

Case Report

Remained Insect's Body Part in the Corneal Stroma: A Rare Case Report

Bagian Tubuh Serangga yang Tertinggal di Stroma Kornea: Laporan Kasus Langka

Fauzi Abdillah¹, Ilham Aditya Widyanto², Dessira Rizka Tri Ariany³

^{1,2}Medical Study Program Faculty of Medicine Universitas Brawijaya Malang

³Regional Public Hospital dr. Harjono S Ponorogo

ABSTRACT

Corneal foreign bodies are the second most common cornea disease after corneal abrasion. The causes of foreign bodies in the cornea vary, most often due to lack of eye protection. Patients with foreign bodies in the cornea usually complain pain, a lump in the eyes, visual acuity deficit, watery eyes, red eyes, sticky eyes, and photophobia. Rapid and effective treatment is needed to avoid the risk of worsening the patient's condition and decreasing vision or even permanent blindness. In this case, we report a 41-year-old male who suffered an eye injury due to insect's body parts remaining in the corneal stroma while riding a motorbike. Foreign body extraction, eye irrigation, topical and systemic antibiotics and steroids, topical cycloplegic are the various treatment modalities for better result. Further examination could be done to find out the chemical elements of insect's toxin so that more adequate therapies can be given.

Keywords: *Corneal foreign bodies, insect's body part foreign body, lump, visual acuity deficit*

ABSTRAK

Benda asing pada kornea merupakan penyakit tersering kedua pada kornea mata setelah abrasi kornea. Penyebab benda asing pada kornea bervariasi, tersering dikarenakan kurangnya proteksi mata. Pasien dengan benda asing di kornea biasanya mengeluh nyeri, rasa mengganjal pada mata, defisit ketajaman penglihatan, mata berair, mata merah, mata lengket dan fotofobia. Diperlukan penanganan cepat dan tepat guna menghindari risiko terjadinya perburukan keadaan pasien dan penurunan penglihatan hingga kebutaan permanen. Dalam kasus ini, kami melaporkan seorang laki-laki berusia 41 tahun yang mengalami cedera mata akibat bagian tubuh serangga yang tertinggal di stroma kornea saat mengendarai motor. Ekstraksi benda asing, irigasi mata, antibiotik dan steroid topikal dan sistemik, siklopeglik topikal adalah macam-macam terapi untuk hasil lebih baik. Pemeriksaan lebih lanjut dapat dilakukan untuk mencari tahu elemen kimia dari toksin serangga sehingga dapat memberikan terapi yang adekuat.

Kata Kunci: Benda asing kornea, benda asing bagian tubuh serangga, defisit ketajaman penglihatan, mengganjal

Correspondence: Fauzi Abdillah. Medical Study Program Faculty of Medicine Universitas Brawijaya Malang, Jl. Veteran Malang 65145
Tel. +682139789313 Email: abdillahfauzi.fa@gmail.com

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INTRODUCTION

Corneal foreign bodies are the second most common cornea disease after corneal abrasion (1). The causes of foreign objects in the cornea vary, most often due to lack of eye protection when working in the field, such as welding iron or metal, sparks from firearms, cutting wood, and lack of eye protection when driving a motorized vehicle or when walking (1,2).

Based on data from the Global Burden of Disease Study 2019 (GBD 2019), the incidence number of foreign bodies in the eye from 1990 to 2019 in 204 countries increased by around 30.29%, with an incidence of 35.790.000 cases to 46.630.000 cases. The South Asia, East Asia, North Africa, and Middle East regions have the highest incidence rates, while the Oceania, Australia, and Southeast Asia regions have the lowest incidence rates (3). Indonesia itself is the country with the highest incidence number in the Southeast Asia region, with the incidence number in 1990 ranging from around 553.380 cases and increasing by around 49.04% to 818.940 cases in 2019 (3).

Patients with foreign objects in the cornea will usually experience symptoms such as pain, a lump in the eye, decreased vision, watery eyes, red eyes, sticky eyes, and photophobia. The onset of complaints is usually rapid and preceded by appropriate risk factors (2). Injuries that last a long time and are not treated immediately can result in scar tissue, structural changes in the cornea, and corneal infections such as endophthalmitis and even retinal detachment (4).

