Corneal bee sting with retained stinger – is surgical removal always indicated?

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Background: Corneal bee sting is an environmental eye injury which can be blinding, while its management remains controversial. We share two similar cases which were managed differently by non-surgical and surgical methods.

Objective: To report cases of corneal injury by bee sting, presenting features, management, and clinical outcomes.

Method: Case series with literature review

Results: A 45 year old gentleman presented early with a history of bee sting to his right eye. His vision was counting fingers. He had two retained stingers at the deep corneal stroma layer. Treatment was initiated with intensive topical steroid, antibiotic and cycloplegia. Symptoms and vision improved with final best corrected vision acuity (BCVA) of 6/6 at 1 month. Second case was a 56 years old gentleman, presented late after a similar injury with vision of 6/60 and a paracentral corneal ulcer with retained stinger in mid stroma layer. Similar topical treatment was initiated using broad spectrum antibiotic and antifungal eye drop. The stinger was eventually surgically removed. At one year the ulcer healed with scarring and achieved BCVA of 6/12, pinhole 6/9.

Conclusion: Corneal bee sting injury management depends on severity of the corneal reaction, the distance and depth of the stinger from the visual axis, and its external accessibility.

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Keywords : Cornea bee sting, trauma, surgical stinger removal.

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Introduction

Bees play a vital role in the preservation of ecological balance and biodiversity in nature. However bee sting on the ocular surface is uncommon and could potentially result in devastating ocular complications. Ocular morbidity depends on the etiology of the stinger, penetration into the ocular structures, the immunologic and toxic effects of the stinger which contains infected venom and also the presence of secondary infection.[1] We report two cases which were managed differently. Analysis of the final outcome revealed important observation.

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Result

Case 1:

A 45 year old gentleman presented with severe right eye pain, epiphora and decreased vision two hours after a bee sting to the eye. His vision was counting fingers. A retained stinger was lodged at 10 o'clock position, 4 mm from the limbus, extending into the posterior stroma with an overlying central epithelial defect measuring 5.2 mm vertically (V) and 6.0 mm horizontally (H). There is generalised corneal oedema with endothelial striation involving the visual axis (Figure 1 and 2). The anterior chamber (AC) was deep with moderate inflammation with no hypopyon The Intraocular pressure (IOP) was normal and there was no relative afferent pupillary defect (RAPD). B-scan ultrasound was normal.

Intensive topical steroid (Prednisolone Forte 1%) hourly and antibiotics (Levofloxacin 0.5%) QID were initiated with cycloplegics. Preservative free artificial tears were commenced every hour to provide comfort due to the presence of epithelial defect. Symptoms improved rapidly over the next few days with resolution of the epithelial defect with no signs of secondary infection. His vision recovered to 6/6 hence the stinger was not removed (Figure 3). At one month follow up, his best corrected visual acuity (BCVA) remained at 6/6.

Case 2:

A 56 year old gentleman was referred for right eye bee sting induced corneal ulcer. He presented with eye pain, redness, and decreased vision for 4 days. His BCVA was 6/60 OD. There was a paracentral corneal ulcer at 9 o'clock measuring 1.2mm (H) x 1.2mm (V) (Figure 4). A retained stinger at mid stromal level with moderate inflammation in the anterior chamber was observed (Figure 5). He was treated with broad spectrum topical antibiotics. While waiting for the corneal scraping report,

