CASE REPORT

# How to Safely Remove Live Nematode in The Eye

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**ABSTRACT**

**Objective:** To provide information about a safe and easy technique to remove live nematode in the anterior chamber.

**Case Presentation:** A 21-year old male presented with a sudden-onset of pain in right eye for 5 days. The complaint was accompanied with irritation and photophobia. On examination, visual acuity was 6/6,5 with his best corrected, with circumcorneal congestion. We performed slit-lamp examination on the AC and witnessed a thin, white motile object with wriggling movement, that was swimming live in AC. The worm was removed surgically from AC by using forceps and adding lidocain with nacl 0,9% intracorneal to stop its movement. The worm was sent to pathological anatomy department to be examined microscopically.

**Conclusion:** A method of using lidocaine as a chemoparalysis substance has been proven effective to facilitate an easy removal of the worm so as to prevent major harm to the ocular structure.

**Keywords :** Anterior chamber, worm eye, chemo-paralysis, lidocain

Indonesia is an endemic area for parasite, particularly worms. Parasitic route of human infection are varied from oral fecal to direct infection through skin. It can manifest as systemic symptoms such as fever, anorexia, also gastrointestinal and respiration disturbance. It may also spread to other organs, although unlikely, such as eyes.[1, 2]

Parasitic infections of the eyes is a rare occasion mosty take place in the certain geographical area with poor sanitation that sustain the liveability of the parasite. Eye lesion may occur due to direct damage by the pathogen and indirect damage caused by its toxins, infection triggered immune responsee, or ectopic parasitism. The epidemiology of cases alike are useful to illustrate the type of parasite and the patient's habit and health status.[2]

There are two types of worms that are known to cause eye infection, which are round worms or nematode and flat worms or cestode.[2] Among these types of worms, filaria and angiostrongylus were the most common cause of nematode infection in South East Asia. In Indonesia, the incidence of filariasis are still considered high, being reported as many as 13.032 cases in 2015.[3] Referring to the data mentioned before, it is very likely for Indonesian to be infected by

filariasis with its various types of manifestation.

On of the nematode that are frequently infecting human is filarial worm. Depend on the type, adult filarial worms are able to live in lymphatic vessel, blood vessel, serous membrane, skin, and connective tissue.[4,5] Despite intraocular infection of filarial worm is very uncommon, there are several reports coming from India and Nigeria about worms living in vitreous humor and anterior chamber.[4,6] There are no similar report from Indonesia yet although from epidemiological point of view, Indonesia is an endemic area for filariasis. Angiostrongylus is the most commonly found nematodes in South East Asia, and Indonesia being one of which.[2,7] Angiostrongylus larva can reside in lungs, meninges, brain parenchymes, cranial nerve, and also eyes.[1,7] A case of angiostrongyliasis of the ocular anterior chamber has been reported previously from Semarang, Indonesia.[8]

This report will explain and illustrate the extraction of a live worm in the anterior chamber (AC) with a modification in the technique to prevent ocular structural damage.

## CASE PRESENTATION

A 21 year old male presented with a sudden-onset of pain in right eye for 5 days. The complaint was accompanied with irritation and photophobia. There were no other complaints such as fever and neither gastrointestinal nor dermatological abnormalities. The patient was a student living in South Kalimantan, Indonesia.

On examination, visual acuity was 6/6,5 with his best corrected, with circumcorneal congestion. We performed slit-lamp examination on the AC and witnessed a thin, white motile object with wriggling movement, that was swimming live in AC (Figure 1). Vital signs, conjunctiva, iris, cornea, pupil reaction, and IOP were within normal range. Complete blood count showed no abnormality. Preoperatively, the patient was diagnosed as having foreign body in the right eye and was planned to undergo foreign body extraction in the operation room.