The cornea is a part of the refractive medium that protects the eye's front part from foreign objects. Rapid and effective treatment is needed to avoid the risk of worsening the patient's condition and decreasing vision or even the worst condition, such as permanent blindness.

CASE REPORT

A 41 years old male patient came to the Eye Polyclinic at Regional Public Hospital (RSUD) dr. Harjono S Ponorogo has complaints of a lump in his left eye and blurred vision after riding a motorbike about 5 hours ago. The patient rode a motorbike without wearing a helmet or other eye protection. The patient also complained that his left eye felt painful, reddish, and watery (Figure 1). Patient explained that he often rubbed his eyes after the accident because he felt lumpy. Patient did not give any medications before went to hospital. The patient has a history of stroke and hypertension. The patient has no history of eye surgery or use eye glasses before. The patient also has no history of allergies. Family's history of medical eye diseases was denied.

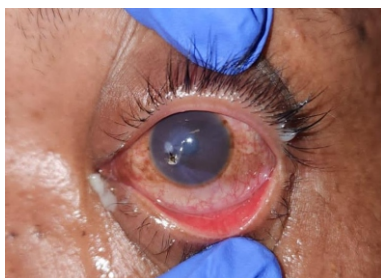


Figure 1. Appearance of Foreign Objects in the Cornea Accompanied by Inflammation of the Conjunctiva saw by naked eyes

Upon physical examination, blood pressure was found to be 200/110mmHg, and other vital signs were within normal limits. Upon ophthalmological examination, the visual acuity in the right eye was 5/15, and the left eye was 2/60. On examination of the anterior segment, there was conjunctival injection, pericorneal injection and secretions, cloudy cornea and positive infiltration of foreign body in paracentral region of cornea, deep anterior chamber, radline iris, isochore pupil, diameter 3mm, positive pupillary reflex, and clear lens (Figure 2). Fundus examination was not possible due to severe corneal edema.

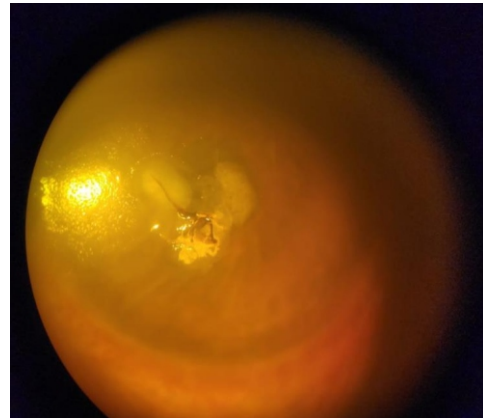


Figure 2. Insect body parts left in the cornea saw by Slit Lamp

The patient was diagnosed with a corneal foreign body caused by an insect. Because the foreign object was embedded too deep in the cornea, it was decided to remove it by small incision surgical technique without suture, because corneal endothelial's condition still intact. The operation was successful and the condition of the patient's left eye after surgery can be seen from the Figure 3. Foreign body that was successfully removed was part of an unidentified insect's leg with brownish color and length around 1-2mm.

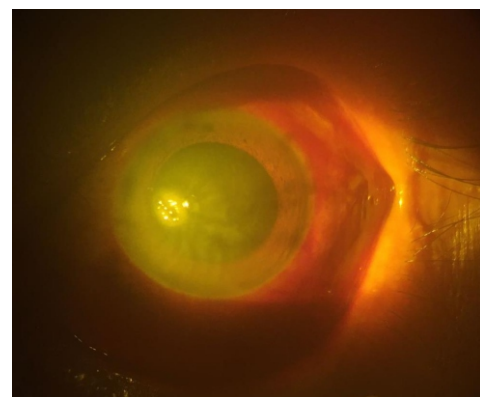


Figure 3. Corneal's patient condition after removed insect body parts

After surgery, patient complains such as red eyes, pain and watery have reduced. Patients receive irrigation therapy at

every return visit and are given home medication in the form of antibiotics and steroids as in the Table 1. First day after surgery patient complains vision still cloudy and unclear. From the examination, the corneal still edematous and patient ocular sinistra's visual acuity has decreased to 1/300 because inflammation still occurring after the surgery. 3 days after surgery, patient still complains some symptoms same as first day after surgery but it has decreased. The corneal edema and hazy slightly decreased, ocular sinistra visual acuity increased to 1/60. 1 week visiting after surgery, patient felt blurry vision with ocular sinistra visual acuity increased to 3/60. The defect in the corneal stroma has slowly healed, leaving a slight clouding in the paracentral region. After ocular sinistra visual acuity's 1 month after surgery increased to 5/10.

