

Twisted Tale of a Barbed Fish Hook!

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Ocular fish hook injuries should be treated judiciously in view of the damage to the ocular structures because of the barbed tip and chances of the infection due to the bait. Surgical management has to be planned based on the hook type and the area of involvement. If treated in time, visual prognosis can be excellent. We present a case of an accidental fish hook ocular injury to the child, managed by 'cut it out technique' with excellent post operative outcome. Early commencement of medical management, planned surgical approach and vigilant post operative outlook are the keys to success.

Keywords: Round Bend Barbed Fish Hook; Cut it Out Technique; Fishing; Penetrating Ocular Injury; Corneal Foreign Body**Introduction**

Fishing is considered to be a popular recreational activity in western countries [1]. On the contrary, it is the main occupation and the sole source of earning in developing countries like India, especially in the coastal areas. The injuries are inevitable due to the use of pointed fish hooks with or without barbs. Most commonly involved body parts are hands and head [2]. Though rare, ocular injuries need to be treated judiciously in view of the damage to the ocular structures because of the barbed tip and high chances of the infection due to the bait. If treated in time and with utmost care to avoid inadvertent damage while removing the hook, visual prognosis can be excellent. We present a case of an accidental fish hook penetrating ocular injury to a child with fish hook, managed by 'cut it out technique' with excellent post operative outcome.

Case Report

An 11 year old boy presented to our clinic with a history of accidental injury with barbed fish hook, 2 hours prior. The attached rope with the bait was cut by the attender and the hook was dangling over the patient's cheek. Detailed history was

taken from the parents. It was a round bent J shaped fish hook with a single barb, with earthworms as bait. Patient was not co-operative to check visual acuity on presentation. On slit lamp examination, fishhook was embedded obliquely into the cornea in the midperiphery at 8 o clock position in the right eye (Figure 1a). Localised corneal oedema was present in the area of involvement. It was a full thickness injury with the tip and barb of hook stuck in the iris tissue close to the angle, curved outwards towards the limbus. Lens was clear. Anterior and posterior segment examination of the left eye was normal.

Figure 1: a. Slitlamp picture of the right eye showing embedded fish hook, b. Post operative picture at 1 week follow up showing well opposed corneal tear edges.

After an informed consent from the parents, patient was posted for the fish hook removal with corneal tear repair under general anaesthesia. We tried to go ahead with the commonly employed 'back out method', but it was firmly adherent to the underlying tissues. Iris tissue was getting pulled along with the hook due to the entanglement of the barb and the tip in it. Due to the anticipated risk of iridodialysis and severe bleeding, we abandoned that approach. We tried to enlarge the same primary incision with 15 degree sideport in a curvilinear fashion so as to give way to the barbed tip. Disengagement of the tip from the iris was done with the help of a spatula inserted through the paracentesis. It was removed with an oblique tangential motion to avoid any further engagement on the way. Corneal laceration was sutured with 4 interrupted 10-nylon sutures. Thorough anterior chamber wash was given and intracameral moxifloxacin 0.5 % and voriconazole 1 % was injected at the end of the procedure. Lens was found to be clear intra operatively.

At one week follow up, tear edges were well opposed and the localised corneal oedema was reduced (Figure 1b). Lens was clear. Post operative fundus examination by indirect ophthalmoscopy was within normal limits. Best corrected vision was 20/20 in the involved eye. Topical moxifloxacin and voriconazole were continued for two more weeks, 6 and 4 times for one week each.

Discussion

Fishing is the prime occupation in southern coastal areas of India. Hook and line fishing is very common, economically viable and low energy fishing method employed by most [3]. Insufficient protective gear and inadequate parental supervision is the reason behind the mishaps. Though rare, fish hook injuries cause devastating ocular damage in the long run. Hence, management has to be timely and sagaciously planned. As noted by Aiello, *et al.* due to the protective nature of the orbit and the surrounding structures and the anterior segment is more affected than the posterior. Simultaneous injury to the eyelid and the cornea is also rare, justifying the protection offered by the lids [1]. Here, we describe the management in case of penetrating hook injury to the cornea and iris tissue.

Basic hook structure needs to be understood to plan fish hook removal. It starts with an eyelet, continuing into a shank which curves and ends into a tip and a barb, pointed in different directions.

Standard parts of the fish hook [3] as depicted in figure 2 a are-

Figure 2: a. Basic parts of a fish hook, b. Round bend fish hook with a needle point and a single barb, after removal from the eye.

- **Point:** The sharp bit that pierces the fish's mouth.
- **Barb:** A backwards-facing spike that stops the hook from coming loose.
- **Throat:** The section of the hook running down from the point.
- **Bend:** Where the hook curves back on itself.
- **Shank:** The same as the throat, but on the blunt end.
- **Eye:** The ring that attaches the hook to a lure or a line.
- **Gap/Gape:** The distance between the throat and the shank.

