Scholars Journal of Medical Case Reports **ISSN 2347-6559 (Online)**
Sch J Med Case Rep 2015; 3(9B):906-910 **ISSN 2347-9507 (Print)**
©Scholars Academic and Scientific Publishers (SAS Publishers)
(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjmcr.2015.v03i09.036

Glass piece in the retina after road traffic accident: to remove or not to remove

Tan Pek Hwi[1], Teh Wee Min[2], Choo Swee Ying[1], Sunder Ramasamy[1], Jamalia Rahmat[1], Joseph Alagaratnam[1]
[1]Department of Ophthalmology, Hospital Kuala Lumpur, Jalan Pahang, 50586 Kuala Lumpur, Malaysia
[2]Department of Ophthalmology, Hospital Tuanku Ampuan Najihah, 73000 Kuala Pilah, Negeri Sembilan, Malaysia

***Corresponding author**
Dr Tan Pek Hwi
Email: tanpekhwi@hotmail.com

Abstract: A 7-month-old infant was brought to the Eye Clinic when his mother noticed peripheral cornea opacity 2 weeks after a road traffic accident. The accident involved a collision between two vehicles, and the windscreen of the car that the child was travelling in shattered while he was held by his mother at the front passenger seat. He was not brought to any medical attention initially as there were no obvious injuries noted. Examination revealed an intact right globe and a quiet anterior chamber. Fundus examination of the right eye showed a glass piece lodged between the optic disc and fovea. As there were no complications noted, it was managed conservatively at first. However, as the child gained increasing mobility and there was development of cataract, a decision was made to perform lens aspiration and vitrectomy to remove the glass piece. Intraoperative, a retinal tear was noted inferotemporally. Cyrotherapy and endo laser were performed to secure the area around the retinal tear. 8 months after the first surgery, a secondary lens implant was implanted. Intensive visual rehabilitation was prescribed and the toddler continued to be under regular follow-ups.
Keywords: Glass, intraocular, foreign body, vitrectomy, trauma.

INTRODUCTION

Ocular trauma with retained intraocular foreign bodies (IOFB) is common and constitutes 18-40% of all ocular injuries requiring surgical management [1]. There are about 4-7% of eye injuries involving glass piece [2]. Among these, about 5% of eye injury involving glass piece are children [2]. Most of the glass fragments (86.5%) were located within the posterior chamber or both posterior and anterior chambers [3].Eye injuries are an important cause of ocular morbidity in children and it is the leading cause of non-congenital unilateral blindness in this age group[4]. Majority of glass IOFB are caused by blast injury [3]. Glass IOFB is rare in infant. This is a rare case reported on glass IOFB in the retina of an infant after a road traffic accident (RTA).

CASE REPORT

A 7 month-old baby was involved in a road traffic accident one month prior to presentation in eye clinic. Upon colliding with another car, the front windscreen of the car he was seated in shattered and multiple glass pieces hit his face and right eye. No obvious external injuries were noted by his mother immediately post-trauma. However, right cornea opacity was noted by his mother 2 weeks after the accident. Otherwise, there was no eye redness or lid swelling. The child was not in pain and not irritable.

Examination of the right eye showed no swelling of the eyelid or injection of the conjunctiva. There was a corneal opacity at 6 o'clock position over the right eye (Figure 1). Seidel's test was negative. The anterior chamber was quiet and formed. The pupil was slightly peaked at 6 o'clock. Left eye examination was unremarkable. Both eyes were able to fix briefly at the light but did not maintain fixation. The corneal reflex was central in both eyes. Refraction assessment showed hyperopia of the right eye (+ 3.00DS) and left eye was myopic at -1.00DS

Examination under anaesthesia (EUA) showed a glass piece lodged between the macula and the optic disc of the right eye (Figure 2). Otherwise, the fundus was normal. There were no vitreous cells, retinal detachment or haemorrhage of the right eye. The glass intraocular foreign body (IOFB) was mobile with eye movement. Left eye was normal.

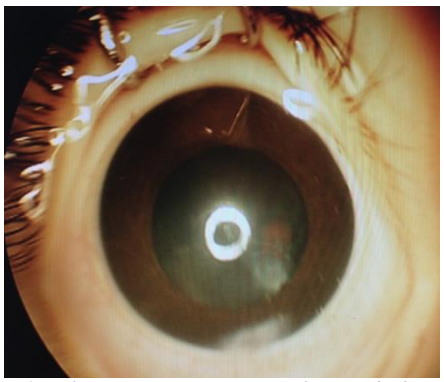

Figure 1: Right eye cornea opacity at 6 o'clock region with white conjunctiva. Pupil was dilated pharmacologically during EUA.