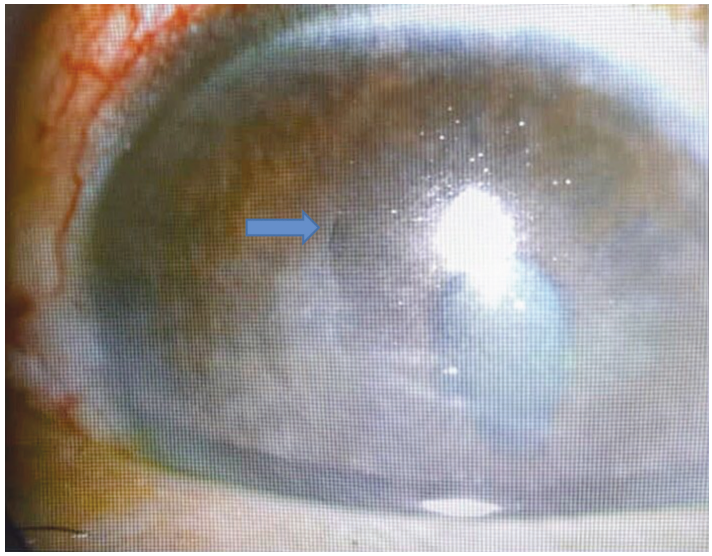

Figure 1: Bee stinger embedded in the cornea (arrow) with generalized corneal edema and descemet striae of the right eye

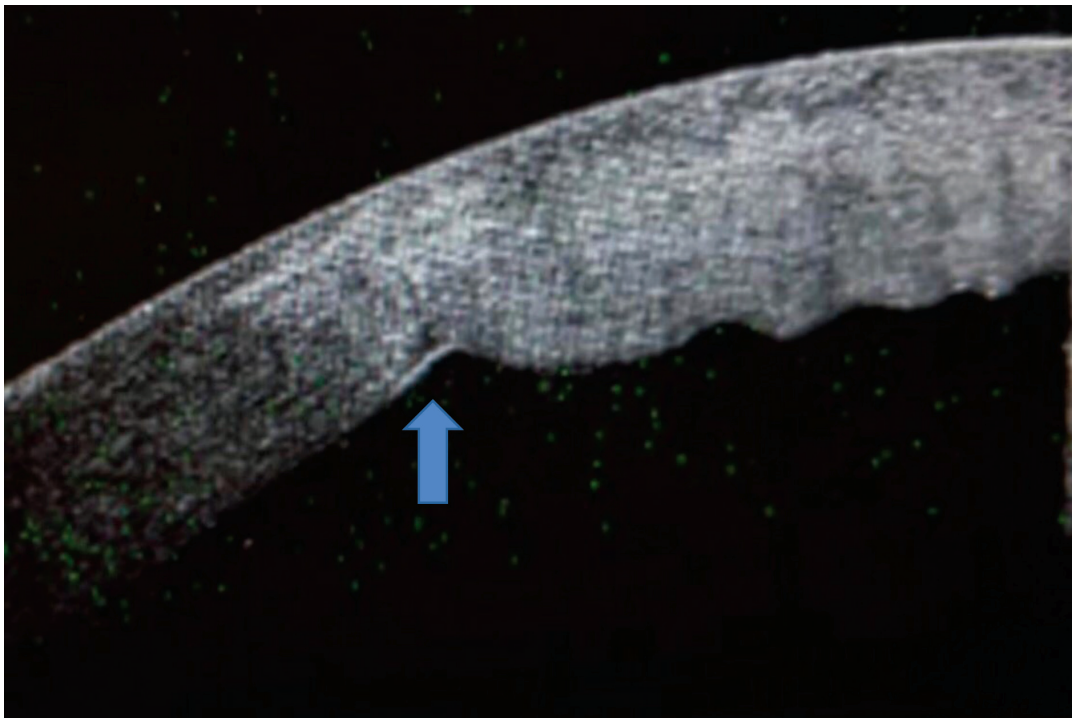

Figure 2 : Anterior segment optical coherence tomography (AS-OCT) showing embedded intrastromal bee stinger with surrounding corneal edema and inflammatory cells in the anterior chamber.

