



Intrastromal Corneal Glass Foreign Body in a Case of Spectacle Glass Injury

**Suwarna Suman^{a*}, Arushi Kumar^b,
Hemant Uttamrao Rathod^a and Virendra K. Pal^c**

^a Department of Ophthalmology, All India Institute of Medical Sciences Jodhpur, Rajasthan, India.

^b Department of ENT, Nalanda Medical College and Hospital, Patna, Bihar, India.

^c Eye Hospital, Regional Institute of Ophthalmology, Sitapur, UP, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJMAH/2023/v21i3799

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/96442>

Case Report

Received: 06/12/2022
Accepted: 14/02/2023
Published: 18/02/2023

ABSTRACT

Spectacle-related glass foreign body eye injury is commonly associated with sports activities and a significant contributor to penetrating eye injury. Optically clear glass particles may easily be missed during the examination. We present a case of intrastromal glass foreign body embedded in superficial layers of corneal stroma associated with sports-related spectacle injury in a 21-year male. There were multiple superficial lacerations and multiple small glass fragments on the surface of the cornea. After the removal of glass fragments under a slit lamp, the eye was washed thoroughly and patched with antibiotic and cycloplegic eye drops for twenty-four hours. However, the next day we could detect a small intrastromal glass fragment in the superficial layers of the corneal stroma under slit-lamp examination with high magnification. A small piece of glass (1mm in length) was removed under topical anaesthesia.

*Corresponding author: E-mail: suwarnasuman@gmail.com;

Keywords: Foreign body; glass foreign body; intracorneal foreign body; spectacle injury.

1. INTRODUCTION

Spectacle-related ocular trauma is commonly associated with sports activities, assaults and occupational injuries [1-3]. "In one study of 446 cases of penetrating ocular injury occurring over a ten-year period, sixteen injuries (3.6%) were due to spectacles; 40% of these were adult male nonprofessional athletes" [4]. "A retrospective study of hospitalized eye injuries in Taiwan found that broken eyeglasses/spectacles were also significant contributors to penetrating eye injury (12, 7.7%), along with scissors (21, 13.5%), pencils and pens (19, 12.2%) and knives (10, 6.4%)" [5].

"In the broken glass injury, sharp-edged glass fragments can easily penetrate the cornea and be retained in the corneal stroma. Glass foreign bodies (FBs) are typically inert and, hence, do not elicit an inflammatory response; can be safely retained in the corneal stroma for a long time. However, they can cause damage by mechanical irritation depending on the mobility and sharpness of the FB" [6].

Here we present a case of intrastromal corneal glass foreign body embedded in superficial layers associated with sports-related spectacle injury in a 21-year male. A small piece of glass (1 mm in length) is removed under topical anaesthesia.

2. CASE REPORT

A 21-year-old male presented in the emergency eye clinic with a painful diminution of vision in the left eye three hours following a spectacle injury with a cricket ball while playing. Mild lid ecchymosis was present along the lid margin and on the skin over the inferior orbital margin in the left eye. There was no associated laceration of the face or forehead. Uncorrected visual acuity was 6/36 in the right eye (RE), and counting fingers at one meter in the left eye (LE). Slit-lamp examination of the LE showed bulbar conjunctival congestion and subconjunctival haemorrhage superiorly. There were multiple superficial lacerations and multiple small glass fragments on the surface of the cornea. The pupil was round, regular, and reactive. The anterior chamber was normal in depth and content. Examination of the RE was unremarkable. The glass fragments were removed with the help of a 26 G needle and cotton bud after topical

anaesthesia (Proparacaine hydrochloride 0.5%) under slit-lamp biomicroscopy. The eye was washed thoroughly. Slit-lamp examination showed multiple superficial lacerations and areas of epithelial defect stained positive with fluorescein stain. However, no FB was seen and the Seidel test was negative (Fig. 1a). The RE was patched with eye drop moxifloxacin 0.5% and cyclopentolate hydrochloride 0.5% and the patient was advised to review in OPD in next morning. The next day the best-corrected visual acuity was 6/6 RE and 6/60 LE and Intraocular pressure was 12 mmHg in the right eye and 14 mmHg in the left eye. Slit-lamp examination with high magnification of the LE revealed a small intrastromal glass fragment in the superficial layers (Fig. 1b). The patient has advised the removal of the glass particle under the operating microscope. A small glass fragment (1 mm in length) was removed after topical anaesthesia (Fig. 2a). Superficial lacerations healed with linear scarring in a week. In the LE visual acuity improved to 6/12 with correction at the one-month follow-up (Fig. 2b).

