

Case Report

Penetrating Ocular Injury in a Young Child: A Case Report Highlighting the Urgency of Corneoscleral Repair

Agnestya Christine Zely Raule^{1*}, Dian Mayangsari¹¹Sultan Imanuddin Pangkalan Bun General Districts Hospital, Pangkalan Bun, IndonesiaCorrespondence: agnesraule@gmail.com**ABSTRACT**

Introduction: Penetrating ocular trauma is an ophthalmologic emergency that can lead to significant vision loss, especially in children. This report describes the presentation and management of a severe case in a young child from a remote area.

Case Description: A 3-year-old girl presented with a left eye injury after being struck by a nail. Examination revealed a superior eyelid laceration, a full-thickness corneal laceration with iris prolapse, and hyphema. Initial visual acuity in the affected eye was 1/300. The patient underwent immediate corneoscleral repair followed by postoperative treatment with systemic and topical antibiotics, corticosteroids, and tetanus prophylaxis.

Discussion: Prompt surgical intervention is essential in cases of penetrating ocular trauma to preserve globe integrity and minimize the risk of complications such as endophthalmitis and amblyopia. Despite immediate surgical intervention, the patient's visual acuity remained poor two days post-surgery.

Conclusion: This case underscores the critical need for early recognition, timely surgical intervention, and diligent follow-up care in the management of pediatric penetrating ocular trauma, particularly in remote areas where access to specialized care may be limited.

Keywords: Penetrating Ocular Trauma, Corneal Laceration, Upper Eyelid Laceration

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INTRODUCTION

Penetrating ocular trauma represents one of the most serious forms of eye injury, as it disrupts the anatomical integrity of the globe and often leads to permanent visual impairment if not managed promptly. In penetrating injuries, a foreign body enters the eye but does not exit, whereas perforating injuries involve both entry and exit wounds through the ocular structures. These injuries are typically caused by sharp objects, projectiles, or high-velocity impacts, and they can result in complications such as endophthalmitis, retinal detachment, intraocular foreign body toxicity, and even sympathetic ophthalmia. The prognosis for visual recovery depends heavily on the type, location, and severity of the trauma, as well as the timeliness of medical intervention.

Epidemiological studies show that ocular trauma disproportionately affects males, particularly those in their productive years, often around the age of 30. This demographic trend is linked to occupational hazards, outdoor activities, and greater exposure to high-risk environments. Globally, ocular trauma remains a significant cause of monocular blindness, with penetrating injuries accounting for a large proportion of vision-threatening emergencies. The American Academy of Ophthalmology emphasizes that early recognition, appropriate surgical

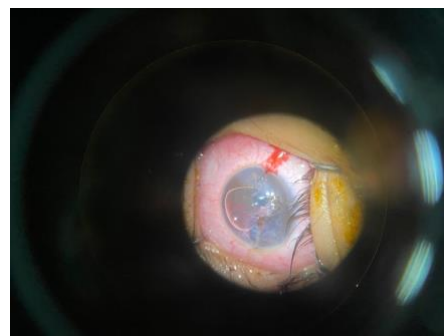
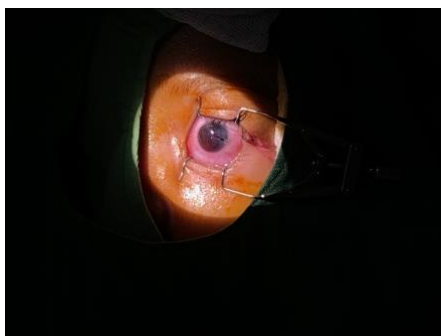
management, and prevention strategies are critical to reducing the burden of ocular trauma (American Academy of Ophthalmology, 2022).

In Indonesia, ocular trauma accounted for approximately 0.5% of all trauma cases in 2018, with the highest incidence reported in East Nusa Tenggara Province (NTT) at 0.8% (Banamtuan et al., 2025). These figures highlight regional disparities in trauma incidence, likely influenced by occupational and environmental factors. However, there are currently no published data on the incidence of ocular trauma in Pangkalan Bun, Central Kalimantan Province, underscoring the need for localized epidemiological studies to better understand the burden of disease in different regions.

Given the potentially devastating consequences of penetrating ocular trauma, comprehensive documentation of its incidence, risk factors, and outcomes is essential. Such data not only inform clinical management but also guide public health interventions aimed at prevention, including workplace safety measures, protective eyewear promotion, and community education. Expanding research in underreported regions like Central Kalimantan will contribute to a more complete picture of ocular trauma in Indonesia and support efforts to reduce preventable blindness.

CASE DESCRIPTION

A 3-year-old girl was brought by her mother to the Emergency Department of RSUD Sultan Imanuddin with an open wound on the left eye, sustained after being struck by a nail approximately three hours prior to admission. The child was irritable and complained of pain. On physical examination, the patient appeared seriously ill but remained conscious (*compos mentis*). Vital signs were as follows: heart rate 112 beats per minute (regular, adequate volume and pressure), respiratory rate 20 breaths per minute (regular), and body temperature 36.3°C. Anterior segment examination of the left eye revealed an open wound on the upper eyelid measuring approximately 0.5 cm in length, with minimal bleeding. The conjunctiva was hyperemic. A full-thickness corneal laceration was identified extending from the 12 o'clock to the 3 o'clock position, accompanied by iris prolapse. Slit-lamp examination demonstrated hyphema in the anterior chamber. Visual acuity in the left eye was reduced to 1/300, while the right eye maintained normal vision (6/6). Extraocular movements were intact, with no limitation observed.



Picture 1. Before (left) and after (right) corneoscleral laceration repair and upper eyelid repair.