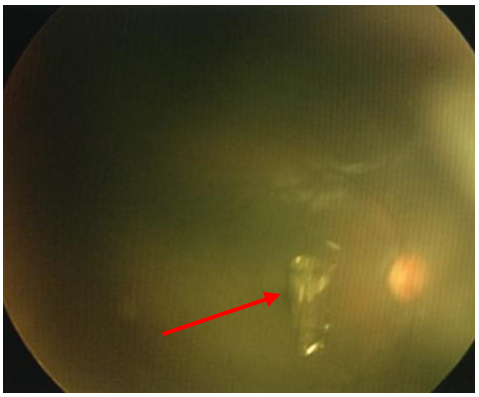

Figure 2: Glass piece (red arrow) measuring about 2 disc diameter in size lodged between right optic disc and fovea.

The child was initially managed conservatively with observation and monitoring of possible complications (retinal tear, detachment, haemorrhage and cataract) due to the foreign body in the retina.

The parents were informed regarding possible complications secondary to intraocular foreign body. As the child was growing, the risks of complications were higher especially when the child commenced greater mobility via crawling, walking and running. At 10 months old, the child started to develop post-traumatic cataract in his right eye (Figure 3). As the cataract became visually significant, the child underwent right eye lensectomy without intra ocular lens implant. In view of the risk of retinal tear and haemorrhage secondary to a very mobile glass piece in the retina and the child had started crawling, a decision was made and the parents consented to having the glass piece removed during trans pars plana vitrectomy (under general anaesthesia) in the same setting.

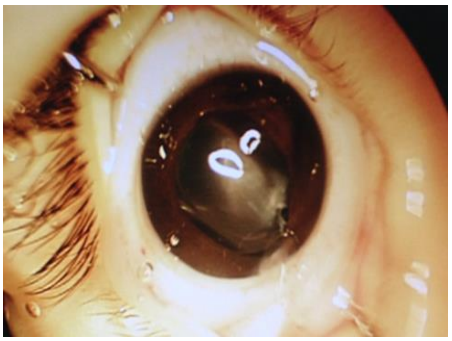

Fig 3: A cataractous right lens with cornea opacity during examination under anaesthesia (EUA).

Intra-operatively, right eye lensectomy was done via anterior approach. Then, core vitrectomy was done followed by injection of perfluoro decalin ($C_{10}F_{22}$) to protect the macular and attempt to float the glass piece. Sclerotomy at 10 o'clock position was enlarged to 5mm to remove the glass piece with conjunctival forceps. The glass piece measured 3.5mm x 4.0mm. Scleral indentation was also done and a retinal tear was noted at the infero temporal quadrant. Cyrotherapy and endo laser were performed, followed by fluid-air-gas exchange with perfluoro propane (C_3F_8).

Post-operatively, the child was started on 2-hourly dexamethasone and moxifloxacin eye drops for the right eye. The eye drops were tapered down gradually over 1 month. The parents were advised to keep the child in left lateral position whenever possible.

At one week post-operative visit, inflammation had subsided. The child was able to open his right eye comfortably. Fundus was not able to be visualized; however, B-scan showed flat retina without vitreous opacity or flocculation (Figure 4).

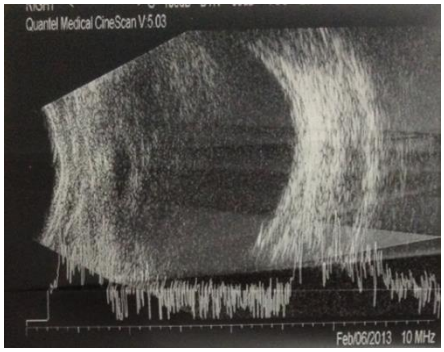

Fig 4: B scan of the right eye showed flat retina. There was no vitreous opacity.

At three months post-operatively, EUA showed that the macula was flat with retinal scar at the inferior temporal region (Figure 5). There was no sign of inflammation. Visual assessment showed that the child followed light occasionally (the child refused occlusion of the left eye during examination). An intraocular lens implantation was proposed to the parents, and they agreed to it.

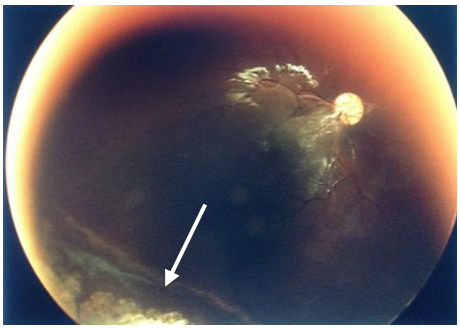

Fig 5: Right retina and macula were flat with retina scar (arrow) at interior temporal region. There was no retinal tear or detachment.