3. DISCUSSION

There are several case reports of intracorneal and intraocular glass fragments in the literature. However, only a few case series are reported regarding ocular glass injury. Glass is reported to be one of the most common causes of open globe injuries in children; together with knives, and scissors account for 34.4% of injuries [7]. Keeney et al reviewed 42 patients with spectacle glass injury: 6 were occupational, 4 were sports-related, and 9 were due to assaults [3]. Kaufman reported eleven cases of injury due to glass fragments in a study that reviewed 1107 cases of industrial injuries. Nine were caused by the broken spectacle glass hit by flying objects [8].

"Glass FBs are typically inert and biocompatible with ocular tissues. Santoni reported a fragment of glass near the optic disc for 11 years that remained asymptomatic; while Cohen described a glass fragment that remained asymptomatic in the retina for 28 years in a patient" [9,10]. Glass particles can remain in the cornea for long periods without inciting a pathologic tissue response. However, corneal complications ranging from low-grade corneal oedema to severe bullous keratopathy have been reported in association with intracameral and intraocular glass FBs [6,11]. "Corneal oedema developed

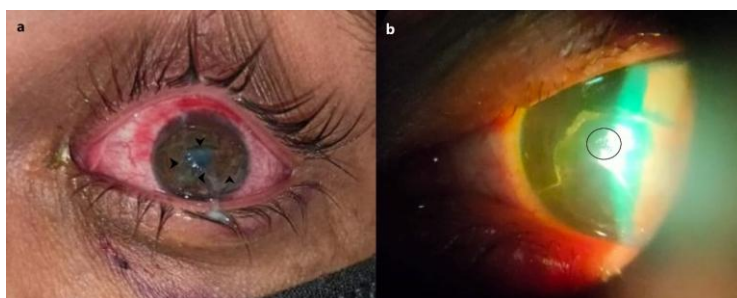


Fig. 1. (a) Clinical photograph showing multiple superficial corneal lacerations (arrowheads) after the removal of glass fragments. (b) Slit lamp photograph showing a small piece of glass (black circle)

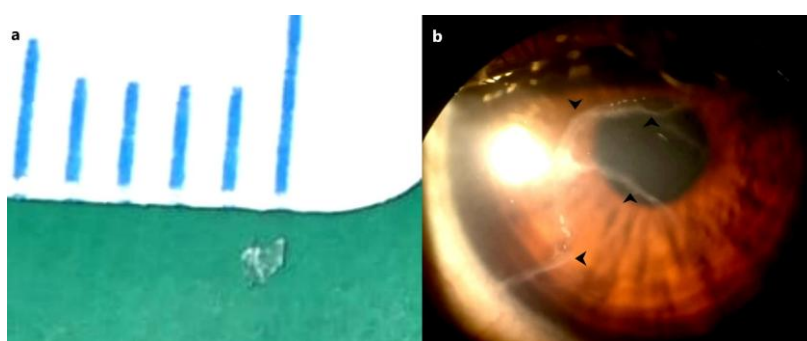


Fig. 2. (a) Photograph showing glass fragment 1 mm in length. (b) Linear scarring after healing of superficial corneal lacerations (arrowheads)

months to years after the initial injury and, improved when the source of irritation is removed. These cases have been attributed to mechanical irritation from intracameral glass, which may be due either to the sudden shifting of the FB or to repeated small movements with subsequent endothelial decompensation” [6,11]. Rarely anterior uveitis and even sympathetic ophthalmitis has been reported. A traumatic cataract may result from the original injury or may occur later through the movement of sharp spicules damaging the anterior lens capsule. [6] Mannis et al reported a case of a 36-year-old patient with nonedematous keratopathy associated with microscopically demonstrable intracorneal glass fragments after 5 months of glass fragment injury. In addition to the keratopathy, a peculiar conjunctival degenerative process developed on the superior tarsus of the patient's same eye [12].

