



CASE REPORT

Penetrating Globe Injury by a Treble Barbed Fish Hook and Its Surgical Management by “Vertical Lid Split and Cut-It Out Technique”

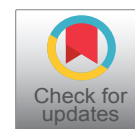
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Abstract

Fish hook related ocular trauma can range from simple to severe vision threatening injuries and safe removal of the hook can be a challenge. We are sharing a unique presentation of fish hook injury in a 12-year-old child, with penetration of lid, sclera and retina and its successful management. Ophthalmologists must be aware to address the clinical and surgical challenges associated with intraocular fish hook injuries.

Keywords

Fish hook injury, Barbed fish hook, Cut it out technique, Penetrating ocular injury, Ocular foreign body

Introduction

Fishing is a popular recreational activity for people of all ages all around the world, whereas it is the prime occupation in coastal areas of developing countries [1]. Hook and line fishing is a very commonly used, economically viable and low energy fishing method. It is considered pleasant and harmless [2], but insufficient protective gears can lead to accidental eye injuries. Fish hook related ocular trauma can range from simple to severe vision threatening injuries and safe removal of the hook can be a challenge.

We report a rare case of barbed fish hook injury through upper lid, penetrating sclera in a 12-year-old child. Ophthalmologists should be well aware of

various techniques available for removal of fish hooks. By adopting the correct surgical technique, based on the understanding of fish hook type, it can be removed with minimum damage to other intraocular structures, enabling good postoperative optical and surgical outcomes.

Case Presentation

A 12-year-old boy from Maldives presented with a history of accidental injury to his right eye with a barbed metal fish hook 24 hours before. The child had accompanied his friends for fishing and sustained injuries while his friend cast a line. Due to the lack of eye care facilities locally, they presented here 24 hours after the incident. It was a round bent triple J shaped fish hook with a treble barb. The attached rope with the bait was cut by the attender, but no attempts had been made to remove the hook.

On examination, one hook among the J shaped treble hook was penetrating the right eye through the upper lid, above tarsus. Vision testing, detailed evaluation of anterior and posterior segments could not be properly performed as the upper eyelid was stuck with the fishhook. Condition of the globe was not visible. The part of fishhook from its bend to needle point was embedded obliquely into the eyeball. CT scan showed metallic hook penetrating globe with altered contour of the eyeball suggestive of globe rupture (Figure 1).



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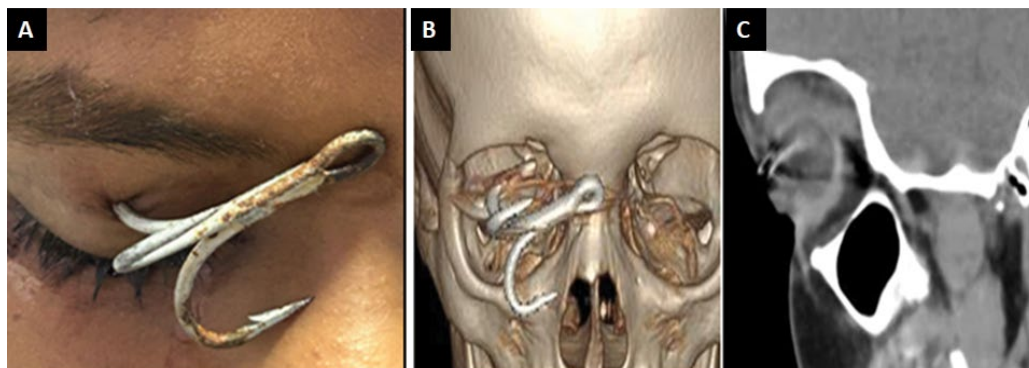


Figure 1: (A) Clinical photograph showing fish hook penetrating the globe; (B and C) CT scan showing penetration of the globe.

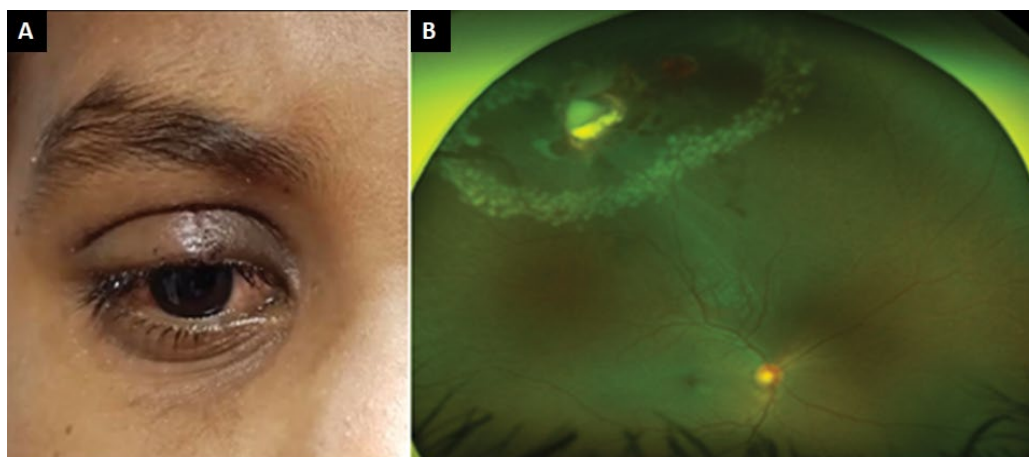


Figure 2: (A) Clinical photograph taken one week after the foreign body removal; (B) Fundus picture showing retinal tear with surrounding barrage laser marks.