At 1 year and 6 months of age (about 8 months after initial surgery), the child underwent secondary intraocular lens implantation. The intraocular lens was implanted at the sulcus, with a targeted refractive outcome of +2.00DS. The child was on left eye patching on the first day post operation and then 4 hourly per day. At the same time, he was also started on dexamethasone and ciprofloxacin eye drops every 2 hourly immediately post-operation and tapered down over 1 month.

Right eye vision 2 weeks after secondary intraocular lens was blink to light and left eye was at least 6/15. Refraction of the right eye was -2.50DS/-1.0DC x 180^0. The parents were advised to perform left eye patching for at least 4 hours per day for the child. Visual stimulation was advised.

DISCUSSION

The commonest location for eye injury to take place is at home which accounts for about 50% of all accidents [5]. Traumatic eye injury secondary to road traffic accident (RTA) is relatively uncommon in children, especially in infants even though RTA is one of the commonest causes in adult (about 33%) [6]. The incidence of injuries from RTA in children is about 6% [6].Various studies had emphasized on the importance of safety belts and laminated glass windscreens in preventing eye injuries. Those countries using laminated glass windscreens reported almost no eye injuries [6, 7]. In this case, the child was only restrained by his mother without the use of any child seat or safety belt.

Clinical signs from a high velocity and small IOFB injury may not be obvious especially in children or infants, as demonstrated in this child. His mother did not notice any obvious injuries to the eye until about a month after the RTA when a corneal opacity was seen. Other than corneal opacity, there was no inflammation like eye redness or pain which can draw the parents' attention earlier. It can then be missed during initial ocular examination for intraocular foreign body (IOFB) [8]. Thus, detailed history and careful ocular examination are very important to prevent misdiagnosis. Dilatation of the pupil and careful examination of the entire retinal periphery with sclera indentation is important. As this patient was an infant, examination under anaesthesia (EUA) was mandatory in order to have careful and detailed ocular examination. EUA can help to locate the IOFB and to look for complications of IOFB like retinal detachment, tear, haemorrhage, cataract and others.

Retained intraocular glass piece in a child is rarer as compared to metallic foreign body. Glass piece is an inert material which may not result in significant inflammation [9]. As there were no signs of infection, retinal detachment or visual compromise, the parents had opted for conservative management initially. Thus, 3-monthly EUA was done to monitor and observe for the complications of IOFB in this patient. The parents were informed to seek medical attention if there were eye redness, pain (if the child was irritable), eye discharge or any squints.

There are advantages and disadvantages for conservative management for glass piece IOFB. It is difficult to weigh the risks and benefits from the surgery itself versus complications of leaving the IOFB in the eye.

Glass is inert and it does not cause any chemical reaction. Rathmann and Aerztl reported that only one out of 62 eyes with retained glass foreign body in the eye was complicated with perforation [10]. The damage of the glass foreign body can due to impact of the injury itself or secondary to movement of the glass piece causing mechanical injury to the eye. Foreign body in the posterior segment is relatively immobile and less injurious. Santoni reported a fragment of glass near the optic disc for 11 years that remained asymptomatic [11]; while Cohen described a glass fragment that remained asymptomatic in the retina for 28 years in a patient [12].

If the glass foreign body can remain asymptomatic in the eye, monitoring and conservative management can reduce risk of surgery in the child. Any ophthalmic surgery may cause more harm to the patient. The possible complications are either from general anaesthesia or from surgery itself, such as corneal opacity, refractive error which may lead to amblyopia in children, rapid development of cataract, vitreous haemorrhage, retinal tear or detachment during surgery and severe post-operative inflammation.

Therefore, after a lengthy discussion with his parents about the condition, this child was managed conservatively at the beginning by monitoring for possible complications as the glass piece did not cause harm to the child initially.

On the other hand, there are a few case reports on late complications and spontaneous movement of retained glass foreign body in the eye. Saar I *et al .;* reported a case of glass splinters migration from vitreous to anterior segment causing acute corneal edema after fifteen years [13]. Lohlein reported migration of glass foreign body from oraserrata to anterior segment and causing traumatic cataract [14]. Migration of intraocular glass is usually from posterior

to anterior segment and 85% of the cases will shift downward [2].Vitreous liquefaction increases with age and following trauma [13]. It may then cause anterior migration of glass piece from the posterior segment. Vitreoretinal traction due to vitreous liquefaction may also cause retinal tear or detachment later. In a child, any of these possible complications will lead to amblyopia. Moreover, early vitrectomy has helped in attaining useful functional visual outcome in 25-50% of the eyes with posterior segment trauma [15].

