CASE REPORT

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Inflammation after corneoscleral rupture and traumatic cataract due to blunt trauma in a child: a case report

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ABSTRACT

Background: Ocular trauma is the most common cause of acquired monocular blindness in children. It is because of the inflammation following corneoscleral rupture and traumatic cataracts due to blunt trauma. This case study aims to evaluate the corneoscleral rupture and traumatic cataracts due to blunt trauma in a child.

Case Presentation: We present a 5-year-old male who sustained blunt trauma to his right eye. He presented with blurry vision, mild pain and watering from the affected eye. His examination revealed visual acuity of 6/60 in the right eye (RE), corneal laceration extending from 3 o'clock towards 11 o'clock with possible extension to the sclera, and cortical lens matter in the anterior chamber. The patient underwent globe rupture repair under general anesthesia immediately. Postoperative day one revealed 2 mm hypopyon thick inflammation cells and fibrin. He was on topical steroids and topical antibiotics. The fourth postoperative day showed reduced inflammation, wound sutures in place and absence of hypopyon, thick membranous in the pupil. The patient is then referred to the Pediatric Ophthalmology department for a follow-up operation of clearing lens particle remnants to reduce inflammation and IOL insertion.

Conclusion: Management of the injury and traumatic cataract is crucial to prevent vision loss and amblyopia, to maintain binocularity, prevent strabismus or even phthisis bulbi. Along with early management, routine follow-up examination for prevention of other unwanted complications is advised.

Keywords: Blunt Trauma, Case Report, Child, Cornealscleral Rupture, Traumatic Cataract.
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INTRODUCTION

Ocular trauma is the most common cause of acquired monocular blindness in children. Globally, around 3.3–5.7 million children under 15 years of age suffer from ocular trauma every year with pediatric ocular trauma being more prevalent in males.[1] There are still very limited data regarding pediatric ocular trauma in Indonesia; however, reports from the United States estimated OGI to occur at a rate of 2-3.8/100,000. Visual prognosis of OGI in children is worse than adults due to the severe nature of injuries, amblyopia, traumatic cataract, and infectious endophthalmitis due to delayed presentation.[2,3]

Blindness or impaired vision carries heavy psychological, social, and economic burdens, significantly decreasing quality of life.[4] A thorough understanding of the epidemiology, diagnosis, management, and the prognosis is critical to preventing vision loss early in life after injury.[5]

Inflammation is the immune system's reaction to damaging stimuli like pathogens, damaged cells, poisonous substances, or irradiation, and it works by eliminating injurious stimuli and commencing the healing process.[6,7] Typically, cellular and molecular activities and interactions efficiently limit impending harm or infection during acute inflammatory responses. The restoration of tissue homeostasis and the resolution of acute inflammation are both aided by this mitigation process. On the other hand, uncontrolled acute inflammation can develop chronic, leading to a range of chronic inflammatory disorders.[8] Inflammation can also occur as a result of blunt trauma, according to a prior study.[9]

Based on those mentioned above, this case study aims to evaluate the current management of inflammation after corneoscleral rupture and traumatic cataracts due to blunt trauma in a child.

CASE REPORT

A previously healthy 5-year-old male child was admitted to the outpatient department after falling off his bike and his right eye hitting the handlebar one day prior to arrival. He reported no loss of consciousness, nausea or vomiting after the incident. The patient did not have any prior ocular injuries, history of ocular disease, or prior ocular surgeries. The patient reported that he does not wear glasses. He complained of blurry vision,

mild pain and watering from the affected eye.

On examination, the patient had visual acuity of 6/60 in the right eye (RE) and 0,7 F in the left eye (LE). His RE showed subconjunctival hemorrhage on slit-lamp examination, a corneal laceration extending from 3 o'clock towards 11 o'clock with possible extension to the sclera, and cortical lens matter in the anterior chamber (Figure 1). The posterior segment could not be examined. The patient was then prepared for globe rupture repair under general anesthesia (GA) immediately. Chest X-Ray and Laboratory tests included a full blood count, liver function tests, INR, prothrombin time, partial thromboplastin time, kidney function tests were assessed and all were within normal. These tests were done for preoperative preparation in general anesthesia.

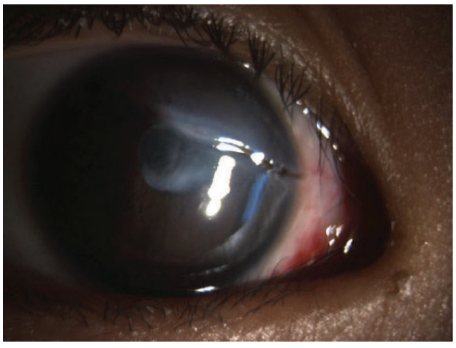

Figure 1. Slit-lamp examination of the right eye showing corneal laceration.

