



Ocular thelaziosis: A case report of an emerging zoonosis

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ABSTRACT

Purpose: To describe an unusual case of ocular thelaziosis due to *Thelazia callipaeda*, an underdiagnosed and emerging zoonosis.

Observations: We report an 81-year-old woman presented to our emergency department with a week long history of bilateral redness and tearing that had not improved despite antibiotics and corticosteroid topical treatment. Slit-lamp biomicroscopy showed signs of bilateral conjunctivitis and mucopurulent discharge in fornices. Under the upper tarsal conjunctiva of the left eye, two filiform worms were identified, which were removed and sent on wet mount slides for microscopic examination and genetic identification. The rest of the ophthalmoscopic examination was rigorously normal. Polymerase chain reaction (PCR) assay turned positive for *Thelazia callipaeda*. During further questioning, the patient reported that she had been on summer vacation in contact with dogs which were infected with eye worms.

Conclusions and Importance: Ocular thelaziosis is an emerging zoonosis in Spain, but also in the rest of the world. Ophthalmologists should include ocular thelaziosis in humans as a possible cause of conjunctivitis, tearing, and corneal ulcer, thus avoiding underdiagnosis and inappropriate treatments. The epidemiology of the disease makes anamnesis essential. A confocal biomicroscopy is a useful device for identifying this eyeworm but the definitive diagnosis will be made taking into account the morphological identification under microscope, together with the molecular identification by PCR techniques.

1. Introduction

Thelaziosis is a zoonosis caused by nematodes belonging to the genus *Thelazia* (*Spirurida: Thelaziidae*), transmitted by *Musca* fly and drosophilid vectors which deposits the larvae in the host's conjunctiva.^{1,2}

This parasitosis has been reported in some exceptional human cases and three species have been identified in pathogenesis: *Thelazia callipaeda*, *Thelazia californiensis* and *Thelazia gulosa*.² *Thelazia callipaeda* is the most common cause of thelaziosis in humans and two intermediate hosts have been identified, *Phortica variegata* in Europe and *Phortica okadai* in Asia, which feeds on lacrimal secretions releasing larvae in human's conjunctiva.²⁻⁴

Adults worms located in conjunctival sac produces tearing, itching, foreign body sensation, photophobia or signs of conjunctivitis and nematodes can be observed with slit-lamp biomicroscopy under tarsal conjunctiva.⁴ The definitive diagnosis will be made taking into account

the morphological characteristics evidenced by vision under microscope, together with the molecular identification by polymerase chain reaction (PCR).^{2,4}

It is important to know this entity in order to include it in the differential diagnosis of red eye in patients with epidemiological history of contact with animals and also in those who, despite not having been in contact with animals, have stayed in rural or forested areas where *Thelazia callipaeda* vectors are available.

2. Case report

An 81-year-old woman presented to our emergency department with a 1-week history of red eyes, photophobia and tearing that had not improved despite antibiotics and corticosteroid topical treatment. Best-corrected visual acuity was 10/200 in right eye and 20/100 in left eye (she suffered from bilateral optic atrophy due to childhood meningitis),

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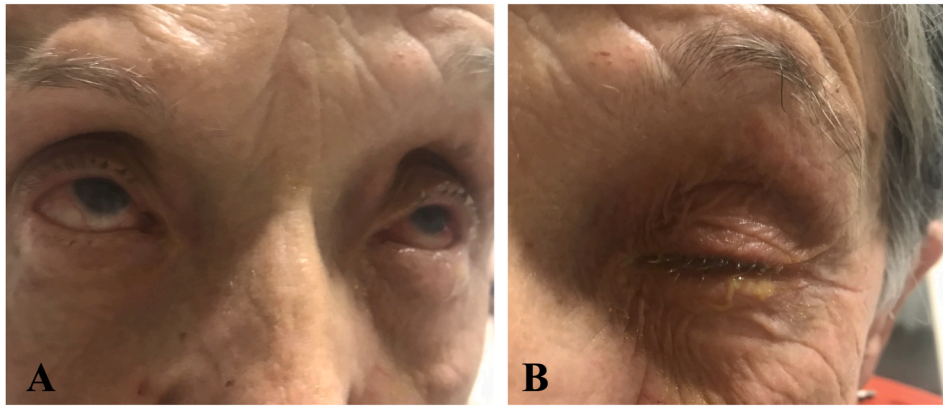


Fig. 1. 1A. Color photograph of the macroscopic appearance of the patient. Bilateral eye redness is observed. 1B. Color photograph of the left eye which demonstrates yellow discharge on the lower eyelid. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



Fig. 2. Color photograph made by looking through the slit-lamp biomicroscopy. A whitish-transparent mobile worm approximately 5–6 mm in length held by tweezers is observed.

showing signs of bilateral conjunctivitis with mucopurulent discharge in conjunctival fornices (Fig. 1).

