Corneal Bee Sting Causing Serious Visual Complications: A Case Report

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Abstract

***Purpose*:** To report the complications and acute and chronic managements of a case of corneal bee sting injury and to report the outcome of visual performance

***Case report*:** A 28-year-old Caucasian man who was stung by insect and was complaining of ocular pain and decreased vision in the left eye, presented to the emergency room. A sting was found and completely removed. Corneal edema, bullous keratopathy, corneal epithelial defect, cataract and transitory rise of intraocular pressure (IOP) were identified. The corneal edema not improved despite topical and systemic corticosteroids were given during the follow-up period. IOP returned to normal with anti-glaucoma drugs. Penetrating Keratoplasty (PK) and extracapsular cataract extraction (ECCE) and IOL insertion was done 10 months after trauma. Graft resuturing and amniotic membrane transplant (AMT) was done 3 months after PK for loose sutures and persistent graft epithelial defect. Later perilimbal subconjunctival injection of 0.1 ml bevacizumab was done. The cornea was vascularized and scarified and patient was placed on the waiting list for rePK.

***Conclusion*:** Bee sting can lead to serious visual impairment despite adequate medical and surgical approaches.

***Keywords*:** Bee Sting, Corneal Edema, Cataract, Penetrating Keratoplasty, Extracapsular Cataract Extraction, Glaucoma

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Introduction

Ocular damages by insects are infrequent events but may have serious ophthalmologic consequences. Some of the complications reported in the literature include: catarrhal conjunctivitis, corneal epithelial defect, corneal edema, decreased corneal endothelial cell density, corneal scarring, secondary bacterial keratitis, iris heterochromia, internal ophthalmoplegia, cataract, lens dislocation, anterior uveitis, hyphema, glaucoma, toxic optic neuropathy and chorioretinopathy.[1-5]

Insect sting ocular damages have been reported to be associated with various insects and spiders such as bee, wasp, caterpillar, insect wings, fly larva and fire ants.[6]

In this report we report the complications and management of the corneal bee sting injury.

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Case report

A 28-year-old Caucasian man presented to the emergency room. He was stung by an insect 3 hours ago when he was on out door picnic and was complaining of ocular pain and decreased vision in the left eye.

On examination, visual acuity (VA) was $^{6}/_{10}$ in the right eye and $^{4}/_{100}$ in the left eye. Relative afferent pupillary defect was not seen. He stated the history of amblyopia in the right eye. Slit-lamp examination of the left eye revealed both upper and lower lids swelling, conjunctival chemosis and hyperemia. There was the piece of foreign body (suspected to be bee stinger) at the periphery of the corneal stroma, not penetrating to the anterior chamber (AC).

The cornea showed edema and mild infiltration around the foreign body, after dying with fluorescein the corneal epithelial defect and corneal infiltration were revealed. The AC was deep and 4 plus AC reaction was noted. Pupil was reactive and lens was cataractous (Figure 1). The intraocular pressure (IOP) which was measured with pneumatic tonometry was elevated. Funduscopy revealed normal optic disc and retina. The right eye examinations were normal.

The patient was admitted and vertical incision over the foreign body was done and the foreign body was removed, finally the subconjunctival betamethasone and vancomycin were injected under general anesthesia (Figure 2).

The histopathologic exam was done on the removed material next day.

The treatment was followed with: prednisolone per os 1 mg per Kg per day for 1 week, drop ciprofloxacin 0.3%, 6 times per day for 1 week and then replaced with drop chloramphenicol 0.5%, 4 times per day for 2 months, drop homatropin 2%, 3 times per day for 1 week, tablet acetazolamide 62.5 mg 4 times per day for 20 days and then was continued 62.5 mg 3 times per day for 2 months and then discontinued and replaced by drop biosopt, drop betamethasone 0.1%, 3 times per day and was tapered during 1 month, to be replaced by the drop natrisalt 5%, 4 times per day for 2 months. The histopathologic result confirmed bee sting but the kind of bee was not determined.

On follow-up examinations there was no improvement in VA and there was persistent corneal edema and bullous keratopathy and persistent epithelial defect also iris atrophy and posterior subcapsular opacity of the lens which was slowly increasing. On 40 day of treatment the IOP was raised under our treatment with acetazolamide per os 62.5 mg 3 times per day and therefore drop timolol maleate 0.5%, 2 times per day and drop biosopt 0.5%, 2 times per day was added (Figure 3).

Ten months after trauma the VA was $^{3}/_{10}$ in the left eye and there was corneal scar and posterior subcapsular cataract (Figure 4), therefore penetrating Keratoplasty (PK) associated with extracapsular cataract extraction (ECCE) and intraocular lens (IOL) insertion was performed.

On the first postoperative examinations the VA was $^{4}/_{100}$ and slit-lamp examination revealed edematous and hazy graft. The IOP was in the normal range and no IOP rise was found after PK.

