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## Corneal Bee Sting



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### ABSTRACT

**Introduction:** Cases of bee stings on the cornea are rare cases. It can cause several reactions including penetrating reactions that appear on the sting device, toxin reactions and immune reactions. Therefore, management of the therapy should be well executed. Delay in management will be fatal for patients.

**Purpose:** To highlight rare case patient with corneal bee sting.

**Case Presentation:** A Male 48 years old with complaints of pain in the right eye after being exposed to bee stings come to the emergency unit. Initial visual acuity 1/60, with the remainder of the bee sting on the cornea which results in corneal edema, inflammation of the anterior chamber. Patients undergo surgery to

remove the bee sting that is left in the cornea and get topical and systemic corticosteroid treatment, cyclopegic, topical antibiotics and analgesics. Visual acuity of patients with maximal correction becomes 6/24 with corneal leucoma.

**Conclusion:** Appropriate management of therapy can save the patient's vision, taking bee sting that left in the cornea is a challenge both in terms of therapeutic and patient's visual acuity prognosis. Management of therapy is sustainable both for the end result of patients with bee stings and can prevent dangerous complications.

**Keywords:** *bee stings, corneal bee stings, uveitis anterior*

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### INTRODUCTION

In United States, bee species account for more than 1 million stings annually, but cases of bee stings on the cornea are rare. According the US Bureau of Labor Statistics, from 2003 to 2010, bees accounted for 52 fatal occupational injuries and wasps/yellow jackets 14 fatal injuries.<sup>1,2</sup>

Bee stings on the cornea can threaten vision. Many cases have been described regarding cases of bee stings on the cornea. The severity of a bee sting case depends on the type of poison contained in the stinger and the initial treatment given when the patient comes to ask for help. Cases of bee stings can cause several reactions including penetrating reactions that appear on the sting device, toxin reactions and immune reactions.<sup>3,4</sup> In the case of penetration due to the sting device, bee sting tool can left behind in the cornea, so it is requires adequate inspection and observation to identify them. Bee sting poison has up to thirteen different antigens. Serotonin causes various effects through the 5-hydroxytryptamine (5-HT) receptor, including strong local vascular spasms. In addition, bee sting poisons also have enzymes such as phospholipase and mastoparan peptides, cause degranulation

of mast cells by releasing histamine. The sudden release of histamine contained in poisons cause vasodilation, which is an increasing of membrane permeability and an immune response type 1 hypersensitivity mediated by immunoglobulin E. This rare case of bee sting causes no clear guidelines for management of affected patients.<sup>5,6</sup>

Cases of bee sting on the cornea have many complications if not treated properly, including keratitis, corneal opacification, uveitis, iris atrophy, glaucoma, cataracts, lens subluxation, bullosa keratopathy, optic neuritis and retinopathy.<sup>7</sup> This case is made to highlight rare case patient with corneal bee sting so that taking care the patient with corneal bee sting will be less of complication and visual acuity rehabilitation will be achieved.

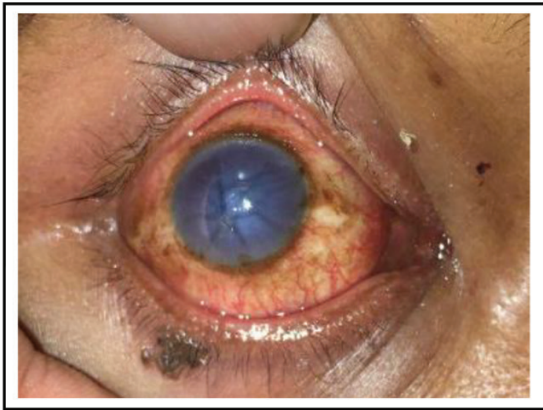
### CASE PRESENTATION

This was a single case study from patient who came to the Sanglah Hospital, Bali. Patient were followed up from Mei 2018 until August 2018 and diagnosed as RE corneal foreign bodies with anterior uveitis and toxic insect injury complication with corneal edema.