In the left eye under the upper tarsal conjunctiva, 2 whitish filiform worms 5 mm long were identified, which after instillation of topical anesthetic, were removed without incident with tweezers (Fig. 2). The eyeworms were sent, on wet mount slides, to the microbiology department for microscopic examination and molecular identification (Fig. 3). The rest of anterior chamber and fundus examination did not show any interesting findings.

Given the findings, epidemiological factors were emphasized. On further questioning, the patient reported that, during summer vacation period four weeks before in *El tornadizo*, Salamanca, she had been in contact with the neighbors' dogs, which had presented worms in the

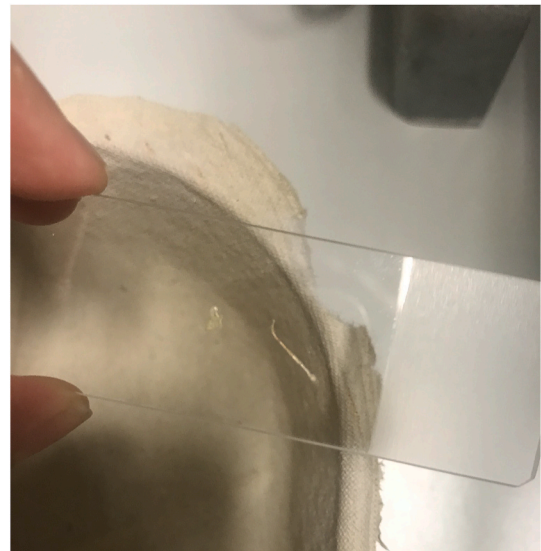


Fig. 3. Color photograph of the wet mount slide displaying two worms, the one on the right extended and the one on the left folded on itself. This wet mount slide was sent to the microbiology department for microscopic examination and molecular identification. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

eyes.

The patient was re-examined 24 hours later undergoing an exhaustive screening, ruling out the presence of new strange formations. After the mechanical removal of eye worms, the symptoms disappeared and there were no recurrences. Topical treatment was maintained so that the patient continued with the antibiotic and topical corticosteroid regimen in descending dose for the following 3 weeks. Direct examination showed a helminth nematode which was identified as *Thelazia callipaeda* using PCR techniques in a reference laboratory (Fig. 4).

3. Discussion

The oriental eyeworm, *Thelazia callipaeda* is a parasitic helminth transmitted by *Phortica variegata* and *Phortica okadai* while feeding on ocular secretions of their hosts.^{1,2} This nematode is localized under the eyelid of canids, felids, rodents and humans, and it may cause signs and symptoms that can range from mild to severe, such as lacrimation, itching, conjunctivitis or even corneal ulceration if it is not properly treated.^{2–4}