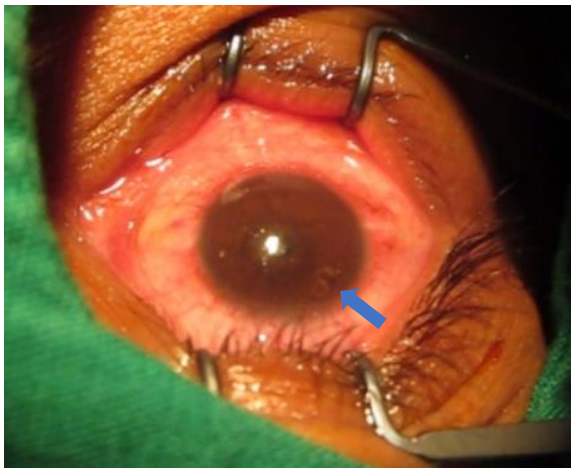


**Fig 1.** (blue arrow) showing an actively moving worm in the anterior chamber of the right eye

Subconjuntival injection was chosen as the anesthesia method. A 2,75 mm incision then done at 12 o'clock direction. We discovered a white paracite, possibly worm, that were actively moving around, making it difficult to be extracted. A total of 0,4 ml mixture of 1:1 lidocaine and NaCl 0,9% were then injected intracamerally with the aim to reduce the worm's movement. After a while the worm seemed less active and we carried out the worm's body using forcep ultrata. In this procedure, we did not give Hydroxy propyl methyl cellulose (HPMC) for fear of making the worm pushed further and cause further damage to the endothelium. The head of the worm was detached due to its active movement during the extraction process (Figure 2 & 3).

The speciment were sent to the Clinical Pathology laboratory and morphological examination revealed a white, round worm which possesed a long and slender with smooth cuticles, finger-like tail. The body length was 4 mm and

width were 0,2 mm with tail width of 0,1 mm. It was identified to be resembling a filarial worm.

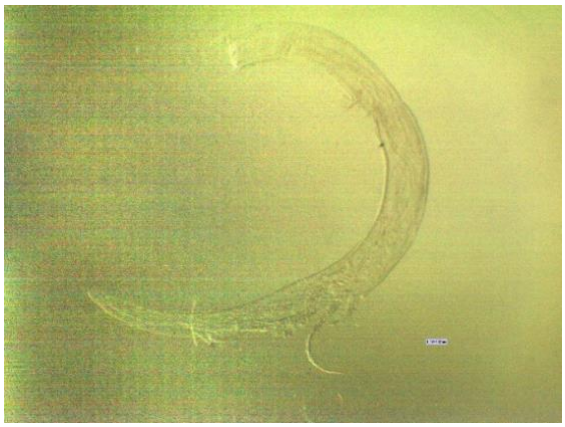
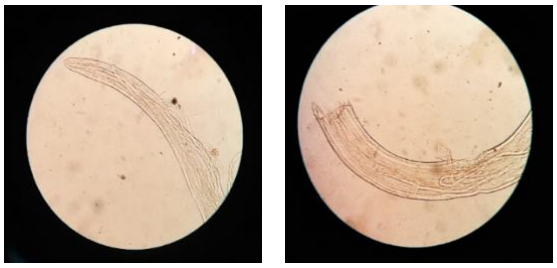


**Fig 2.** Microscopic image of the worm, the head was detached from its body as seen in the cranial end



(A) (B)

**Fig 3.** Microscopic image at the 10x magnification. (A) Caudal end; (B) Cranial end with scrap due to head detachement in the extraction process

Post operatively the patient was given topical and oral steroid, NSAID and antibiotic. Patient was also consulted to the Internal Medicine Department and was given oral antihelmintic namely diethylcarbamazine 3 x 100 mg and albendazole 2 x 400 mg for 2 weeks. After completion of treatment the visual acuity was 6/6 without any ocular complication.

## DISCUSSION

Eye disease and blindness are among some of very feared events because they are related to daily quality of life. Blindess has become a priority in the field of eye health in terms of its management and prevention. Some parasite (protozoa, worms and diptera) had been known to cause blindness particularly in developing countries.[7, 9] Of some parasite that cause eye damage, worm infection inflict challenge to clinician because of its motility in the extraction process. Eye worm infection is considered a rare case so that not every clinician is familiar with it. Even more, to add certain difficulties, worm can migrate between intraocular chamber.