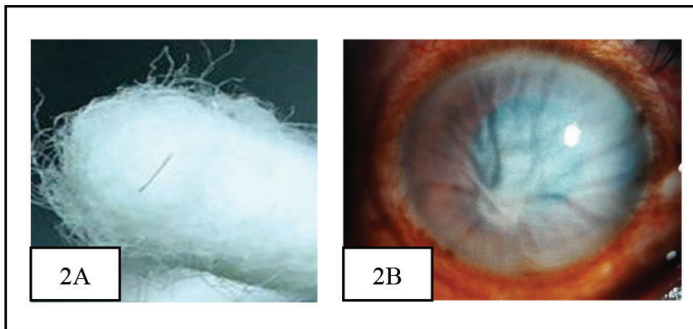
A 48 years old Male came to the emergency

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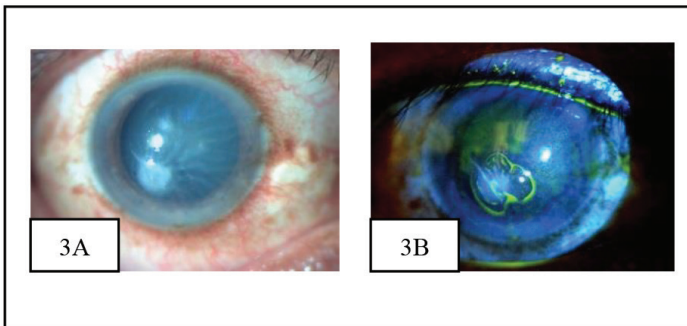


**Figure 1.** Clinical photograph of the patient showing bilateral swollen eyelids



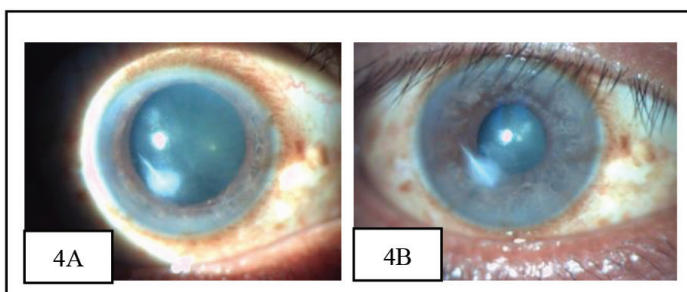
**Figure 2A.** Foreign body from the cornea

**Figure 2B.** Cornea condition after extraction of the foreign body.



**Figure 3A.** Eye condition after one week

**Figure 3B.** Eye condition after three weeks



**Figure 4A.** Eye condition after 6 week

**Figure 4B.** Eye condition after 10 weeks

room with pain in right eye after being stung by a bee. Complaints are accompanied by blurred vision, red eyes, glare, and watery eyes. From the examination, visual acuity is 1/60, with palpebral spasm and edema, hyperemic conjunctiva, corneal edema, descemet fold, foreign body remain on the cornea (Figure 1).

Patients undergo foreign body extraction on RE. Follow up show descemet fold and corneal edema, with cell +2 and flare +2 (Figure 2B). Patient was given systemic and topical antibiotics, systemic and topical steroid, cycloplegic, analgesics.

After one week, cornea condition getting better and the therapy is maintained, steroid being *tapering off*, patient visual acuity was 3/60 (Figure 3A). But two weeks after surgery appear bullae on the cornea, and we give hypertonic eye drops, with oral acetazolamide (Figure 3B).

Two weeks later corneal show good improvement with patient visual acuity 6/48 with pin hole 6/15 (Figure 4A). And the last follow up after 3 months the visual acuity 6/48 with pin hole 6/15, corneal scar and good healing (Figure 4B).

## DISCUSSION

Bee stings in the eye are rare cases, bee stings most often affect the cornea and have complications that threaten vision. Bee stings to the cornea can cause conjunctival hyperemia and chemosis in the acute phase, sometimes accompanied by pain, corneal edema, and decreased vision.<sup>8</sup> Variations in acute response depend on the amount of toxin exposed, complications that can occur including corneal epithelial defects, corneal stromal infiltration, corneal endothelial cell loss, glaucoma, cataracts, anterior uveitis, optic neuritis, and permanent vision loss.<sup>9</sup>

The pathophysiology and complications of bee stings can generally be categorized as penetrating/mechanical, toxic and immune reactions. By penetration/mechanical bee stingers can penetrate and can be left in the corneal tissue, otherwise it can damage the tissue and is difficult to take out depending on the depth of the sting device penetration.<sup>5</sup>

Toxic bee stings contain a mixture of compounds including non-enzymatic polypeptides and enzymes (phospholipase A, phospholipase B, and hyaluronidase). Mast cells, phospholipase A2 can cause pain reactions caused by cell destruction from metabolic processes and function as potent neurotoxins, whereas apamin produces heat and mechanical hypersensitivity. In addition, phospholipase A, phospholipase B, and peptides can cause mast cell degeneration directly with

histamine release. The release of histamine from bee sting venom suddenly can cause vasodilation which is increased capillary permeability and type 1 hypersensitivity.<sup>7</sup>

In the immune reaction, the process of penetration / mechanics and toxic effects on patients due to bee stings, vasodilatation occurs in the initial phase, tissue edema (cornea), and leukocyte chemotaxis. With prolonged exposure if a bee sting device is left behind it will cause chronic inflammation along with local tissue degradation.<sup>3</sup>