In this case, the decision for vitrectomy and IOFB removal was made as the child became older. He became more active and had started to crawl and walk. This will further endanger the child as the mobile glass piece can cause retinal tear or detachment and induce cataract formation. Surgical options were discussed with the parents. This child had undergone lensectomy due to cataractous changes of the lens besides vitrectomy and removal of IOFB. Intra-operatively, there was retinal tear noted at the infero temporal region. Thus, cryotherapy and barricade laser were performed. Fortunately, the posterior pole of the retina was not detached. Secondary intraocular lens was then inserted.

The parents were also informed of long term follow up and possible risk of amblyopia. Alford V et al reported that patients with traumatic cataract which need lensectomy and vitreous surgery have less favorable outcome due to amblyopia in the future [16]. Besides that, there are several pre-operative, intra-operative and post-operative factors which have prognostic value in the final visual outcome of traumatized eye with retained IOFB. This child had several good prognostic factors. The good prognostic factors were pre-operatively good visual acuity, no active inflammatory reaction and endophthalmitis, no retinal detachment, tear or haemorrhage, and self-sealed corneal wound. However, IOFB retained in posterior segment instead of anterior segment is one poor visual outcome prognostic factors this child had [17]. Thus, the child needs to be followed up for amblyopia and secondary glaucoma in the future.

CONCLUSION:

Traumatic eye injury cannot always be prevented. However, high index of suspicion is needed to diagnose IOFB when there are minimal signs of infection or inflammation especially in a child. Identification of the underlying cause, mechanism of injury and type of IOFB may provide crucial information to determine the most effective methods of reducing possible complications in the treatment of IOFB.

ACKNOWLEDGEMENT

The authors would like to acknowledge the contribution of the late Dr TVN Karunakar for his input and contribution towards the writing of this case report.

REFERENCES

1. Thompsom JT, Parver LM, Enger CL; Infectious endophthalmitis after penetrating injuries with retained intraocular foreign bodies. National Eye Trauma System, Ophthalmology, 1993; 100: 1468-1474.
2. Milkowski S; A rare case of spontaneous shifting of intraocular glass foreign body 21 years after trauma. WiadLek, 1978; 31: 1065-9.
3. Gopal L, Banker AS, Deb N, Badrinath SS, Sharma T, Parikh SN *et al.;* Management of glass intraocular foreign bodies. Retina, 1998; 18(3): 213-220.
4. National Society for the Prevention of Blindness. Fact Sheet. Vision problem in the US. New York: National Society for the Prevention of Blindness, 1980.
5. MacEwen CJ, Baines PS, Desai P; Eye injuries in children; the current picture. British Journal of Ophthalmol, 1999; 83: 933-936.
6. Soni KG; Eye injuries in road traffic accidents. Injury, 1973; 5: 41-46.
7. Taylor WOG; Car seat belts and the eye. Injury, 1974; 6: 3-6.
8. Zhang Y, Zhang M, Jiang C, Qiu HY; Intraocular foreign bodies in China: clinical characteristics, prognostic factors, and visual outcomes in 1421 eyes. Am J Ophthalmol 2011; 152: 66-73.
9. Mostafavi D, Olumba K, Shrier EM; Fiber glass intraocular foreign body with no initial ocular symptoms. Retin Cases Brief Rep, 2013; 0: 1-3.
10. Rathmann GZ, Aerztl Z; Studies on the causes of eye injuries due to glass jars and the possibility of their avoidance. Zeitschrift fur arztliche Fort bildung, 1962;56:1008-14
11. Santoni A; Sullecon sequeneze della reitenzione die frammenti di vetronell'internodell'occhio. Boll Oculust 1958; 37: 81-8.
12. Cohen M; Glass embedded in the eye. Arch Ophthalmol 1929; 1: 528-9.
13. Saar I, Raniel J, Neumann E; Recurrent corneal oedema following late migration of intraocular glass. Br J Ophthalmol, 1991; 75: 188-189.
14. Lohlein W; Bemerkungenzur operative Indikations stellungbei intra ocularen. Fremdkorpern (Kupfer, Eisen, glas) in letzenAuge. Klin Monatsbl Augenheilkd, 1951; 119: 113-2.
15. Esmaeli B, Elner SG, Schok MA; Visual outcome and ocular survival after penetrating trauma. A clinico pathologic study. Ophthalmology, 1995; 102: 393-400.

16. Chaudhry NA, Walonker AF, Runyan T, Saito Y, Liggett PE; Penetrating injuries in young children. Retina, 1994: 14(3): 201-205
17. Chaudhry IA, Shamsi FA, Al-Harthi E, Al-Theeb A, Elzaridi E, Riley FC; Incidence and visual outcome of endopthalmitis associated with intraocular foreign bodies. Graefe's Arch Clin Exp Ophthalmol 2008; 246: 181-186.