On the initial surgery, 12 stitches were done with nylon 10.0 for the laceration from the cornea extending to the limbus. In the surgery, lens particles seen on the COA were removed with Irrigation and Aspiration tip, without intraocular lens implantation. The posterior capsule lens ruptured due to trauma and vitreous contents were found in the COA, which hindered the cataract extraction process. This initial operation was done solely to close globe rupture to maintain RE integrity and prevent further infection and unwanted complications. At surgery, the vitreous was found in the anterior chamber.

The first postoperative visit revealed corneal edema with sutures in place, 2 mm hypopyon, thick inflammation cells and fibrin (Figure 2). The patient was on topical steroid (prednisolone acetate 1% eye drop 3 hourly) and topical antibiotics (levofloxacin 0,5% eye drop 3 hourly). The inflammation after the surgery was quite severe due to possible vitreous in the capsule bag and debris of lens particles and vitreous in the capsule bag. By the fourth postoperative day showed reduced inflammation, wound sutures in place, absence of hypopyon, but there was a thick membranous in the pupil, which possible inflammation inside the eye (Figure 3). In this follow-up period, The patient is then referred to the Pediatric Ophthalmology department for a follow-up operation of clearing lens particle remnants that are still left to reduce inflammation and IOL insertion further.

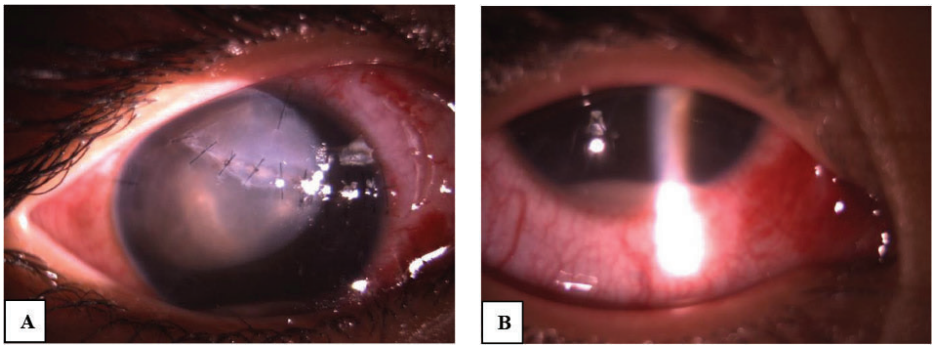

Figure 2. (A) Day one post-surgery showed sutures in place; (b) hypopyon, cells and fibrin in the anterior chamber.

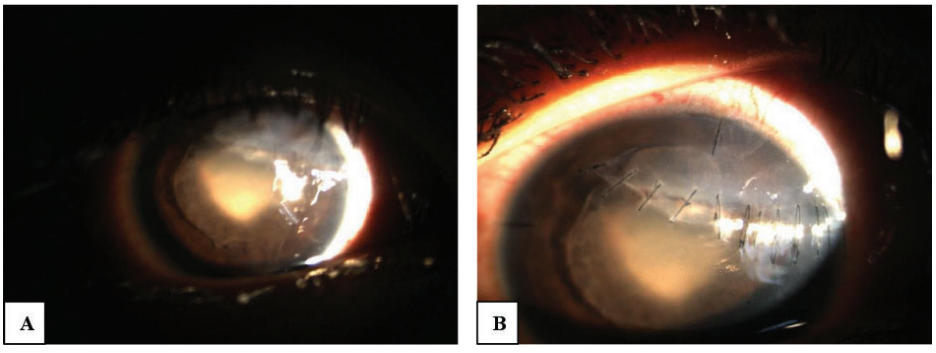

Figure 3. (A) Day 4 post-surgery showed wound sutures in place; (B) Absence of hypopyon, cells, and fibrin.

DISCUSSION

Ocular injuries are one of the most common causes of acquired unilateral blindness in children, accounting for 8-14% of the total injuries. The epidemiology of childhood ocular trauma varies from region to region. In a study conducted in India, about 41,2% of ocular trauma occurred in children 2 – 6 years old, with a 2.9:1 male to female ratio, and the most common cause of injury occurs during sport and recreational events.[10,11] Multiple studies reported that most cases occur at home and are caused by a sharp object.[4,5,12,13] There have been no studies on the incidence of ocular injuries in Indonesia. The 5-year-old male patient suffered from open globe trauma while riding his bicycle, but unlike most cases, the injury to the RE was caused by a blunt object rather than a sharp object.