But 3 months after surgery due to persistent graft epithelial defect and loose sutures, graft resuturing and amniotic membrane transplant (AMT) were performed.

Four months after PK, VA was $^{3}/_{10}$ and AMT was resolved and graft thinning and edema was slowly increasing also filamentary keratopathy was observed therefore lateral blepharorrhaphy was done. Three months later graft thinning and edema improved therefore the lid sutures were removed. One year after PK, graft was scarified and peripheral corneal vascularization was observed (Figure 5), and perilimbal subconjunctival injection of 0.1 ml bevacizumab (Avastin) was prescribed. Fifteen months after PK, VA was $^{4}/_{100}$ and graft was scarified and optically failed. The patient was placed on the waiting list for rePK.

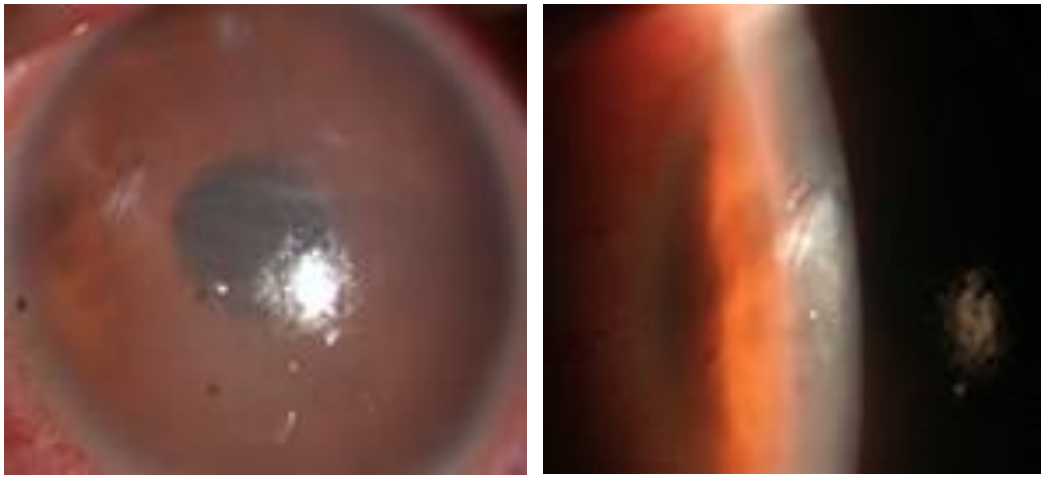

Figure 1. Corneal bee sting 3 hours after injury

Figure 2. One hour after stinger removal

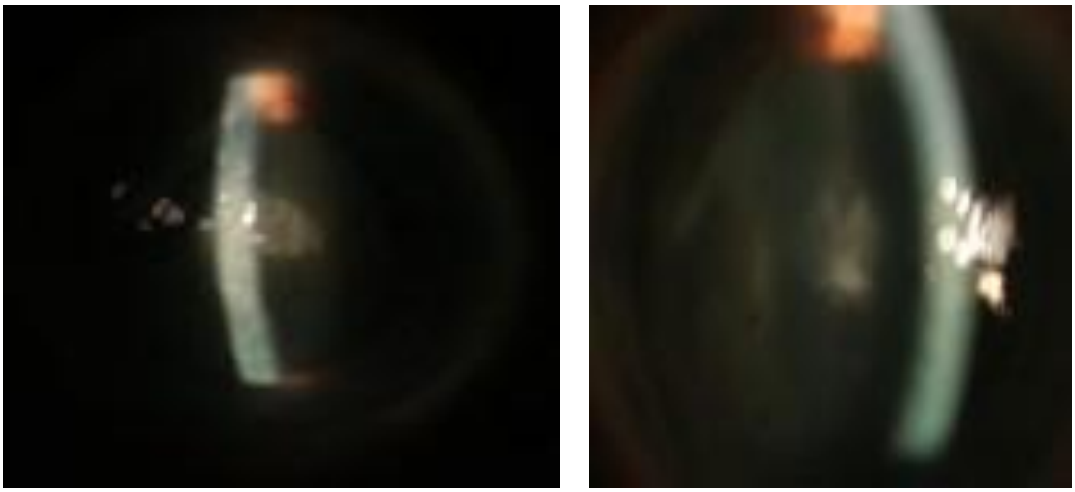

Figure 3. One month after corneal stinger injury

Figure 4. Ten months after corneal stinger removal

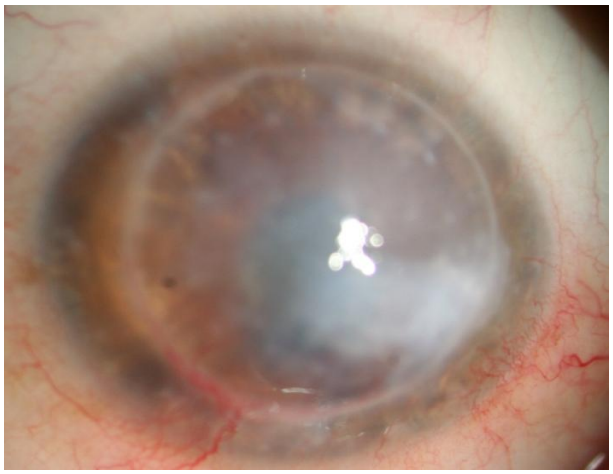

Figure 5. One year after penetrating keratoplasty, scarified graft and peripheral vascularization observed