Table 1. Postoperative Therapy

Medicine name	Medicinal Preparations	Dose
Tobroson	Eye Drops	6x1 drop
Levocin	Eye Drops	6x1 drop
Sanbe Tears	Eye Drops	6x1 drop
Cendo Tropin	Eye Drops	3x1 drop
Ciprofloxacin	Tablet	2x750mg
Mefenamic acid	Tablet	3x500mg
Methylprednisolone	Tablet	3x8mg
Vitamin C	Tablet	4x500mg
Ringer Lactate	Infusion Fluids	2 liters for 3 days

DISCUSSION

Foreign bodies in the cornea are the second most common disease of the cornea after corneal abrasion (1). Eye trauma is divided into two, open eyeball trauma and closed eyeball trauma, classified based on types, visual acuity, pupil condition, and location of trauma. The patient, in this case, can be categorized into cases with closed globe trauma (superficial corpus alienum) because corneal endothelial's layer still intact. This condition according to the classification of the ocular trauma system (Table 2) (5,6).

Table 2. Classification of ocular trauma systems

	Open Eyeball Trauma	Closed Eyeball Trauma
Type	Rupture Penetration Intraocular Corpus Alienum Mixture	Contusion Lamellar Laceration Superficial Corpus Alienum Mixture
Visual Acuity	≥ 20/40 5/20-20/100 19/100-5/200 4/200-LP NLP	> 20/40 20/50-20/100 19/100-5/200 4/200-LP NLP
Pupil	RAPD (+) RAPD (-) I: Trauma to the cornea and limbus	RAPD (+) RAPD (-) I: Trauma to external structures (bulbar conjunctiva, sclera, and cornea)

Table 2. Classification of ocular trauma systems

	Open Eyeball Trauma	Closed Eyeball Trauma
Zone	II: Trauma 5mm posterior to the limbus III: Trauma >5mm from the limbus	II: Trauma to the internal structures of the anterior segment (cornea, Lens posterior and pars plicata)

Notes: LP (light perception), NLP (no light perception), RAPD (relative afferent pupillary defect)

Source: Serdarevic R. The ocular trauma score as a method for the prognostic assessment of visual acuity in patients with close eye injuries. *Acta Informatica Medica*. 2015;23(2):81–5

The causes of foreign objects in the cornea vary, most often due to lack of eye protection when working in the field, such as welding iron or metal, sparks from firearm, cutting wood, and lack of eye protection when driving a motorized vehicle or when walking (1,2). In this case, a 41 years old man discovered a foreign object in his eye in the form of an insect body part left behind when riding a motorbike without wearing a helmet or other eye protection.

Identifying the type of foreign object in the eye is vital to determine the treatment that can be given. The eye's reaction to retain foreign bodies varies according to the composition of the particles. Eye reactions divided into three types: First, inorganic substances do not cause specific reactions except mechanical irritation and exudative and fibroblastic isolation of foreign bodies. Second, chemical reactions can produce nonspecific or sometimes specific damage. Third, organic materials tend to cause a proliferative response characterized by the formation of granulation tissue with giant cells. In this case, the foreign body in this patient was identified as being caused by an insect. Insects themselves are organic foreign objects (7).

Insect parts remaining in the eye are considered a rare case because there was not much related literature discussing this matter. Insects can be divided into two, namely poisonous and non-poisonous insects. The most common poisonous insects are the *Hymenoptera* group, such as wasps and bees (8). Wasps and bees sting can cause severe inflammation due to immunologic and toxic reaction to cornea. Corneal penetration due to sting can cause corneal ulcer formation in few hours. Insects have normal flora that grows on their bodies and is not present in the eyes, especially the cornea, including the bacteria *Staphylococcus epidermidis*, *Mycobacterium fortuitum*, and *Corynebacterium's* species (9).