There were several case of eye worm infection that had been reported from South East Asia countries, namely angiostrongyliasis and filariasis. Both type of worms may induce vision impairment (blurred vision and poor visual acuity), retinal vasculitis, panuveitis with secondary glaucoma, and blindness.[2] Indonesia is an endemic of filariasis. According to data from Pusat Data dan Informasi Kementrian Kesehatan RI (Data and Information Center of Indonesia Ministry of Health / PUSDATIN), there were 13.032 cases of filariasis in 2015 and in 2016 it was reported that 29 cities and 239 regencies were endemic of filariasis. In South Kalimantan itself 239 cases were reported in 2015.[3] Although report of filariasis with systemic manifestation were abundant, infection of filaria in the eyes had never been reported. Meanwhile, infection angiostrongylus in the eyes had been reported in Semarang, Indonesia by Widagdo etc.[8]

Adult filarial worms are commonly long, slender, and possess smooth cuticle. Filarial worms have two types, *Wuchereria bancrofti* and *Brugia malayi*. Male wuchereria usually measured 40 mm in length and 100 μm in width with finger-like tail. Female wuchereria are usually longer than its male counterparts with 6-100 mm in length and 300 μm in width. [10, 11] Adult worms usually reside in human lymphatic gland. In microfilarial form, they usually measured around 240-300 μm.[1] On staining with giemsa, microfilaria of wuchereria show several internal nucleus and organs.[10, 11] In its cycle of life, *W. bancrofti*, following its nocturnal life cycle, will

migrate to peripheral circulation around 10 pm and 2 am. *B. malayi* have similar morphology with *W. bancrofti* but with smaller size. [10, 11] The male are 15 – 20 mm in length and 70-80 μm in width, while the female are 80-100 mm in length and 50-300 μm in width.9,10 In microfilarial form, they usually are only measured around 180-230 μm. [1] *B. malayi* have one nuclei in the tip of its tail. Adult filarial worm can live in carotid artery which is a direct branch of the aorta. Because carotid artery supply blood to the head, it is possible that the worm is carried over to the eyes.[12] An exact route of microfilarial infection to the eyes has not yet been established, but according to its cycle of life microfilaria may enter the peripheral circulation at night. Several of the possible route for worm to enter eyes are through posterior cilaris artery, cerebrospinal fluid, or optical nerve sheath.[13]

Angiostrongyliasis are commonly caused by *Angiostrongylus cantonensis.* This species is divided into two types according to its location, in which type A is asian type and type B is american type.[1] Type A are usually found in Asia Pacific, including India, China, South East Asia and Australia. Meanwhile, type B are found in Central America, North America, and South America including Colombia, Brasil, and Venezuela.[1] Type A *(Angiostrongylus cantonensis* or *Parastrongylus cantonensis)* are also known as rat lung worm.[11] *A. cantonensis* have no buccal cavity. Male worms are usually 17 mm in length and female are 24 mm. [1] Snails usually serve as their intermediate host. Infection is acquired through consumption of infected snail and also several other possible host such as amphibians, reptiles, several kinds of crustaceans, and sometimes undercooked vegetables.[1, 7] Larva migration inside human will usually proceed to centran nervous system and sometime ended in eyes up along the optic nerve.[7]

In this study we found a white, round worm with finger-like tail, measured 4 mm in body length, 2 mm in body widthm and 1 mm of tail width. Unfortunately, because of our limitated facilities we could not perform staining and worm measurement could not be done perfectly due to partial disengagement happened in the extraction process. Based on the available data, we suspect this worm belong to the group of filarial worms, consistent with Indonesia condition as an endemic area. Microscopically the worm's tail in this study resemble the one possesed by *W.brancofti.* However, this does not rule out possibilities of this worm belonged to other species such as *B.malayi, Loa-loa,* even *Angiostrongylus cantonensis* which are also commonly found in South East Asia.[1, 2, 7]