After an informed consent from the parents, patient was immediately posted for the fish hook removal with globe repair under general anaesthesia, under intravenous antibiotic cover.

Vertical lid split was done from the lid margin till the site of penetration. Fish hook was separated from the lid. Medial and lateral portions of the upper lid secured with 6-0 silk sutures for better exposure. Site of penetration to the globe was 5 mm away from the superior limbus. The primary incision was enlarged with 15-degree side port in a curvilinear fashion. Disengagement of the tip from the sclera was done and removed with an oblique tangential motion to avoid any further engagement on the way. Scleral laceration was sutured with 5 interrupted 10-0 nylon sutures. Split lid is sutures in layers. Subconjunctival moxifloxacin 0.5% was injected at the end of the procedure. Lens was found to be clear intra-operatively. BCVA was 6/18 in the operated eye on postoperative day one.

Dilated fundus examination showed irregular retinal laceration with sclera show and vitreous incarceration, surrounding retina showed edema and retinal folds. Barrage laser was done around the retinal hole. Intra-vitreous vancomycin and imipenam injections were given.

Patient was treated with oral and topical antibiotics and steroids. During one week postoperative period, his BCVA was 6/6 with well apposed lid wound, anterior chamber was quiet. Retinal hole was stable barraged. There was no evidence of vitritis (Figure 2).

Discussion

Fish-hook related ocular trauma can involve the eyelids and the anterior- or posterior-segments [3]. But simultaneous injury to the eyelid and the cornea is rare, due to the protection offered by the lids [4]. In our case, it was a penetrating type of open globe injury involving zone 3, that is injury posterior to the ora serrata that involves the retina [5]. The severity of the injury due to fish hooks depends on various factors like type of fish hook, velocity of the hook, direction and orientation from which it is thrown, position of the eye and eye blink reflex to prevent the injury [6]. Surgical management has to be pre planned as per the hook type and the area of involvement. Treating ophthalmologists should have a basic understanding regarding various parts of the fishhook before any attempt at its removal.

The basic parts of the fish hook are given below (Figure 3)

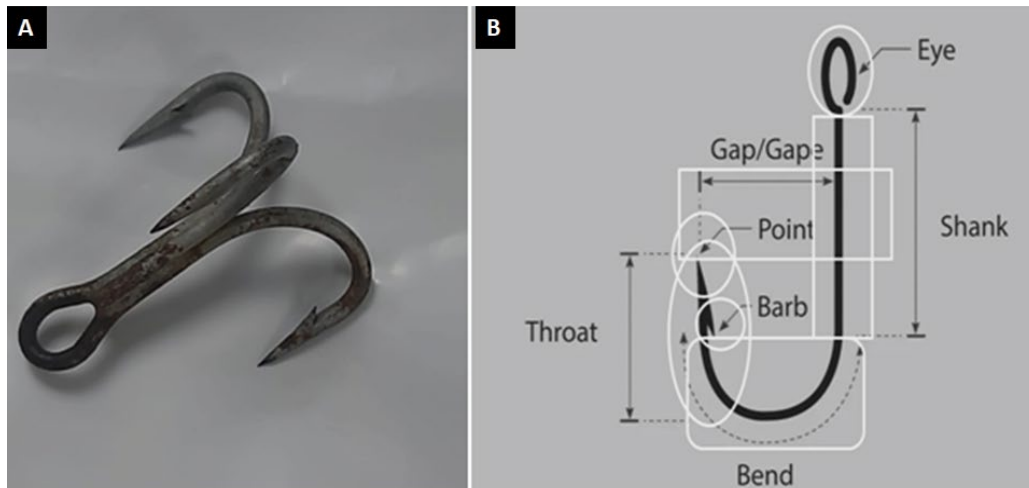


Figure 3: (A) The fish hook on extraction; B) Basic parts of a fish hook.

- The **eye** as in a needle at the back end to which fishing lines is attached via knots.
- The **shank** is the straight mid section of the hook.
- The **bend** is the section where the hook curves back.
- The **barb** is a small reverse-pointing spike stops the hook from sliding back out of the fish's mouth.
- The **point** is the distal most end, which enters and embeds into the fish's mouth.

