

Restoring vision with an early penetrating keratoplasty after bee sting injury: a case report

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Abstract

• A 27-year-old man was stung by a bee presented with severe pain in the right eye. It was associated with reduced vision and swelling of the eyelids. A retained stinger was identified at the center of the cornea, surrounded by dense corneal oedema and numerous folds in the Descemet's membrane. The sting was removed completely. He subsequently developed persistent corneal oedema and heterochromia iridis. He was treated with intensive topical steroids. He underwent penetrating keratoplasty five months after the injury. His visual acuity was satisfactory one year after the surgery. Corneal oedema is an uncommon complication of bee sting injuries. It can be persistent and results in severe visual impairment. An early penetrating keratoplasty offers a good visual outcome after bee sting injury.

• **KEYWORDS:** retained stinger; corneal oedema; early penetrating keratoplasty

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INTRODUCTION

Corneal bee stings rank among the rarest injuries to the eye. When they occur, their complications are extremely visual threatening such as corneal oedema, glaucoma and optic neuropathy^[1-4]. The damage to the ocular structure occurs through mechanical, toxic and immunologic reactions^[1].

We report a case of a young man with corneal bee sting injury and a retained stinger, who subsequently developed a persistent corneal oedema. This has resulted in a severe visual impairment in the affected eye. An early penetrating keratoplasty has restored him a satisfactory visual outcome. Early recognition of the possible complications and appropriate

treatment are essential for a good visual outcome.

CASE REPORT

A 27-year-old man, previously healthy, experienced severe pain resulting from a bee sting in the right eye while he was working in the field. It was associated with decreased visual acuity in the affected eye.

He was examined four hours after the trauma. The visual acuity was 6/24 in the right eye and 6/6 in the left eye. The lids were oedematous with generalized congestion of the conjunctiva. Slit lamp examination showed a bee stinger had penetrated the deep layer of the corneal stroma. The bee stinger was surrounded by a dense corneal infiltration (Figure 1). A generalized corneal oedema had hindered further details of the anterior segment structures. The pupil was slightly mid-dilated and sluggish. There was no relative afferent pupillary defect (RAPD) elicited. The intraocular pressure (IOP) was normal. B-scan ultrasonography of the right eye showed normal vitreous and retina. The left eye examination was essentially normal. The stinger was removed immediately under local anesthesia. The patient was treated with intensive topical steroid and topical antibiotic.

A week later the corneal infiltration had reduced, thus allowed a better visualization of the other structures. The anterior chamber cells were about 2+ with generalized iris atrophy. The topical steroid and antibiotic were tapered down slowly and discontinued at the end of sixth week.

Two months later, visual acuity in the right eye had reduced to counting finger at two feet. The corneal oedema was persistent with extensive areas of iris atrophy. The lens was normal. The fundus view was obscured by presence of corneal oedema. A reverse RAPD was negative and the IOP was normal.

He underwent an uncomplicated penetrating keratoplasty at five months after the injury (Figure 2). The postoperative period was uneventful. His best corrected visual acuity was 6/9 one year after the surgery. Ocular examination at one year after the penetrating keratoplasty revealed a clear corneal button, generalized iris atrophy and normal intraocular pressure. There was no evidence of cataract formation. Fundus examination was normal.

DISCUSSION

Clinical manifestations of corneal bee sting are varies and unpredictable, which include eyelids oedema, conjunctival hyperemia, corneal epithelial defect, corneal stinger, corneal oedema, corneal infiltration, striated keratitis, endothelial

Table 1 Component of bee venom and their effects to human eye

Non enzymatic polypeptide	Enzymes	Biological amines
Major component		
A. Melittin (40% -60%)	A. Hyaluronidase	Histamin Dopamin
● Cellular membrane disruption	● Degeneration & lysis of chromatophores of anterior iris layer -heterochromia	● Sudden release in high concentration
● Protein denaturation		● Severe pain
● Cataract formation	● Immediate release of IgE	● Vasodilatation
● Zonolysis causing lens subluxation	-hypersensitivity reaction	-conjunctiva injection
		● Chemosis
B. Apamin	B. Phospholipase A2 & B	
● Highly antigenic	● Major hydrolytic enzymes	
-play a role in optic neuropathy	-cytolysis	
	-haemolysis	

Table 2 Summary of visual outcome post penetrating keratoplasty following corneal bee sting injury reported in the literature

