

TRAUMATIC CATARACT

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INTRODUCTION

Cataract is by far the commonest complication causing loss of vision following any type of ocular injury. The management of such cases is an important problem in ophthalmology and prognosis is variable. Extent of associated damage to anterior and posterior segment, time of intervention, operative and post-operative complications go a long way in determining the ultimate prognosis. The type of trauma, extent of lenticular involvement and associated secondary rise of intraocular pressure are factors of paramount importance which could dictate the exact time of management of traumatic cataract. Cataracts caused by blunt trauma classically form stellate or rosette shaped posterior axial opacities that may be stable or progressive, whereas penetrating trauma with disruption of lens capsule forms cortical changes that may remain focal if small or may progress rapidly to total cortical opacification. Lens dislocation and subluxation are found commonly in conjunction with traumatic cataract.

PATHOPHYSIOLOGY

Blunt trauma is responsible for coup and contrecoup ocular injury. Coup is the mechanism of direct impact. It is responsible for Vossius ring (imprinted iris pigment) sometimes found on the anterior lens capsule following blunt injury.

When the anterior surface of the eye is struck bluntly, there is a rapid anterior-posterior shortening accompanied by equatorial expansion. This equatorial stretching can disrupt the lens capsule, zonules, or both. Combination of coup, contrecoup, and equatorial expansion is responsible for formation of traumatic cataract following blunt ocular injury.

Penetrating trauma that directly compromises the lens capsule leads to cortical opacification at the site of injury. If the rent is sufficiently large, the entire lens rapidly opacifies, but when small, cortical cataract can seal itself off and remain localized.

Sex

Male-to-female ratio in cases of ocular trauma is 4:1.

Age

- ◆ Work- and sports-related eye injuries most commonly occur in young adults and children.

History

- ◆ Mechanism of injury : Sharp versus blunt
- ◆ Past ocular history : Previous eye surgery, glaucoma, retinal detachment, diabetic eye disease
- ◆ Past medical history : Diabetes, sickle cell, Marfan syndrome, homocystinuria, hyperlysinemia, sulfate oxidase deficiency
- ◆ Visual complaints
 - Decreased vision : Cataract, lens subluxation, lens dislocation, ruptured globe, traumatic optic neuropathy, vitreous hemorrhage, retinal detachment
 - Monocular diplopia : Lens subluxation with partial phakic and aphakic vision
 - Binocular diplopia : Traumatic nerve palsy, orbital fracture
 - Pain : Glaucoma secondary to hyphema, pupillary block, or lens particles; retrobulbar hemorrhage; iritis

PHYSICAL EXAMINATION

- ◆ Complete ophthalmic examination (tailored in cases of globe compromise)

- Vision and pupils : Presence of afferent pupillary defect (APD) indicative of traumatic optic neuropathy
- Extraocular motility : Orbital fractures or traumatic nerve palsy
- Intraocular pressure : Secondary glaucoma, retrobulbar hemorrhage
- Anterior chamber : Hyphema, iritis, shallow chamber, iridodonesis, angle recession
- Lens : Subluxation, dislocation, capsular integrity (anterior and posterior), cataract (extent and type), swelling, phacodonesis
- Vitreous : Presence or absence of hemorrhage, posterior vitreous detachment
- Fundus : Retinal detachment, choroidal rupture, commotio retinae, preretinal hemorrhage, intraretinal hemorrhage, subretinal hemorrhage, optic nerve pallor, optic nerve avulsion

TYPES OF TRAUMATIC CATARACT

- ◆ Penetrating
- ◆ Concussion (Rosette cataract)
- ◆ Infrared irradiation (Glass Blower's cataract)
- ◆ Electrocutation
- ◆ Ionizing radiation

Causes

- ◆ Traumatic cataracts occur secondary to blunt or penetrating ocular trauma.

Other Problems to be Considered

- ◆ Globe rupture
- ◆ Orbital fractures
- ◆ Retinal detachment
- ◆ Secondary glaucoma
- ◆ Traumatic optic neuropathy

Factors to be analysed :

- ◆ Corneal involvement
- ◆ Pre operative and post operative BCVA
- ◆ Visual axis involvement
- ◆ Breach in anterior capsule
- ◆ Lens matter in anterior capsule
- ◆ Pre-existing posterior capsular rent on ultrasound
- ◆ Subluxation of the traumatic cataractous lens
- ◆ Associated iridodialysis

Imaging Studies

- ◆ B-scan - If posterior pole cannot be visualized
- ◆ A-scan - Prior to cataract extraction
- ◆ CT scan orbits - Fractures and foreign bodies

