



Firecracker or Grenade: A Case Report of Shrapnel Injury and Review of Literature

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ABSTRACT

A 4-year-old male presented with sudden onset diminution of vision and pain following a firecracker injury to the left eye. Ocular examination revealed a full-thickness corneal tear with uveal tissue prolapse and a full chamber hyphema obscuring the posterior view. The non-contrast CT revealed an intraocular foreign body of metallic origin in the vitreous cavity. The patient underwent primary corneal tear repair under general anesthesia for the left eye under the cover of systemic steroids. The retained foreign body was left in situ. The surgery was uneventful. This case report highlights the uncommon occurrence of an intraocular metallic foreign body following a firecracker injury and underscores the importance of taking safety precautions during festive celebrations.

INTRODUCTION

Firework-related ocular injuries are a significant cause of eye trauma worldwide, particularly during festive seasons and public celebrations.¹ Fireworks are commonly associated with blast injuries, which can result in extensive damage to the ocular structures due to the high-impact forces involved. Injuries from firecracker-related incidents range from minor abrasions to severe trauma that can result in significant vision loss.²

Paediatric patients are particularly vulnerable to these injuries due to their limited awareness of safety precautions and a higher likelihood of proximity to fireworks during family gatherings. Research indicates that children represent a disproportionately high percentage of those affected by firework-related eye trauma, often presenting with more extensive injuries that may require complex surgical interventions.³

Here we are reporting a shrapnel injury with retained intraocular foreign body following a firecracker injury post festivities in a child which has been rarely reported to the best of our knowledge.

CASE REPORT

In November 2024, After Diwali, a 4-year-old child presented to our emergency department with a history of a left eye injury caused by a firecracker two days ago. The injury was associated with sudden-onset pain, redness, and reduced vision in the affected eye. The injury was sustained when the child was a bystander and not actively involved in the firecracker bursting. The patient was initially evaluated at a local government hospital and was subsequently referred to our facility for further management.

At presentation, the patient was oriented and general physical examination revealed no abnormalities. The visual assessment revealed only perception of light in the left eye, with the projection of rays being inaccurate in all quadrants. The other eye was normal. Anterior segment examination revealed eyelid edema on the left side, diffuse conjunctival congestion, and a full-thickness corneal tear extending from the 10 o'clock position at the limbus to the centre, involving the visual axis. There was also prolapse of uveal tissue, surrounding corneal

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edema, and a full chamber hyphema that obscured posterior details. (Figure 1) Fundus examination of the right eye was within normal limits, but no view was possible for the left eye due to opaque media.

The child was started on topical and systemic antibiotics and steroids along with topical cycloplegic. The clinical picture showed an injury via a flying projectile and the presence of a penetrating injury was suggestive of the possibility of retained intraocular foreign body (RIOFB). The patient was then advised a non-contrast computed tomography (NCCT) of the head and orbit and surprisingly, the imaging showed a metallic intraocular foreign body in the vitreous cavity. (Figure 2) A well-defined, round to oval hyperdense foci, <5mm in size, in the intraocular compartment of the left orbit occupying the mid vitreous cavity with subtle perifocal hyperdensities in its vicinity. The contour of the globe was grossly maintained. Mild preseptal fat stranding was also seen. Given the corneal laceration and retained metallic intraocular foreign body, urgent primary surgical repair of the laceration with evacuation of anterior chamber hyphema under general anesthesia was undertaken in the first stage followed by elective surgery later for managing the associated complications and removal of foreign body in an attempt to restore vision was planned.

The patient subsequently underwent surgical repair, with repositioning of the prolapsed uveal tissue and closure of the tear with nylon 10-0 sutures under general anesthesia, while the intraocular foreign body was left undisturbed under the cover of systemic steroids. Postoperatively, the course was uneventful.

The second surgery is scheduled at a later date at the time of reporting.



Figure 1: Ocular condition at presentation



Figure 2: Noncontrast CT scan

DISCUSSION:

There are numerous reports of ocular injuries involving firecrackers, ranging from closed globe injuries leading to lid tear, corneal foreign body, anterior chamber hyphema, traumatic cataract, berlin's edema, vitreous hemorrhage, to open globe injuries causing corneoscleral tear, retinal tear and IOFB.^{3,4}

However, retained *metallic* IOFB/Intraocular *Shrapnel* injuries due to firecrackers have been rarely reported in the literature as per our best knowledge⁵. Shrapnel injuries are commonly seen in weapon-grade explosives used in combats. Firecrackers usually cause injury due to explosion; shock waves resulting in blunt trauma/closed globe injury or burns due to heat. The presence of particulate foreign bodies embedded in the tissue composed of gunpowder has been reported in the cornea, conjunctiva, lids, and face.⁶ These particles do not have enough inertia or mass to penetrate the cornea or sclera, hence retained intraocular metallic foreign bodies have rarely been reported in the literature. This unusual finding raises questions about the mechanism of injury, as it is unclear whether the foreign body was a loose metallic fragment propelled by the explosion or if it was pre-existing within the firecracker casing. If it was indeed embedded within the firecracker, it suggests that even recreational-grade explosives can contain metallic components with the potential to cause high-velocity penetrating injuries. We suggest extra caution and avoid facing the explosive firecrackers during their use even when observing from a distance and not actively lighting the firecrackers.⁷

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