	Case 1	Case 2	Case 3
Indication of surgery	Persistent corneal oedema	Persistent corneal oedema	Central corneal scar
Age	58	34	39
Gender	Male	Male	Male
Time of surgery (after injury)	3 years	6 months	10 years
Visual acuity before injury	PL	CF1/2m	HM
Visual acuity after surgery	20/30	20/25	20/60
Authors	Arcieri <i>et al</i> , 2002	Arcieri <i>et al</i> , 2002	Arcieri <i>et al</i> , 2002



Figure 1 Photograph of the anterior segment of the right eye at initial presentation shows a retained bee stinger surrounded by a dense corneal infiltration and generalized corneal oedema

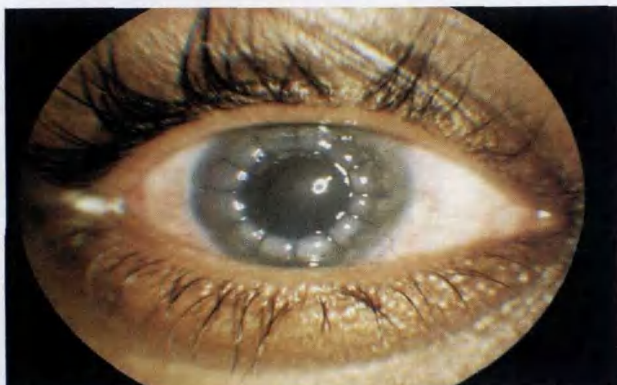


Figure 2 An early penetrating keratoplasty has successfully restored a better visual outcome

cell loss, anterior uveitis, glaucoma, lens subluxation, cataract, heterochromia iridis and toxic optic neuropathy [1-5]. Bee venom consists of both basic and acidic components. The major groups of allergens and toxins are the nonenzymatic polypeptides (such as mellitin, apamin and minimine) [1-3], high molecular enzymes (such as phospholipase A, phospholipase B and hyaluronidase) [1,6], and biological amines (such as histamine and dopamine) [2,7]. The effects of each component are illustrated in Table 1.

Corneal scar and oedema cause persistent reduced visual acuity after a bee sting injury in the absence of glaucoma and toxic optic neuropathy. Marked corneal oedema has been reported in the literature [3,8,9]. The corneal oedema usually regresses with the treatment, while the infiltrate becomes scar after 4-6 weeks [3,9]. The pathogenesis of corneal oedema has been explained by cell death, due to the activation of the complement cascade by the proteins in the venom [2]. This has resulted in occurrence of anaphylotoxins and chemotactic factor.

Chuah *et al* [10] reported a reduced endothelial cell count with polymorphism and polymegathism eleven days after bee sting injury in a 26-year old patient. Gürlü and Erda [8] analyzed the central corneal endothelial cells in a patient who developed corneal scar one year after bee sting injury. They demonstrated a substantial decrease in corneal endothelial density and changes in average size, hexagonality and coefficient variation of the cell. This suggests that the venom is toxic to the corneal endothelial cells.

We are unable to analyze the corneal endothelial morphology

in our patient. This is because of poor cellular tracing resulting from corneal oedema. We believe that our patient has significant reduction in the endothelial cell count, changes in cell size, hexagonality and coefficient variation of the cell.

Penetrating keratoplasty is a treatment of choice in managing patient with persistent corneal oedema. Arcieri *et al*^[9] reported three patients underwent successful penetrating keratoplasty at different post injury periods (Table 2). Our patient has undergone the earliest penetrating keratoplasty from the injury time, which was five months after the injury. The surgery has been successful in restoring a satisfactory visual outcome.

The damages to the cornea after bee sting injury are usually irreversible, ranging from a minor corneal scar to persistent corneal oedema. We suggest an early penetrating keratoplasty to ensure a better visual outcome in patient with persistent corneal oedema after bee sting injury.

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蜂螫后早期行穿透性角膜移植成功恢复视力1例

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摘要

一位27岁的男士右眼被蜜蜂螫伤。右眼剧痛伴视力下降及眼睑肿胀。角膜中央可见滞留的毒刺,周围有明显的角膜水肿和较多的后弹力膜皱裂。针迅速地被移除后,患者继发持续性的角膜水肿和虹膜异色。患眼局部应用激素,并于5mo后行穿透性角膜移植。手术后1a其视力良好。蜜蜂螫伤眼后所致的角膜水肿少见,可长期存在并导致严重的视力损害。早期行穿透性角膜移植有利于获得好的视力。

关键词: 滞留毒刺;角膜水肿;早期穿透性角膜移植