Hooks can be classified as barbed or barbless. Based on the targeted species of fish, each hook is tailored, example Round bend (conventional J shaped), limerick hooks, tuna hooks, circle hooks, octopus hooks, Aberdeen hooks etc. Fish hook points can be of five types based on its shape as rolled in, spear, needle, hollow, knife edge etc. Based on number of hooks, it can be single, double or treble. The smallest hooks out there begin at around a size 30. The second smallest is size 29, then 28, 27, and so on, running "up" to size 1. After size 1, it switches to size 1/0 then 2/0, 3/0, all the way to 27/0. So, always confirm with the patient regarding which hook was used. In our case, it was a treble hook, each hook is round bent with a single barb Treble the points means triple the chances of a hookup, as one of them will always be facing the right way. But the peculiarity of trebles is that they don't tend to pierce very deeply as the shaft that are not buried prevents deep penetration. So, the part of fishhook from its bend to needle point embedded obliquely into the eyeball, without much deeper penetration in our case.

Despite the widespread prevalence of eye trauma related to a fishhook etiology, there is limited published information regarding the penetrating fishhook eyelid and globe injuries [7]. Most of the case reports are regarding corneal penetration. Parab, et al. [8] presented a case of fish hook embedded in the lower eyelid margin with an intact anterior and posterior lamella. They retrieved the hook without traumatizing

both the lamellae by adopting a "suture less, gray line split technique." They emphasized the need to respect tissue anatomy and minimize surgical trauma. In our case the hook was perforating the lid away from the margin, above the tarsus, and the hook was penetrating the globe. So, any manipulations to retrieve the hook from the lid would have caused further damage to the globe. At that time, we were unaware of the site of globe penetration whether it is cornea or sclera. So, we did a vertical lid split from the lid margin till the site of penetration. The fish hook was separated from the lid. Then we secured medial and lateral portions of the upper lid with 6-0 silk sutures for better exposure of the globe.

There are different techniques for removal of fish hooks embedded in ocular tissues [1,9].

The back-out method is primarily useful for barbless hooks, which is backing the hook out through its entrance wound. If this method is attempted for barbed hooks, it can increase the damage to the engaged ocular tissues.

The snatch technique/string yank technique is a traumatic technique, where downward pressure on the hook shank and a rapid pull are used to diminish pain during the removal. This would not be applicable in open globe injuries.

Cut it out technique- barbed hook is removed through the primary incision by extending it. A controlled extension of the wound is done to allow atraumatic delivery of the barb and tip of the hook. Wire cutters are used to cut the hook between the barb and the bend. Then the hook can be easily removed using the back-out method.

Advance and cut technique are a useful technique for barbed fish-hook injuries involving the anterior segment. Secondary incision is placed to deliver the hook, which is between the barb and the bend. The hook is then removed through the primary wound.

Advance without cut method: This method is like “Advance cut method” where the entire hook is advanced through a second incision made near the sharp tip of the hook without cutting the hook in between.

Needle-cover technique is the usual method of choice for hook penetrations of the retina, described by Grand and Lobes [10]. In this procedure, a large bore needle is passed into the eye through the entry wound. Barb of the fish hook is then engaged within the lumen of the needle and both are withdrawn together.

We followed the cut technique with enlargement of entry wound in a curvilinear fashion. Disengaged the tip from the sclera was done and removed with an oblique tangential motion to avoid any further engagement on the way.

Choovuthayakorn, et al. [7] reported a case of mid-peripheral retinal tear, from a point of the fishhook, and a surrounded localized inferotemporal retinal detachment. They managed with a combined lensectomy and pars plana vitrectomy, one week after primary repair. Other posterior segment injuries reported are Choroidal and vitreous hemorrhages, retinal tears and retinal detachments [3]. There is high risk of endophthalmitis, especially in case of delayed wound closure. In our case, there was an irregular retinal laceration with sclera show which was managed with barrage laser around it. Remaining retina was attached.

Unique presentation in our case, with penetration of lid, sclera and retina adds to the existing literature of wide spectrum of presentation of fish hook-related ocular injury. We have given adequate topical and systemic medicines to prevent postoperative endophthalmitis. Even though the patient presented 24 hours after initial trauma, they had not attempted to remove the hook. There was no involvement of cornea, lens and angle structures. All these factors helped to achieve a 6/6 vision in the postoperative one week period. Knowledge about structure of fish hook and employing prompt and appropriate method of removal without traumatizing ocular tissues, vigilant intra and postoperative care to prevent endophthalmitis, multi-staged approach in case of lens or posterior segment involvement helps in better postoperative outcome. Most importantly, raising awareness and actively promoting preventive measures, for both fishermen and observers, is pivotal. Ophthalmologists must be aware of the clinical and

surgical challenges associated with intraocular fish hook injuries.

Conclusion

By adopting the correct surgical technique, based on the understanding of fish hook type, the penetrated barbed fish hook could be removed without damage to lens and other intraocular structures, enabling good postoperative optical and surgical outcomes, under broad-spectrum antibiotic cover.

Conflicts of Interest

We have no affiliations or conflicts of interest in the subject matter or materials discussed in this manuscript.

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