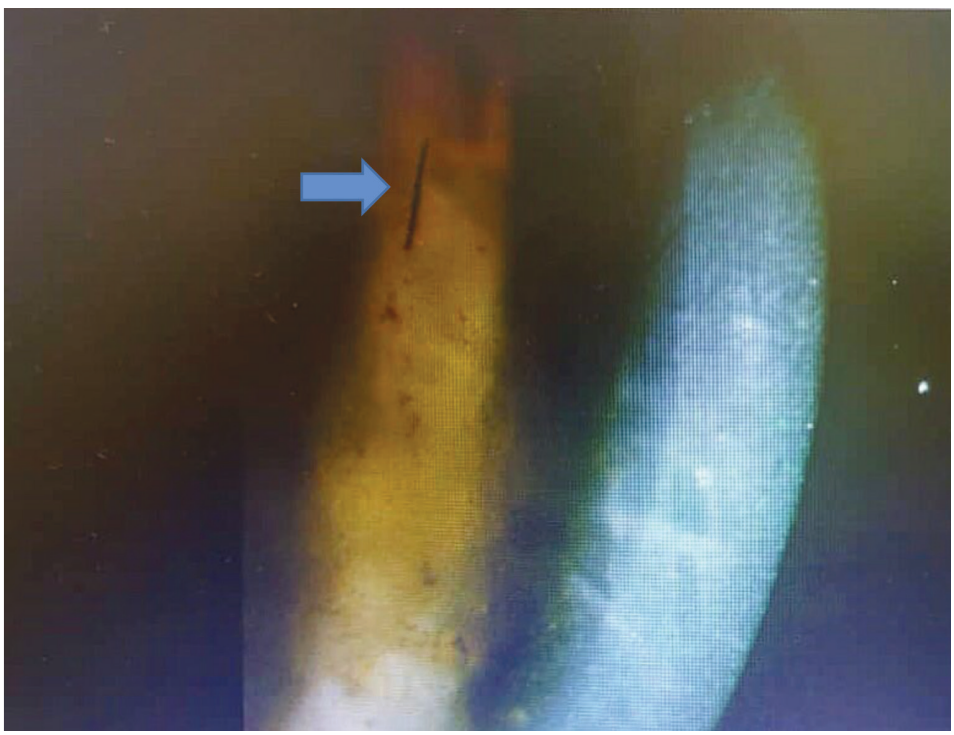

Figure 3 : Retained stinger (arrow) in the deep corneal stroma layer with improvement of the corneal edema after treatment initiation.

antifungal was also initiated due to the fuzzy ulcer margins with a suspicion of superimposed fungal infection. The corneal ulcer did not improve significantly and thus the retained stinger was surgically removed and the cornea was repaired with nylon 10/0. The corneal scraping culture and sensitivity revealed Acinetobacter baumannii sensitive to Ciprofloxacin, hence antifungal were stopped, and topical Dexamethasone 0.1% and Ciprofloxacin 0.3% were initiated. Postoperatively, his vision improved to 6/24. The corneal ulcer continued to improve and eventually healed with corneal scarring resulting in BCVA of 6/12.

Discussion

The sting of Hymenoptera flying insects (honeybees, bumble bees, and wasps) involving the ocular structures are rare but tend to occur at the eyelid and cornea. Bee stingers contain venom and toxin which cause various sight threatening complications affecting both the anterior and posterior segment.[2] This involves toxic

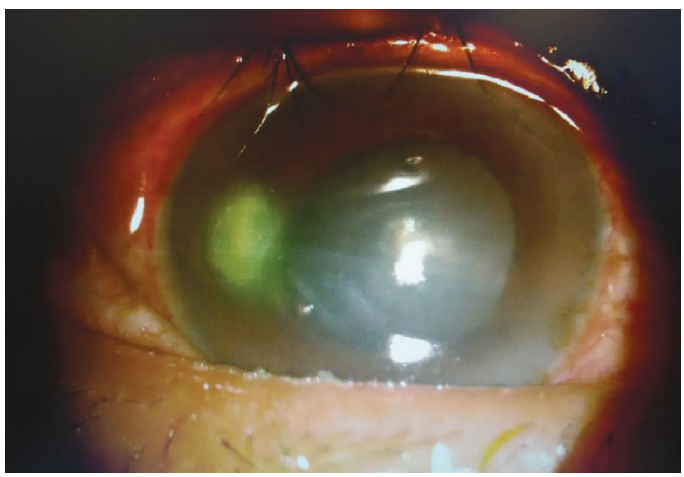

Figure 4: Paracentral corneal ulcer at 9 o'clock measuring 1.2mm x 1.2mm in the right eye.