Discussion

Corneal injury by insect sting is an infrequent ocular trauma even so it can lead to visual threatening complications.

A variety of substances of the venom can lead to toxic and inflammatory ocular reactions.[3]

The severity of inflammation may depend on the composition of the venom, for example bee or wasp stings usually cause acute inflammation.[6]

However bee stings produce exudative iridocyclitis but wasp stings produce a milder reaction.[7]

The venom of hymenopterans insects consist of biologic amins, low molecular weight peptide, major protein subunits and enzymes (hyaloronidase, phospholipase A, lipase, phosphatase, alkaline phosphatase, esterase and phosphodiesrerase).[8]

Although, insect's genus may have an important role in ocular reactions,[8] the biologic amines such as histamine and dopamine by the irritating effects cause the painful reaction also may result in vasodilation and increase in vessels permeability causing chemosis and conjunctival injection.[6,8,9]

The venom enzymes may act as allergic factors, high molecular weight enzymes may produce type 1 hypersensitivity reaction. Mellitin is one of the major peptides present in the venom causing cellular lysis.[6,8,9]

The sterile corneal infiltration after bee sting may be due to chemotaxis of polymorphonuclear leukocytes (PMNs).[5]
The proteolytic enzymes release from PMN's may lead to cellular necrosis and subsequent neovascularization.[6,8]

Other polypeptide toxins include: apamine, mast cell deregulating peptide and minimine. Apamine is a neurotoxin.[9]

In the other hand, lens proteins denaturation results in cataract formation.[5]

There has been report of wasp sting inducing retinal damage with unrecordable electroretinographic responses.[4]

Honey bee venom has a toxic effect on the corneal endothelial cells.[5]

The acetylcholine in the bee venom can cause corneal edema and corneal edema after bee sting usually ends with bullous keratopathy.[5]

It seems that corneal edema responds to topical steroids properly.[1]

However the use of steroids for corneal infiltration recovery may cause complications.[5]

Al towerki et al reported the corneal honeybee stinger removal under slit-lamp guidance using a 27-gauge needle and 90% corneal edema decrease the next day following the removal of stinger without using topical corticosteroids. After 3 months of follow-up the patient had only a mild corneal opacity.[9]

On the other hand the removal of corneal bee stinger is a controversial act.[2]

Manipulation of the retained corneal bee stinger may lead to envenomization and increasing the inflammation.[10]

However, in patients who suffer from ocular trauma by insects, causing corneal infiltration, the first step should be to extract the stinger from the tissue.[10]

Also, the amount of toxin injected depends on the length of the time that the stinger remains within the tissue.[10]

Gurlu reported a case of corneal bee sting, stinger removal followed by systemic, subconjunctival and topical steroids, and systemic and topical antibiotics.

One year later, a corneal scar and anterior capsular cataract and decrease in corneal endothelial cell density were observed.[5]

He suggested if a confocal microscope is available the site of corneal infiltration might be the place to detect retained foreign bodies.[5]

There are some reports about patients who suffered ocular trauma by insects and they underwent PK, ECCE and IOL insertion.[7-9]

In our knowledge only short-term favorable results have been reported for PK after corneal insects injury.[7-9]

Corneal insects injury is a rare injury and has a variable presentation and long-term observation may be needed to evaluate the prognosis after surgical treatments.

In our study intracorneal bee stinger resulted in long term corneal inflammation that was not controlled adequately with topical and systemic corticosteroids, also we used antibiotics to prevent secondary infection.

Additionally our case developed transitory rise of IOP and after treatment with anti-glaucoma drugs, the IOP returned to normal. PK, ECCE and IOL insertion was done for cataract and corneal scar but on postoperation examinations, patient presented persistent graft epithelial defect and therefore requiring graft resuturing and AMT but patient still had a vascularized and scarified graft.

Despite favorable outcomes that were reported previously,[7-10] in our study bee sting resulted in serious visual impairment.

Conclusion

Although, ocular damages by insects are infrequent events, but may have serious ophthalmologic consequences. Ocular damages caused by bee sting can lead to serious visual impairment despite adequately medical and surgical approaches.

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