



## Rare *Thelazia californiensis* infant ocular infestation

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### ARTICLE INFO

#### Keywords:

Pediatric ophthalmology  
Infectious disease  
Foreign body  
Acute conjunctivitis  
Follicular conjunctivitis

### ABSTRACT

**Purpose:** A rare case of *Thelazia californiensis* ocular infestation was diagnosed and treated in an 11-month-old patient.

**Observations:** The patient presented with a visual acuity of 20/130 OU by Teller cards. Exam demonstrated a white, mobile worm in the inferomedial fornix of the right eye. The remainder of the exam was otherwise normal. The worm was removed under anesthesia and identified as *Thelazia californiensis* by the Division of Parasitic Diseases and Malaria, at the Centers for Disease Control and Prevention.

**Conclusions and importance:** This case demonstrates a rare but important cause of follicular conjunctivitis and mobile foreign bodies, especially in patients with a supportive history of exposure to the intermediate and definitive hosts of *Thelazia* species.

### 1. Case

The mother of a nine-month-old infant noticed an asymptomatic foreign body in the infant's right eye, described as "stringy" and "worm-like" (Fig. 1). The patient was evaluated on multiple occasions in the urgent care setting, but no foreign body was visualized. Given a lack of symptoms or examination abnormalities, family was reassured and no intervention or follow-up was recommended.

At age 11 months, the child attended a previously scheduled follow up appointment for pseudostrabismus. Her mother reported intermittent visualization of a mobile, worm-like object tracking across the right eye without additional symptoms.

Her visual acuity was 20/130 OU by Teller cards. Exam demonstrated a white, mobile worm in the inferomedial fornix of the right eye, visible only on eversion of the lower eyelid. The remainder of the exam was otherwise normal, with no injection or follicles seen by penlight in the clinic. An examination under anesthesia was recommended.

Under anesthesia, non-toothed forceps were used to carefully remove three thin, white worms about 1.5–2cm in length (Fig. 2). All were present on the ocular surface and mobile. The fornices of both eyes were thoroughly explored and irrigated with saline and betadine. The worms were sent in saline to the Infectious Diseases Diagnostics Laboratory (IDDL). Additionally, both eyes showed follicular conjunctivitis, although no worms were seen in the left eye, raising the possibility of

prior worm present in the left eye. Intraoperative blood work was normal without eosinophilia on CBC. Pediatric Infectious Diseases Service was consulted and recommended systemic anti-helminthic only for continued conjunctivitis after removal or if there was any concern for incomplete removal of the worms. The patient was monitored closely without use of a systemic anti-helminthic.

The samples were identified by IDDL as female and male adult worms compatible with *Thelazia* species. Subsequently, the CDC confirmed the species as *Thelazia californiensis*.

The patient, a Minnesota native, was up-to-date on vaccinations and had not traveled outside of the country. Family interview revealed the most likely source of acquiring infection while on a two-month trip to California three months prior to them observing a worm on the patient's eye. The patient's mother remembers camping next to a farm where there were numerous flies present, and multiple flies did land on the patient. The family did take their family dog on the trip, however transmission would have still required an intermediate fly host, the dog was asymptomatic, up-to-date on ringworm prophylaxis, and later veterinary examination showed no evidence of the dog having worm infestation.

Examination on postoperative day 12 showed that the follicular conjunctivitis had resolved in both eyes and no worms were visualized on slit lamp microscopy. Continued observation was recommended.

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**Fig. 1.** Patient's right eye. Still image from video taken at home of a nine-month-old showing mobile, thin worm visible across the lateral interpalpebral conjunctiva, which otherwise appears white and quiet.