The surgery to remove the worm is challenge in itself. The worm's motility complicate the process and potentially create damage, either due to the motility or the mistake of the operator while attempting to extract the worm. The use of lidocaine as an agent to facilitate the extraction process of a very actively moving worm is considered very effective. A study by Dinesh Kumar etc describe an extraction process of angiostrongylus worm from anterior chamber of a 12 years old.[14] They mentioned using 0,3 mL of lidocaine after giving local anesthesia were very effective in reducing the worm's motility, making the extraction process much easier and reducing the risk of eye damage along the operation. [14] A similar study were also conducted by Nataraja etc in India, stated that the effectivity of lidocaine as a chemo-paralysis agent were very useful to reduce eye damage caused by the worm's extraction process as well as eye inflammation from the result of the worm's death inside the eyes.[15]

In our case, the technique of removal was performed after anesthesia through the subconjunctiva. Next, an incision was made 2,75 mm at 12 o'clock. Then, we injected 0,4 ml of a mixture of lidocaine and normal saline solution intracamerally. This mixing is intended to make the worm paralyzed but

does not cause side effects. After the vigorous undulating movements of the worm became slower, we took the worm's body using forcep utrata (Figure 4). The use of utrata forceps is expected to pick up worms precisely to prevent the worm from moving into the posterior chamber.

Nonetheless, difficulties occured at the time of extraction because the worm begin to move again, resulting in the detachment of its head. It was presumed that the lidocaine consentration were not sufficient to paralyze the worm due to the dilution process with NaCl 0,9%.

Chemoparalysis is known as a term that is often encountered in dealing with intraocular parasites. It can only be used if the intraocular parasite is located in the anterior chamber.

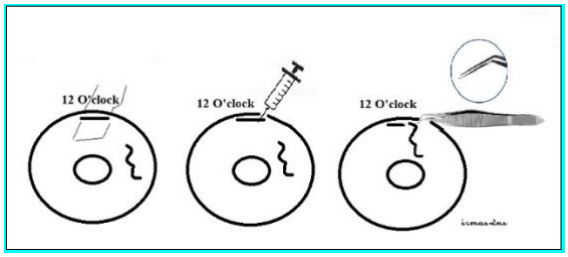



**Fig 4.**Technique of removal in our case

The use of preservative-free lidocaine is recommended to avoid unwanted neurological side effects. Lidocaine is a local anesthetic agent that work by blocking nerve impulse conduction directly in the sodium canal. As a result, it gives a paralysis effect to the worm to reduce its motility.[14, 15] The administration of lidocaine as chemo-paralysis is to facilitate worm retrieval and prevent worms from migrating to the posterior chamber.[16] In that case, it will be difficult to extract the worm because a posterior chamber procedure such as pars plana vitrectomy will be needed.[17] There are many types of worm retrievals such as HPMC or viscoelastic agent, forceps, cryoextraction, and the use of flute needle which have been widely used in previous studies.[15,16] The use of these agents is based on needs by adjusting the characteristics of the worms and the availability of instruments at the hospital facility.

The use of lidocaine is very effective, affordable, and recommended for the case of ocular worm.[16,18] The use is not limited to certain kind of worm, but can only be used if the worm is located in the anterior chamber. [14-16] We recommend the use of lidocaine as a standard method for chemo-paralysing agent in the worm extraction process from the anterior chamber of the eye.

## CONCLUSION

The use of lidocain as a chemo-paralysis agent is considered useful in the extraction process of motile worm in ocular helminthiasis, especially if the worm is located in the anterior chamber. It is also easy to find, cheap, and has the chemo-paralyzing effect that makes the worm become sluggish and prevents it from posterior migration. After the worm became sluggish, the operator can easily took the worm with various methods. Futhermore, this method is effective, practical and efficient in reducing eye inflamation and to prevent blindness as a result of worm exctraction process or the remnant of the worm's death body inside the eye.

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