Case report

Intracorneal glass foreign body in a case of spectacle glass injury

Abstract

Spectacle-related glass foreign body eye injury is commonly associated with sports activities and a significant contributor to penetrating eye injury. Glass particles are optically clear, therefore easily missed during the examination. Also, glass foreign bodies are typically inert and, hence, do not elicit an inflammatory response; can remain asymptomatic in the ocular tissue for a long time. However, they can cause damage by mechanical irritation depending on the mobility and sharpness of the glass particle.

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

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].

Glass particles are optically clear, therefore easily missed during the examination. Also, 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 intracorneal 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 loss 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. 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 with associated corneal oedema and areas of epithelial defect stained positive with fluorescein stain. However, no FB was seen. Intraocular pressure was 12 mmHg in RE and 14 mmHg in LE measured by rebound tonometer (Figure 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. Slit-lamp examination with high magnification of the LE revealed a small intrastromal glass fragment in the superficial layers (Figure 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 (Figure 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 (Figure 2b).

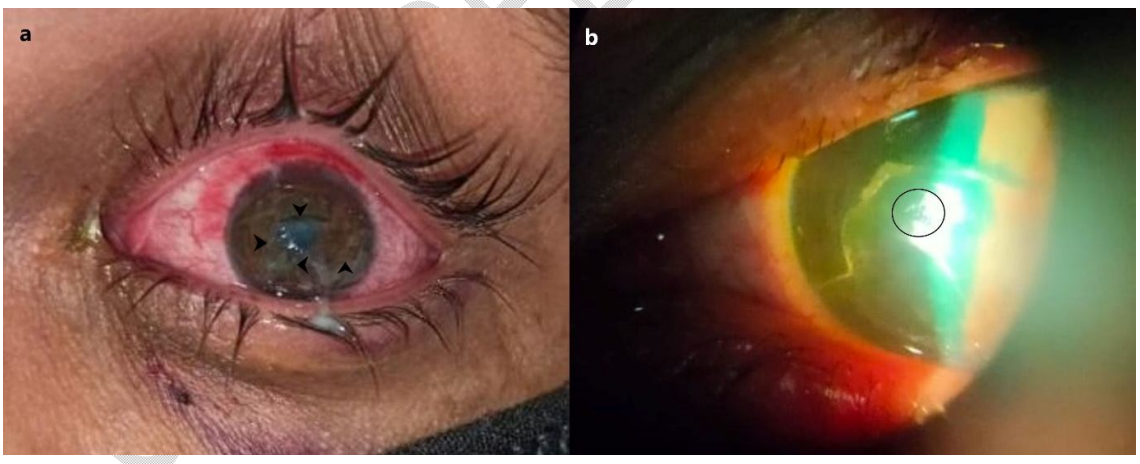

Figure 1: (a) Clinical photograph showing multiple superficial corneal lacerations (arrowheads) after the removal of glass fragments. (b) Slit lamp photograph showing a small piece of glass (black circle).

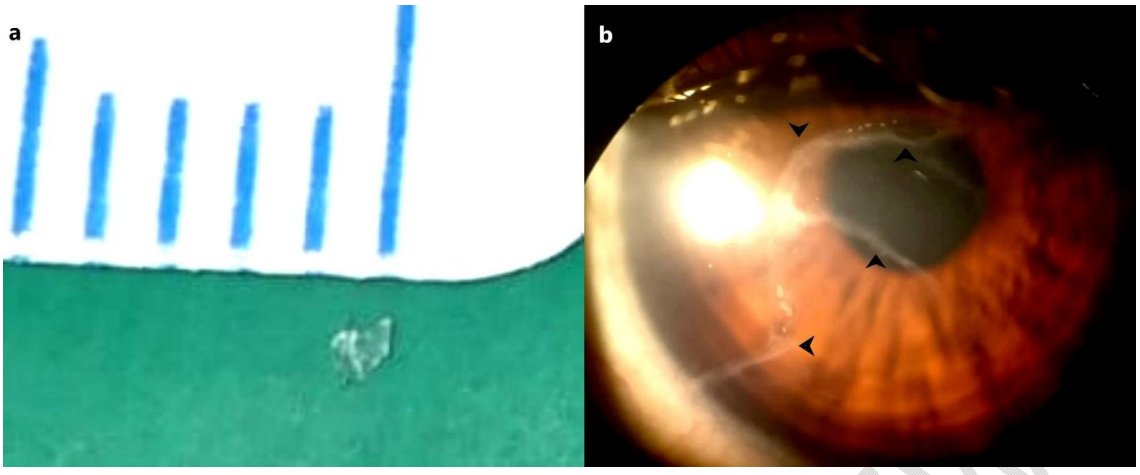

Figure 2: (a) Photograph showing glass fragment 1 mm in length. (b) Linear scarring after healing of superficial corneal lacerations (arrowheads).

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 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

Glass FBs 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. 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

Written informed consent was obtained from the patient to publish the de-identified findings of this case and images.

ETHICAL APPROVAL

Not applicable.

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FIGURES LEGENDS

Figure 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).

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