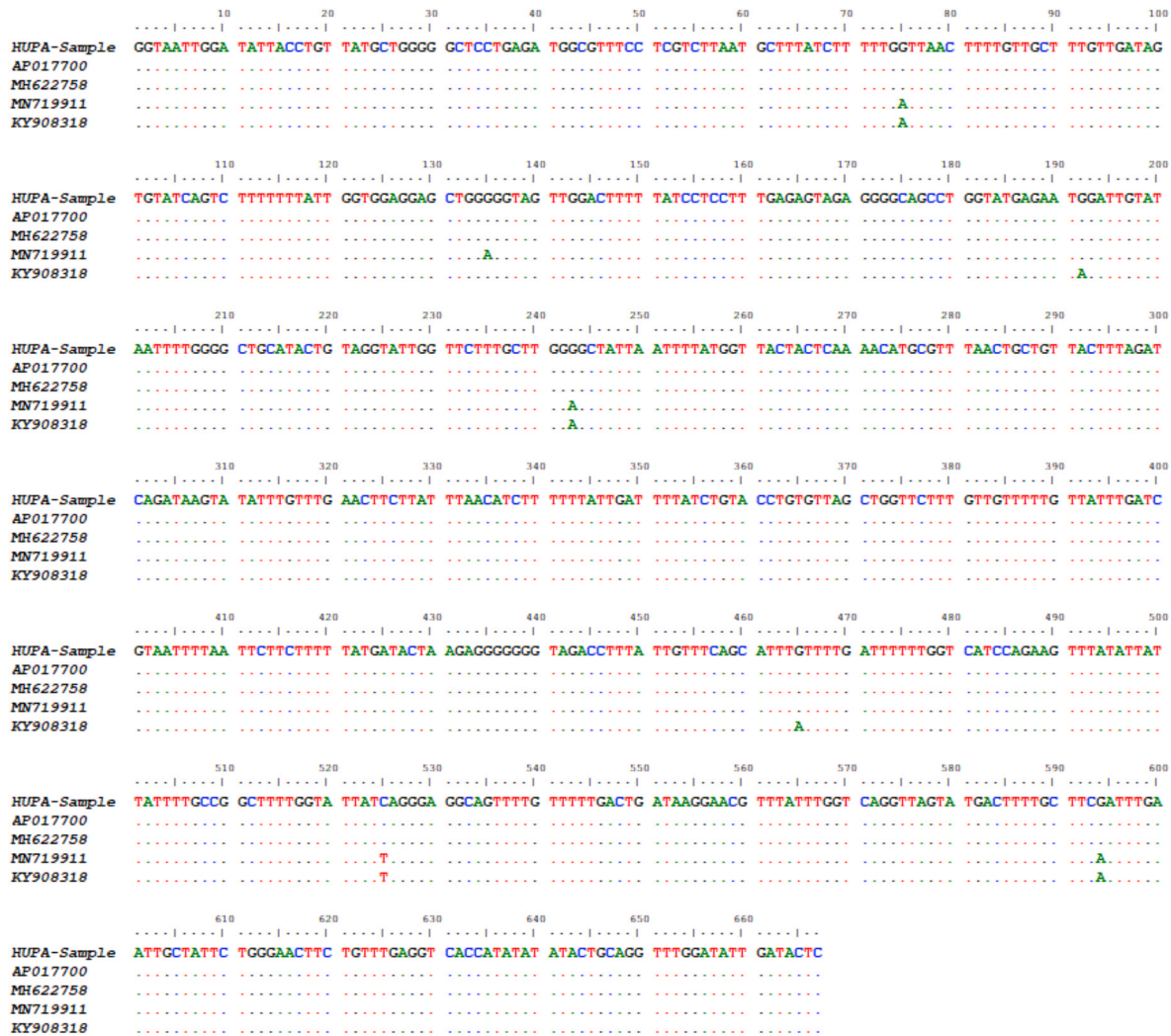


Fig. 4. Partial alignment of the COI-1 (Cytochrome C Oxidase subunit 1) sequence obtained from the PCR amplified sample and a small representation of *Thelazia callipaeda* sequences obtained from GeneBank and named by their database access number. The homology with the *T. callipaeda* in the database is higher than 97%, being in most cases equal to 100%. The image shows two sequences with 98% homology and two with 100%.

This nematode was widespread across Asia, but in last years it has disseminated to Europe among domestic and wild mammals such as dogs, cats, foxes, rabbits, reporting a growing incidence of canine thelaziosis.⁵ In fact, is necessary to consider that the diagnosis of canine thelaziosis is extending considerably in Europe and among their countries also in Spain since 2011⁶⁻⁸, so autochthonous cases of *T. callipaeda* infection has been described in dogs at some Spanish regions specially in western Spain. Spanish regions where canine thelaziosis has been described are La Vera region, Salamanca and Orense provinces and two towns in Madrid called El Escorial and Miraflores de la Sierra.⁹

We present a case of human thelaziosis in a patient living at the center of the peninsula confirmed under PCR techniques. One must take into account the risk of parasitism in humans could be increasing⁶⁻⁸ due to the higher prevalence of *T. callipaeda* infection in animals and its expanding geographical distribution.⁹ We have to be very aware of the possibility of new human cases of *T. callipaeda* in new regions and countries.

Since the beginning of the 21st century, the number of humans infected by *T. callipaeda* in Europe has been increasing, reporting 11 cases from 2001 to 2020. It has been reported including 1 case in Croatia, 1 case in France, 1 case in Germany, 3 cases in Italy and 4 cases in Spain.¹⁰ In light of the reflected data, we can state that human thelaziosis is an expanding disease. Therefore, it becomes necessary to

report all new cases with the aim of sharing clinical characteristics and prevent this zoonosis.

Slit-lamp biomicroscopy will be a fundamental tool for both identification and removal of these nematodes. The epidemiology of the disease makes anamnesis essential, since the history of exposure to potentially infected animals such as dogs, cats or rabbits is very indicative in the diagnosis, although the definitive diagnoses are morphological characteristics under microscope and the PCR assay.^{2,4}

The lack of awareness amongst doctors across Europe concerning the zoonotic potential of *Thelazia callipaeda* can lead to an inadequate diagnosis and treatment, with the complications that this implies, such as prolongation of the parasite's survival, bacterial superinfections or allergic reactions among others.

The aim of this report is to share clinical characteristics and therapeutic orientation with the aim of avoiding associated complications derived from underdiagnosis, and also highlight the importance of veterinarians to prevent this parasitosis.

Patient consent

We obtained written consent signed by the patient and we can provide this consent upon editor request.

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Authorship

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

Declaration of competing interest

None declared.

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