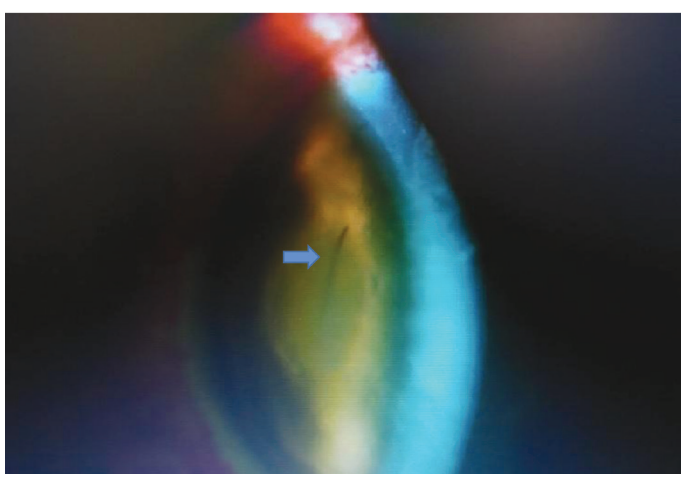

Figure 5: The retained stinger (arrow) in the mid corneal stroma layer

injuries to the cornea, secondary infections with bacterial or fungal ulceration, anterior uveitis, cataract or even posterior segment involvement such as optic neuropathy or retinitis.[3 4] The act of stinging introduces two bodily components comprising of the stinger and its specific venom into the eye.[5] Venom contains biological amines (histamine), polypeptide toxins (melittin) and enzymes (hyaluronidase) which induce ocular inflammation by increasing capillary protein permeability which leads to greater leakage of protein and accumulation of inflammatory cells and ultimately cell death. This manifest clinically as corneal edema with sterile infiltrate around the stinger followed by decrease of endothelial cell density at a later stage.[6]

Management strategies of corneal bee sting injury are controversial depending on the time of presentation following the injury, severity of ocular complications and the status of the stinger within the eye. In the first case, we observed a more severe ocular inflammation with poorer presenting vision, however the patient presented early to our center. Prompt initiation of steroid and antimicrobial treatment led to a good response and recovery. The primary aim of corneal bee sting treatments is to control the inflammatory response. Most ophthalmologists prescribe early intensive topical corticosteroids and topical broad-spectrum antibiotics to prophylactically prevent secondary infection.[7 8] Topical cycloplegics are added to reduce ciliary spasm and stabilize the blood-aqueous barrier. The patient should be monitored closely for any ocular complications

Gilboa postulated that once the venom from the bee stinger is neutralized, the stinger itself becomes completely inert and can remain within the cornea without causing further adverse reactions[2]. The stinger can be barbed (honeybee) with a saw-like architecture therefore an attempt to grasp and pull the embedded stinger out in the reverse direction usually results in its retention requiring operative intervention.[9] Although the straight stinger (wasp, bumblebee) is easier to remove, external pressure may crush it into two separate lancets.[10] If the venom gland is still adherent to the stinger, manipulation can cause attached muscle fibers to contract resulting in additional venom discharge and continued toxicity. On the other hand, Al Towerki reported that immediate removal of the stinger mitigated the need of any additional therapy with good outcome.[11] Our second patient presented late with corneal ulceration which did not improve with medical therapy alone, hence removal of the stinger was crucial to reduce the source of inflammation and infection. Lin et al. reinforced that early stinger removal along with topical antibiotics and steroids ensured a good visual outcome.

The decision to leave the stinger in place depends on the severity of the corneal reaction in the first few hours, the distance of the stinger from the visual axis and the depth of the protrusion and its external accessibility. Both surgical and non-surgical approaches were used in the cases described above. A good control of inflammation and prevention of secondary infections prevented any visual impairments at the end of treatment.

Conclusion

Cornea bee sting injuries are rare. The

retain insect part is usually very thin with surrounding inflammatory reaction and necrosis hence they can be easily missed and may mimic microbial keratitis even under slit lamp biomicroscopy. Corneal bee sting injury management depends on severity of corneal reaction, the distance and depth of the stinger from the visual axis, and its external accessibility. To prevent permanent corneal damage, early and prompt action is important while considering surgical removal where it is necessary. AC-OCT has been a complimentary tool in demonstrating the depth of stinger in the cornea.

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