The initial treatment for bee stings is by removing the sting devices that are left in the cornea. Although there is controversy regarding the need to exclude this bee sting device, in general the removal of the remaining bee sting tool is needed in cases related to corneal edema and infiltration. Even so, the removal of residual bee sting devices can be difficult and has the risk of leaving bee sting devices fragments in the cornea. The bee sting device that is left behind does not need to be removed in a number of reported cases as long as it does not result in further complications, the neutralized toxin makes the bee sting tool become inert and does not cause further inflammatory reactions.<sup>7</sup> Gilboa *et al* reported two cases without ejecting bee stings and did not cause eye manifestations.<sup>10</sup>

The decision to leave a bee sting device in the cornea requires several considerations including the severity of the corneal reaction in the first few hours and its effect on vision, the distance between the bee sting devices left behind by the visual axis, the examiner's ability to observe in the following weeks, and the especially is the inside of the puncture and its accessibility from outside to be taken.<sup>11</sup> In addition, irrigation in the anterior chamber can be carried out simultaneously when removing the bee sting device is left behind to ensure that there is no poison from the sting device in it. Suspicion of poison due to bee sting devices in the front eye chamber can be seen from the examination of corneal endothelial cell density, in case reports corneal endothelial cell density decreases rapidly at the start of trauma and is feared to cause further complications such as permanent corneal decompensation.<sup>7</sup>

In this case, the patient underwent surgery to remove the bee sting device left in the cornea. The sting device is easily seen through the slit lamp examination. Krishnakumar *et al* reported that confocal microscopy examination was needed to find the remnants of bee stings left on the cornea that were not visible through the slit lamp.<sup>15</sup> We didn't do irrigation of the anterior chambers due to limited visualization cause by corneal edema.

Medical treatment that can be given in the case

of bee sting is topical and systemic corticosteroid administration, cyclopegic, analgesic, and topical antibiotics.<sup>12</sup>

Systemic corticosteroids as the initial medication given to suppress active inflammatory reactions. By giving this systemic corticosteroid a sharp recovery of vision and corneal clarity can be achieved in five days, this proves that recovery requires shorter time compared to some other studies that require two weeks to three months in other case reports. Kim *et al* reported giving high dose of systemic corticosteroid give a promising prognosis in anterior chamber reaction within a week. Gurlu and Erda reported the same result as they give the patient with high dose systemic corticosteroids. In addition, additional damage to the corneal endothelium can be prevented by administering the systemic corticosteroid.<sup>7,12</sup> Razmjoo *et al* reported without giving systemic corticostreoid, visual acuity rehabilitation achieved in one month.<sup>11</sup> Lin *et al* reported 3 cases without giving systemic corticosteroid, visual acuity rehabilitation within 2 weeks to 2 months.<sup>17</sup>

Cyclopegic function is to prevent complications that can be caused by inflammatory reactions due to bee sting poison in the front eye chamber and further complications arising when prolonged inflammatory reactions occur, in addition to cyclopegic administration, the pain caused can be reduced. Analgesics are needed in cases with very strong pain reactions.<sup>13</sup> DeBroff *et al* reported that bacteria were cultured in about 14% of cases of corneal foreign bodies. Although infections caused are even less frequent in bee stings to the cornea and only a few cases of bacterial infections have been reported in other cases.<sup>4,14</sup>

In this case we give the patient with analgesics, cyclopegic, and topical antibiotics together with systemic and topical corticosteroids.

Kim *et al* reported that their patients who had corneal edema had to undergo corneal transplantation, resulting in permanent vision loss and ptosis.<sup>16</sup>

In this case, Even though the patient had corneal edema and bullous keratopathy, removal of the remaining bee sting device and appropriate medical therapy can provide good visual acuity results with minimal complication. Limitation of this case is anterior chamber observation in the Emergency room cause by corneal edema make us decide not to irrigate the anterior chamber.

## CONCLUSION

Corneal bee stings injury, although rare, can cause severe inflammation, decrease visual acuity, anterior

chamber reaction and much more complications. Surgery to remove bee stings device should be done in this case because of its reaction to the cornea and anterior chamber. And no less important giving analgesics, cyclopegic, and topical antibiotics together with systemic and topical corticosteroids help the visual recovery and anterior segment faster.

Appropriate management of therapy can save the patient's vision, taking bee sting that left in the cornea is a challenge both in terms of therapeutic and patient's visual acuity prognosis. Management of therapy is sustainable both for the end result of patients with bee stings and can prevent dangerous complications.

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