Glass particles are optically clear, therefore easily missed during the examination. A careful examination with a slit-lamp under high magnification can avoid the missed diagnosis of a glass FB like in this case. Recent advances in ocular imaging including high-resolution techniques for visualizing the anterior segment

and angle structures such as anterior segment optical coherence tomography (AS-OCT) may be complementary to the diagnosis of missed glass particles and useful for monitoring patients with intrastromal glass FB. It helps in localization and can determine the depth and extent even when slit lamp evaluation is limited by corneal opacities [12,13].

Al-Ghadeer et al reported a 19-year-old patient with multiple intrastromal glass FBs with a description of its imaging with the Pentacam Scheimpflug camera and AS-OCT. Surgery was avoided and the patient’s visual acuity remained stable at 20/30 at the 1-year follow-up with no migration of the intrastromal glass and no adverse sequelae [14]. Pretz et al reported “the 4-year course of a retained intrastromal glass FB in a 9-month-old girl”. “The patient was closely monitored with regular AS-OCT and specular microscopy assessment. The corneal scar and glass FB were found to be stable with no migration or inflammatory reaction. AS-OCT images at 4 years post-injury showed the FB to be stationary at a distance of 214 and 253 mm from the epithelial and endothelial surfaces, respectively” [15].

4. CONCLUSION

There is a high risk of small glass fragments being embedded in the stromal layers in the broken glass injury. A careful examination with a slit-lamp under high magnification can avoid the missed diagnosis of a glass FB like in this case. Non-contact imaging such as AS-OCT may be helpful in diagnosis and enables exact localization and determination of the size of the foreign bodies, as well as useful for the monitoring of patients. Retained intracorneal/intrastromal glass FBs are usually stationary and can be safely retained under observation.

CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Weitgasser U, Wackernagel W, Oetsch K. Visual outcome and ocular survival after sports related ocular trauma in playing golf. *J Trauma*. 2004;56:648–650.
2. Ong HS, Barsam A, Morris OC, Siriwardena D, Verma S. A survey of ocular sports trauma and the role of eye protection. *Cont Lens Anterior Eye*. 2012;35:285–287.
3. Keeney AH, Estlow BR: Spectacle glass injuries to the eye. *Am J Ophthalmol*. 1971;72:152–158.
4. Christianson MD, Parker JA, Arndt J. Material and thickness: the important factors in the impact resistance of spectacle lenses. *Can J Ophthalmol*; 1977;12:300–303.
5. Liu ML, Chang YS, Tseng SH, Cheng HC, Huang FC, Shih MH, et al. Major pediatric ocular trauma in Taiwan. *J Pediatr Ophthalmol Strabismus*; 2010;47:88–95.
6. Archer D, Davies M, Kanski J. Non-metallic foreign bodies in the anterior chamber. *Br J Ophthalmol*; 1969;53:453–6.
7. Bunting H, Stephens D, Mireskandari K. Prediction of visual outcomes after open globe injury in children: a 17-year Canadian experience. *J Am Assoc Pediatr Ophthalmol Strabismus* 2013;17:43–8.
8. Kaufmann, MIH. The incidence and management of common industrial eye injuries. *Canad. Med. Assoc. J*. 1956;75:284, 1956.
9. Santoni A; Sullecon sequenze della retenzione die frammenti di vetronell'internodell'occhio. *Boll Oculust'* 1958;37:81-8.
10. Cohen M; Glass embedded in the eye. *Arch Ophthalmol'* 1929;1:528-9.
11. Saar I, Raniel J, Neumann E; Recurrent corneal oedema following late migration of intraocular glass. *Br J Ophthalmol'* 1991;75:188-189.
12. Mannis MJ, Fiori CE, Krachmer JH et al. Keratopathy associated with intracorneal glass. *Arch Ophthalmol'* 1981;99(5): 850–852
13. Jancevski M, Foster CS. Anterior segment optical coherence tomography. *Semin Ophthalmol'* 2010; 25(5–6):317–323
14. Al-Ghadeer H, Al-Assiri A. Identification and localization of multiple intrastromal foreign bodies with anterior segment optical coherence tomography and ocular Pentacam. *Int Ophthalmol*. 2013;34:355–8.
15. Peretz D, VandenHoven C, Mireskandari K. Retained intrastromal corneal glass foreign body in an infant. *Can J Ophthalmol*. 2019;54(5):232-233.

© 2023 Suman et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/96442>