Management

Emergency corneoscleral laceration repair was performed using 10-0 sutures as part of the patient's non-pharmacological treatment. Postoperatively, pharmacological management included Ringer's Lactate (RL) infusion, intravenous Paracetamol administered four times daily, intravenous Ceftriaxone twice daily, and tetanus prophylaxis at a dose of 250 IU. Topical therapy consisted of an eye ointment containing Dexamethasone, Neomycin Sulfate, and Polymyxin B Sulfate applied once daily at night; sterile eye drops with Diclofenac administered three times daily in the left eye; and a combination eye drop containing Polymyxin B Sulfate, Neomycin, and Dexamethasone administered four times daily in the left eye. In addition, oral Dexamethasone was given three times daily. Following corneoscleral repair, the patient's visual acuity in the left eye remained unchanged at 1/300, both before and after the procedure.

DISCUSSION

A study conducted in East Nusa Tenggara (NTT) reported that unilateral ocular trauma was the most common presentation, occurring in 95.7% of cases (Banamtuan et al., 2025). In terms of age distribution, research in Denpasar found that one of the highest incidences occurred in children aged 1–10 years, accounting for 20.1% of cases. The majority of injuries took place at home (59.2%), with nails identified as one of the common causes of ocular trauma (Pradana et al., 2017).

Initial management of sharp ocular trauma involves immediate first aid and intervention to prevent further damage. The main treatment for open-globe injuries is corneoscleral repair, which aims to preserve ocular integrity, prevent complications, and improve quality of life. Any ocular trauma associated with symptoms or vision impairment is an indication for reconstructive surgery. Standard initial steps include protecting the eye with a shield, administering systemic analgesics, providing broad-spectrum antibiotics to prevent endophthalmitis, and giving tetanus prophylaxis (Razzaqy et al., 2023). Clinical manifestations may include decreased visual acuity, abnormal pupil shape or position, visible corneal or scleral ruptures, tissue prolapse, and hyphema (American Academy of Ophthalmology, 2022).

Prompt wound closure is essential to restore globe integrity and reduce the risk of intraocular damage, inflammation, microbial proliferation, and endophthalmitis. Before surgery, clinicians should apply a protective shield, minimize manipulation, instruct the patient to remain nil per os, prescribe sedation and pain control, initiate intravenous antibiotics, provide tetanus prophylaxis, and arrange anesthesia consultation. General anesthesia is almost always preferred for open-globe repair. Full-thickness corneoscleral lacerations with uveal prolapse typically require surgical repair in the operating room. The primary goal of repair is to restore globe integrity, while the secondary goal — achieved during primary or subsequent procedures — is to restore vision. Surgeons should avoid overly optimistic prognoses, as subsequent surgeries may be required and are often eye-saving rather than sight-saving. Postoperative management focuses on preventing infection, reducing inflammation, controlling intraocular pressure, and relieving pain (American Academy of Ophthalmology, 2022).

Postoperative care may include intravenous antibiotics (such as a cephalosporin and an aminoglycoside) for 48 hours, followed by oral antibiotics. Topical corticosteroids may be administered 4–8 times daily depending on the degree of inflammation, and cycloplegics are tapered as inflammation subsides. In children, sutures can be removed as early as 6–8 weeks, either partially or completely, depending on clinical progress. Because of the risk of amblyopia, visual correction should not be delayed, and occlusion therapy of the uninjured eye may be required to reduce amblyopia risk (American Academy of Ophthalmology, 2022).

Associated ocular injuries may involve surrounding structures such as eyelid lacerations, which require surgical repair to preserve function and cosmetic appearance. Penetrating ocular trauma remains a leading cause of unilateral visual loss in children; a similar pattern has been reported elsewhere, with 65% of pediatric injuries occurring in children under 10 years of age and often resulting in severe and irreversible visual impairment (Omobolanle et al., 2012). Childhood eye injuries are among the most common causes of acquired unilateral blindness. Differences in pediatric ocular anatomy and stronger inflammatory responses compared to adults often worsen prognosis in children. Full-thickness corneal lacerations require primary suturing, and reviews of ocular trauma show that perforating and penetrating injuries account for nearly half of cases, followed by penetrating trauma with intraocular foreign bodies (IOFB). Open-globe injuries generally have poorer visual outcomes, and the risk of amblyopia complicates rehabilitation in pediatric patients (Bayar et al., 2022).

This case did not correlate with previous findings that ocular trauma incidence is higher in males (Swetha et al., 2024). Limitations of this report include the absence of long-term follow-up and the lack of data on potential complications in this patient. The Ocular Trauma Score (OTS) is a valuable prognostic tool that can help inform patients about expected visual outcomes following ocular injury. Knowledge of their OTS allows patients to set realistic expectations, whether favorable or poor. For ophthalmologists, OTS serves as an important aid in counseling, clinical decision-making, and research, as it enables evaluation and comparison of outcomes across ocular trauma cases (Justin & Scoville, 2024).

CONCLUSION

Penetrating ocular trauma is a serious condition that occurs when a sharp object disrupts the anatomical structures of the eye, including the cornea, sclera, and eyelids. Immediate wound closure and surgical repair are critical to preserving the integrity of the globe and preventing further complications. The administration of appropriate systemic and topical antibiotics is essential to reduce the risk of infection, while tetanus prophylaxis should be provided, particularly when the injury is caused by contaminated objects such as nails. In addition, anti-inflammatory and analgesic therapy plays an important role in ensuring patient comfort, minimizing inflammation, and supporting recovery. Comprehensive management that combines surgical intervention with pharmacological therapy is therefore vital to optimize outcomes and reduce the risk of long-term visual impairment.

CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this case report.

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