## 2. Discussion

The treatment of thelaziasis in humans requires worm removal. In children, examination under anesthesia is preferred to identify and remove all worms and eggs, and to thoroughly rinse the eyes with betadine and saline to achieve complete removal of the infestation. While there are no direct studies of the use of betadine to kill eggs and adult worms in these types of infestations, it is regularly used for this purpose with anecdotal support for its use.<sup>1-4</sup>

We suggest separate sterile instruments be used for each eye to minimize accidental inoculation of an uninvolved eye. Of note, the left eye had follicular conjunctivitis despite the absence of worms or eggs at the time of the exam under anesthesia. While we cannot be sure of the cause for this, given the thorough exam under anesthesia including irrigation with saline and betadine, and the close follow-up with a reliable family, we felt comfortable with pediatric infectious disease's recommendation on holding off on systemic anti-helmenthics. The use of systemics is on a case-by-case basis. Systemic ivermectin could be considered if re-infection or follicular conjunctivitis persists after worm removal. Ivermectin has not been licensed for use in children under <15kg. However, there is ongoing discussion and research regarding its safety in children. A recent meta-analysis demonstrated adverse events in only 1.4% of children treated with ivermectin, none of which were

serious adverse events.<sup>5</sup>

Due to the life cycle of *Thelazia* species, we recommend patients be monitored for any visible worms or follicular conjunctivitis for two months after worm removal. The larvae mature in the digestive tract of the fly. They migrate to the mouth when mature and infect the definitive host's conjunctival sac when the intermediate host fly feeds on lacrimal secretions.<sup>6</sup> The larval and adult forms can cause conjunctivitis, keratitis, and discharge.<sup>7</sup> Once the definitive host has been infected, the larvae require one month to mature.<sup>6</sup>

*Thelazia* human infection is rare in the US. Ten cases of *Thelazia californiensis* have been identified in California and Utah. The two most recent cases, in 1996, were from patients in the Rocky Mountains.<sup>8-10</sup> The other known species to cause human infection in the US is *Thelazia gulosa*, with only two reported cases in Gold Beach, OR in 2017 and Carmel Valley, CA in 2019.<sup>8,11</sup>

This case exemplifies the importance of listening to families. Initial parental report of a visible worm was dismissed twice. We recommend that family report of an ocular foreign body prompts a referral to an eye provider, particularly for challenging infant exams.

In summary, this case demonstrates a rare but important cause of follicular conjunctivitis and mobile foreign bodies, especially in patients with a supportive history of exposure to the intermediate and definitive hosts of *Thelazia* species.

### Patient consent

Consent to publish the case report was obtained. This report does not contain any personal information that could lead to the identification of the patient.

### Authorship

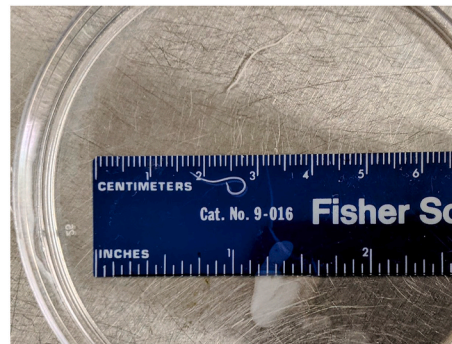
All authors attest that they meet the current ICMJE criteria for Authorship.

### Declaration of competing interest

The authors have no conflicts of interest relevant to this article to disclose. No funding was secured for this study.



A



B

**Fig. 2.** Samples surgically removed from the right eye of an 11-month-old infant on March 9th, 2021. Panel A shows the entire length of one of the worms removed from the right eye. Panel B shows the approximate length of the worm as 1.5–2 cm. The Division of Parasitic Diseases and Malaria, at the Centers for Disease Control and Prevention identified the samples as female and male adult worms compatible with *Thelazia californiensis*.

## Acknowledgements

A thank you to the Division of Parasitic Diseases and Malaria, at the Centers for Disease Control and Prevention who examined the provided worms, identified them to speciation, and to the technologists, Kathleen Ormberg and Susan Johnson in the Parasitology Section of the Infectious Diseases Diagnostic Laboratory, University of Minnesota Medical Center, Fairview.

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