CAUSES OF POST OPERATIVE NON IMPROVEMENT OF BCVA IN TRAUMATIC CATARACT

- ◆ Amblyopia
- ◆ Corneal scar involving visual axis
- ◆ Cortex in papillary area
- ◆ Subluxation of IOL
- ◆ IOL tilt
- ◆ CME
- ◆ Traumatic optic neuropathy
- ◆ Pupillary capture

MANAGEMENT

Medical Care

- ◆ If glaucoma is a problem, control intraocular pressure with standard medications; add corticosteroids if lens particles are the cause or if iritis is present.
- ◆ Focal cataract
 - Observation if cataract is outside the visual axis
 - Miotic therapy may be of benefit if the cataract is close to the visual axis.
- ◆ In some cases of lens subluxation, miotics may correct monocular diplopia; mydriatics may allow for vision around the lens with aphakic correction.

Practical points in management of traumatic cataract:

- ◆ Corneoscleral integrity
- ◆ Meticulous restoration of normal relationships
- ◆ Sufficient release of posterior synechiae
- ◆ Capsular and zonular integrity
- ◆ Vitreoretinal changes

Surgery :

Depending on the clinical situation, the surgical management of a traumatic cataract is performed either a standard anterior limbal or posterior pars plana approach. An anterior approach is best for a traumatic cataract unless there is complete lens dislocation or capsular rupture with significant lens material incarcerated in the vitreous.

Practical tips while performing traumatic cataract surgery :

- ◆ Planning surgical approach is of utmost importance in cases of traumatic cataract.

- ◆ Preoperative capsular integrity and zonular stability should be surmised.
- ◆ In cases of posterior dislocation without glaucoma, inflammation, or visual obstruction, surgery may be avoided.
- ◆ Indications for surgery include the following:
 - Unacceptable decreased vision
 - Obstructed view of posterior pathology
 - Lens-induced inflammation or glaucoma
 - Capsular rupture with lens swelling
 - Other trauma-induced ocular pathology necessitating surgery
- ◆ Standard phacoemulsification or manual small incision cataract surgery may be performed if lens capsule is intact and sufficient zonular support remains.
- ◆ Intracapsular cataract extraction is required in cases of anterior dislocation or extreme zonular instability. Anterior dislocation of the lens into the anterior chamber requires emergency surgery for its removal, as it can cause pupillary block glaucoma.
- ◆ Pars plana lensectomy and vitrectomy may be best in cases of posterior capsular rupture, posterior dislocation, or extreme zonular instability.
- ◆ Automated irrigation/aspiration can be used in patients younger than 35 years. Look for the posterior capsular support preoperatively, should be careful while performing automated irrigation aspiration and while switching the anterior chamber maintainer on as the fluid flow inside the eye can enlarge the pre existing posterior capsular dehiscence and can result in lens matter drop or nucleus drop.
- ◆ Lens implantation
 - Capsular fixation is the preferred placement if lens capsule and zonular support are intact. In the case of surgery to remove a traumatic cataract, the
 - CTR may be implanted before or after phacoemulsification. Although early insertion provides support during phacoemulsification, it may create additional zonular trauma. The use of iris or capsule retractors at the capsulorhexis' edge or the use of a capsular tension segment (CTS; Morcher GmbH, Stuttgart, Germany [not currently approved by the FDA]) during phacoemulsification are other alternatives that do not induce significant capsular torque during insertion. The CTS is a partial PMMA ring segment containing an anteriorly offset eyelet through which an iris retractor or suture may be placed.
 - Capsular tension ring should never be implanted in cases with broken capsulorrhesis and in eyes with pre existing posterior capsular rent.
 - Polymethyl methacrylate (PMMA) capsular tension rings allow capsular fixation in cases of zonular dialysis less than 180 degrees.
 - Sulcus fixation is safe if posterior capsule is compromised but zonular support is maintained.
 - Suture fixation is chosen if both capsular and zonular supports are insufficient and the angle is damaged minimally.
 - Anterior chamber placement is an option if no posterior support remains and iris or ciliary body trauma prevents suture fixation.
 - Aphakia may be a better choice in young children and patients with highly inflamed eyes; they may experience better outcomes if lens implantation is deferred.

COMPLICATIONS

Surgery for traumatic cataract is associated with high incidence of complications and surgeon should anticipate and be prepared for complications during the surgery. The different complications during traumatic cataract surgery can be :

- ◆ Posterior capsular rent
- ◆ Zonular dialysis

- ◆ Nucleus or lens matter drop
- ◆ Post operative unusual inflammation
- ◆ Posterior capsular opacification
- ◆ Pupillary capture of IOL
- ◆ Post operative refractive surprise

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