A wide range of fish hooks are available (Figure 3), eg- Round bend (conventional J shaped), circle hooks, octopus hooks, Aberdeen hooks etc. All of which have a different angle of the tip and barb, different number of barbs and distinct length of gape. Hence, it is mandatory to confirm with the patient regarding which particular hook was used. Round bend hooks are the most widely used hooks, for both sea water and fresh water fishing in southern Indian coastal areas [3]. Hooks can also be classified on the basis of structure of tip and the barb, viz. Barbless, needle, microbarb, knife edge etc (Figure 4). It is crucial to confirm with the attender that whether the fish hook was with a single barbed, multiple barbed or treble. Considering the circumstances, it is always advisable to ask the accompanying the attender for a similar hook for inspection, if available. Our patient's fish hook was round bend with a needle point and a single barb (Figure 2b). Needle points are designed to pierce easily with a small entry point, thus causing minimal

damage to the underlying tissues. On account of the straight nature of the needle point with non-curved barb, retrieval was relatively easy as compared to other points like knife edge or hollow point. The challenges in the surgery were to remove the hook through the small opening created by the needle point and also to maintain the correct movement while removing the throat and the bend.

Figure 3: a: Types of fish hooks, b: Schematic representation of fish hook classification.

Figure 4: Fish hook classification based on tip and barb.

Five techniques have been documented so far for the fish hook removal [4,5]

- Snatch technique- This method is employed for non-ocular tissues. Downward pressure is applied on the shank to remove the hook.
- Back out technique- This technique is useful for barbless hooks, where the hook is removed through the same entrance wound.
- Needle cover technique- It was for hook penetration in the retina. This procedure involves passing a large bore needle through the entry wound to engage in the barb, and then they are withdrawn together.
- Advance and cut technique- This technique was described to remove fish hooks with barb. Secondary incision is placed to deliver the hook with the barb end. Sterile wire cutters are used to cut the hook between the barb and the bend. Then, the hook is removed through the primary wound similar to back out method. This method provides an advantage in the form of controlled secondary incision with atraumatic removal.
- Cut it out technique- This method is particularly useful in a way that, barbed hook is removed through the primary incision by extending it. Diagrammatic representation of the same with successful hook removal was given by Bhalerao, *et al.* [6] where the visual axis was involved with iris tissue stuck in the barb.

Ahmad, *et al.* [7] also described a case where they removed a fish hook with 'cut it out technique'. Involvement of the visual axis and resultant traumatic cataract worsened the visual prognosis in their case in the immediate post operative period. We followed a similar technique of extending the primary incision in a curvilinear fashion. Risk factor in our case was involvement of iris close to the angle. Iris was separated from the tip with the help of spatula inserted from the paracentesis. Gentle tangential motion is needed while removing the barbed hook initially from the iris, so as to avoid the risk of iridodialysis and subsequent bleeding. Even though multiple techniques are at hand in the literature, the movement during the removal has to be individualised as per the case. We disengaged the barbed tip with a vertical motion and removed from the extended corneal incision by oblique tangential motion. Poor visibility in the involved area due to the localised corneal oedema poses a challenge for the removal. It is imperative to check whether the hook has been removed in toto by careful inspection

to avoid any remnants. Anterior chamber has to be inspected for any parts of the bait.

Risk of traumatic endophthalmitis has to be kept in mind while treating the patient post operatively. Due to the use of variety of baits and delayed wound closure may lead to subsequent infection. Aiello, *et al.* [1] has described a case of fulminant enterobacter panophthalmitis after 48 hours of delayed wound closure. Common natural baits are worms, maggots, caterpillars or insects. Exposure of these baits to the ocular tissue may increase the chances of infection. In our case, fish hook was baited with the earthworms and patient was taken for surgery within 2 hours of presentation. Early surgical intervention with adequate topical and parenteral antibiotics might have circumvented the risk of future endophthalmitis.

Though, the advantage in our case was the non-involvement of lens, there is no alternative to the earliest commencement of medical management, thoroughly planned surgical approach and vigilant outlook post operatively. This case is a reminiscence of the face that the best optical outcome is possible for the patient despite the initial horrendous presentation.

Conclusion

Take home points noted by the authors:

- It is necessary to take a detailed history regarding the type of fish hook that was used
- Surgical management has to be pre planned as per the hook type and the area of involvement
- Along with barbed tip, it is necessary to confirm whether any part of the bait is stuck in the involved ocular part.
- Multi-staged approach may be needed in case of lens or posterior segment involvement, though it was not needed in our case.
- Adequate topical and systemic medical management should be given to prevent post operative endophthalmitis.
- Protective eye wear should be recommended to all the fishermen to avoid grievous injuries. Parental supervision is essential to avoid paediatric injuries.

Conflict of Interest

No financial interest or any conflict of interest to disclose.

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