zonular compromise and an intact posterior capsule
- Minimal zonular compromise, no displacement of the lens, and no vitreous present in the anterior chamber
- Dislocation of the lens into the anterior chamber.

Posterior Approach (Pars Plana Incision):

A pars plana technique and a posterior approach can be used if there is:

- Posterior subluxation or dislocation of the lens
- Preoperative / intraoperative disruption of the posterior capsule with lens fragments in the anterior vitreous. Preservation of posterior lens capsule in such cases is less important than preventing anterior vitreous traction as alternative method of IOL implantation offer similar functional results.
- Associated posterior segment injuries, where combined lensectomy, vitrectomy & IOL implantation can be planned.

POST-OPERATIVE CARE

Surgery to repair a traumatic cataract has a higher rate of postoperative complications than standard cataract surgery does.

Early post-operative complications can be corneal edema, fibrinous uveitis, hyphema and IOP rise. Fibrinous uveitis is a very common finding and can cause posterior synechiae, pupillary block glaucoma and lenticular membrane formation. Intensive topical corticosteroid, oral corticosteroid, topical antibiotics and cycloplegics usage should be there to minimize complications and should be tapered slowly over weeks. Intracameral dexamethasone can also be used intra-operatively to reduce post operative complications.



Late post-operative complications include posterior capsule opacification, IOL decentration, pupil capture, cystoid macular

edema and retinal detachment. The incidence of posterior capsule opacification in children with traumatic cataract undergoing cataract surgery with posterior chamber intra-ocular lens implantation has been reported to vary between 21% to 100%, posterior capsulotomy at the time of surgery can decrease its incidence. Primary posterior capsulotomy should be done in all children of less than 6 years age. Children with more than 6 years of age can co-operate well for yttrium aluminium garnet capsulotomy.

PROGNOSIS

Patients' age and initial visual acuity are good predictors of final postoperative visual acuity. Ocular trauma score can be used as a reliable tool for predicting the visual outcome of cataract extraction surgery. Classify the injury into open or closed globe injury and then the score calculated preoperatively after patients examination correlates well with post-operative visual outcome. About 2/3rd patients achieve visual acuity of 20/60 or better. Eyes with sharp trauma have poor visual results, as these eyes need multiple surgeries due to coexisting ocular morbidity, commonly corneal tears.

PREVENTION

A lot of ocular injuries could be prevented if proper protective wear are used, but it is difficult to convince rural communities

regarding the advantages of protective wear to their children. Many house-hold items like pins, scissors, knives, pens, pencils, nail cutters and fire works are responsible for the childhood injury. Local schools should inculcate the safety habits through the school curriculum, as is being done in many urban private schools in India, along with lessons on first aid and safety precautions.

Education of the masses to avoid neglect, early referral of complicated cases and awareness of the patient to ensure compliance can avoid the blindness caused by traumatic cataract.

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Few Facts

- *The colour of a chilli is no indication of its spiciness, but size usually is - the smaller the pepper, the hotter it is.*
- *A leech has 32 brains.*
- *Marilyn Monroe had six toes.*