The presence of a foreign object in the eye causes the body's immune response to react and inflammation occurs as a form of continuous self-protection until the foreign objects or insect's body can be removed. Apart from that, bacteria found in insects and the surface of the eye can enter through open wounds on the cornea and can cause infection so that if not treated rapidly it could be worsening the patient's condition (10).

In this case, insect body parts were found remaining in the corneal stroma. If extraction or removal of the foreign object is not immediately carried out, the inflammatory reaction can spread and cause corneal ulcers, uveitis, glaucoma, and inflammation of the optic nerves papillae like optic neuritis or optic atrophy (10).

When a foreign object hits the cornea, a sharp pain like burning occurs, a tear reflex accompanied by momentary blindness, and the eyelids close due to blepharospasm. The patient will rub the eyes vigorously, and this often causes the foreign object to enter the cornea, although sometimes the foreign object can be carried up to the conjunctival fornix (8).

If the foreign body is in the center area of the refractive medium, decreased vision can occur, not only due to lacrimation but also due to the appearance of optical blur due to irregular corneal surfaces as well as edema and folds in the corneal Descemet's membrane (decimate fold) (7). Additionally, in cases of insect body parts remaining in the cornea, as in cases of other corneal foreign bodies, patients usually experience other symptoms such as a lump in the eye, red eyes, sticky eyes, and photophobia (2).

The goal of therapy in cases of corneal foreign bodies is to remove the foreign body, reduce symptoms, and prevent any complications in patient. The initial treatment that can be given is eye irrigation. Eye irrigation is aimed at reducing pain, a lump, and is a way to remove foreign objects in the eye. The recommended irrigation solution is a solution that has an isotonic or equivalent osmolarity's level, such as *ringer lactate* or *natrium chloride*. Physiologically, that solutions were superior to water because it causes less risk of corneal edema (7).

Surgery can be performed to remove foreign objects or to treat complications that occur. The patient, in this case, underwent removal of the foreign body under topical anesthesia in the operating room as a primary procedure, because the foreign body went too deep into the corneal stroma (5).

After successfully removed the foreign object on the cornea, therapies continued, consisting of pain control, follow-up, and consideration of prophylactic antibiotics according to the patient's general condition. Intravenous and topical antibiotics, and oral steroid therapy was given to patients with deep penetrating trauma for prophylaxis against infectious endophthalmitis (1,5).

In this case, eye irrigation was given for 3 days, around of 2 liters per day, considering the presence of chemical compounds and residual debris from insect bodies attached to the cornea, which could cause chemical

trauma. Ocular irrigation is recognized as the most important intervention to manage chemical ocular trauma. This has been proven to reduce the severity of the disease and improve visual outcomes in the chemical eye trauma's cases (11,12). The patient in this case showed an improvement in the patient's eye condition as seen from improvement in the corneal stroma and increased visual acuity after 1 month of therapy.

Before doing irrigation, pH's value should be measured in both eyes even when one eye is affected because the unaffected other eye can serve as a "normal" control value for the affected eye. However, in this case pH measurements was not carried out due to limited equipment available at the eye polyclinic.

The prognosis in this case depends on the time of onset and severity in the patient (1). Prognosis can be significantly improved with prompt and appropriate examination and treatment (1,3).

In conclusion, foreign objects from insect body parts in the corneal stroma is indeed cases that are rarely encountered by clinicians, but they still require rapid and appropriated examinations and treatments. Identification of foreign objects is essential to determine the severity level and the possibility of other deterioration such as the involvement of chemical trauma from chemical compounds in the insect's body. Foreign objects that are not removed immediately can cause infection so that the body's immune response will compensate in the form of inflammation. Chronic sterile inflammation can be affect the area around the site of inflammation and even the back of the eye. If this happens, it can be worsen the patient's condition and can result in permanent blindness in the patient.

In conclusions, remained insect's body part in cornea can cause quite severe inflammation of the cornea. Foreign body extraction, eye irrigation, topical and systemic antibiotics and steroids, topical cycloplegic are the various treatment modalities for better result. To prevent cases like this from happening again, it is recommended to educate patients to use adequate eye protection when doing activities, such as using full face helmet, glasses or other types of protection. Further examination could be done to find out the chemical elements of insect's toxin so that more adequate therapies can be given.

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