Birmingham Eye Trauma Terminology (BETT) system provides clear definitions of ocular trauma terminology. Ocular trauma is divided into close globe injury and open globe injury. Open Globe Injury (OGI) is defined as full-thickness damage of the cornea, sclera, or both. The two types of OGI are ruptures and lacerations. Ruptures result from blunt trauma, causing a full-thickness defect at the weakest point of the eyewall. The patient suffered from an open globe injury resulting from blunt trauma with a full-thickness defect from the cornea extending to the sclera of the

RE. A separate category of intraocular foreign body (IOFB) is penetrating injuries in which foreign bodies remain inside the globe.[5,14]

During the initial assessment, a complete history should focus on the etiology of the trauma. The initial examination evaluates the patient's visual acuity (VA). A thorough slit lamp examination should be performed to assess the conjunctiva, sclera, cornea, anterior chamber, visible foreign body or lacerations, and the pupil should be examined for shape and reactivity. Avoid applying pressure to the globe, including eversion of the lids and tonometry. Intraocular foreign body (IOFB) is suspected of the explosion, gunshot wound, or sharp object entering the eye; therefore, appropriate imaging should be done. The primary imaging modalities used when needed are computerized tomography (CT) and B-scan ultrasonography; magnetic resonance imaging (MRI) is only used to detect non-metallic IOFB, if metallic IOFB is suspected, then MRI is contraindicated.[5]

The affected eye should be covered using a protective device. In awake and alert patients, antiemetics and analgesics should reduce stressors that may increase intraocular pressure. A tetanus shot should be given if recent immunization was uncertain.[15] Surgical management by an ophthalmologist should be done as soon as the patient can safely undergo surgery. Any delay in surgical intervention could lead to worse outcomes and increase the risk of postoperative endophthalmitis. The main goals of surgery are to close primary wounds, reposition of prolapsed ocular contents or debride if extruded for more than 24 hours, IOFB removal, and treat or prevent complications from preserving VA.[5] Hence in this patient repair surgery was done CITO (on the day of the trauma) in hopes of a better prognosis.

In traumatic pediatric cataracts, if the anterior capsule is significantly disrupted and free-floating lens matter in the anterior chamber is observed, the surgeon may be justified for primary cataract extraction with or without IOL implantation. Increased risk for infection, raised IOP, and retinal detachment was observed after primary IOL implantation; hence secondary IOL implantation is recommended.[16] Repair of the patient's RE was done under general anesthesia (GA), the corneal wound was sutured, traumatic cataract was removed without IOL implantation because of the nature of the inflammation occurring in the RE. Also, vitreous was found in the anterior chamber, which gave other difficulties. Limbal sutures were placed, subconjunctival antibiotics and steroids were given and the patient was left aphakic. Postoperative consultations were done to monitor the RE to reduce inflammation with a further thorough evaluation of the posterior segment of the RE. During the first day of postoperative, medication administration to the operated eye was not given; poor medication compliance plays a factor in severe inflammation found during day one postoperative follow-up. The presence of hypopyon and inflammation cells in the RE can also be caused by an infection process that is still occurring. Observation post-operation found unusually severe inflammation reaction halting plans for a secondary operation. Improved medication administration on the RE resulted in partial inflammation resolution on the fourth day of postoperative follow-up.

The Area of injury is classified according to the Ocular Trauma Classification Group into three anatomical zones. Zone I includes the cornea and limbus, zone II is corneoscleral limbus to a point 5 mm posterior into the sclera, and zone III is wound involvement posterior to the anterior 5 mm of the sclera.[17,18]

Ocular Trauma Score (OTS) use as a reliable prognostic tool to predict the visual outcomes in pediatrics after ocular trauma with traumatic cataracts.[19,20] The OTS scoring system includes visual acuity at presentation and the extent of ocular trauma, presence or absence of globe rupture, endophthalmitis, retinal detachment, and relative afferent pupillary defect (RAPD). A higher score is associated with a better prognosis.[21]

CONCLUSION

Management of the injury and traumatic cataract is crucial to prevent vision loss and amblyopia, to maintain binocularity, prevent strabismus or even phthisis bulbi. Along with early management, routine follow-up examination for prevention of other unwanted complications is advised.

CONFLICT OF INTEREST

We declare that there was no conflict of interest in this case report.

ETHICS CONSIDERATION

This case study has following the publication ethics guidelines based on COPE and ICMJE protocol prior to the study being published.

FUNDING

Not applicable.

AUTHORS CONTRIBUTION

CV and GB wrote the case report and reviewed the article. NI managed the child in the outpatient department, the surgery operator, and reviewed the manuscript with few changes. All authors read and approved the final manuscript.

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