



Case Report: Zoonotic Ocular Thelaziosis Infection in Two Dogs and Treatment

Aynur DEMİR^{1,a}, Gülşen SEVİM KARAGÖZOĞLU^{2,b}, Şakir PEHLİVAN^{2,c}, Alev AKDOĞAN KAYMAZ^{3,d}

¹Istanbul University-Cerrahpaşa, Faculty of Veterinary Medicine, Department of Surgery, Istanbul-TURKEY

^{2,3}Istanbul University-Cerrahpaşa, Institute of Postgraduate Education, Istanbul-TURKEY

³Istanbul University-Cerrahpaşa, Faculty of Veterinary Medicine, Department of Internal Medicine, Istanbul-TURKEY

ORCID Numbers: ^a0000-0002-5471-1655; ^b0000-0002-3945-4101; ^c0000-0001-7570-6911; ^d0000-0003-4457-6859

Corresponding author: Aynur DEMİR; E-mail: aynurdemir_1903@hotmail.com

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Abstract: A 1.5-year-old female, hunting dog and a 6-year-old male crossbred dog presenting with eye discharge, conjunctival hyperemia and swelling were reported in this study. After a local anesthetic drug was administered, ophthalmological examination revealed a variable degree of ocular discharge, blepharospasm, conjunctival hyperemia, and the presence of movable parasites hidden behind the third eyelid membrane. A total of 15 parasites (5 males, 10 females) were removed from the eyes of both cases. All the parasites were submitted to the department of parasitology for morphological identification. According to ocular and parasitological examination findings, the patients were diagnosed with ocular thelaziosis. For treatment, a single time 10% imidacloprid and 2.5% moxidectin spot on (Advocate®, Bayer, Slovakia) was applied and tobramycin-dexamethasone (Tobradex®, Alcon, Turkey) 3 times a day, fusidic acid (Fucithalmic®, Abdi Ibrahim, Turkey) twice a day were used topically for 2 weeks. Mechanical removal of parasites and medical treatment were positive in both patients.

Keywords: Dog, eyeworm, *Thelazia callipaeda*, treatment

İki Köpekte Zoonotik Oküler Thelaziosis İnfeksiyonu ve Tedavisi

Öz: Bu çalışmada göz akıntısı, konjonktival hiperemi ve şişlik şikayetleri ile başvuran 1.5 yaşında dişi bir av köpeği ile 6 yaşında erkek melez bir kopek bildirilmiştir. Lokal anestetik uygulama sonrası, yapılan oftalmolojik muayenede değişen derecede oküler akıntı, blefarospazm, konjonktival hiperemi ve üçüncü göz kapağı zarının arkasına gizlenmiş hareketli parazitlerin varlığı tespit edildi. Her iki olgunun gözlerinden toplam 15 parazit (5 erkek, 10 dişi) uzaklaştırıldı. Morfolojik tespit için tüm parazitler parazitoloji bölümüne gönderildi. Oküler ve parazitolojik muayene bulgularına göre, hastalara oküler thelaziosis teşhisi konuldu. Tedavide tek uygulama olarak %10 imidakloprid ve %2.5 moksidektin spot-on (Advocate®, Bayer, Slovakya) uygulandı ve tobramisin-deksametazon (Tobradex®, Alcon, Türkiye) günde 3 kez, fusi-dikasit (Fucithalmic®, Abdi Ibrahim, Türkiye) 2 hafta boyunca günde 2 kez topikal olarak kullanıldı. Parazitlerin mekanik olarak uzaklaştırılması ve medical tedavi her iki hastada olumlu sonuçlandı.

Anahtar kelimeler: Göz kurdu, köpek, tedavi, *Thelazia callipaeda*

Introduction

Thelaziosis is a zoonotic, vector-borne, ocular infection caused by the *Thelazia* nematodes that infect many mammalian species such as human, cats, dogs, rabbits, foxes (Otranto and Traversa, 2005). This parasite is also known as the 'oriental eye worm' in many European countries (Miró et al., 2011; Vieira et al., 2012; Bojan et al., 2014; Marčić et al., 2016). While *phortica variegata* feeds with host's lacrimal secretions, third stage larvae of *T. callipaeda* transmit from vector to host. *T. callipaeda* is located in orbital cavity, under nictitating membrane and lids of host (Otranto et al., 2004). Presence of adult or larval stages of *T. callipaeda*'s, results in various symptoms ranging from asymptomatic to severe (Otranto and

Traversa, 2005). Clinical diagnosis is based on determining the presence of worms on the ocular surface (Balicka et al., 2018; Sah et al., 2018). Treatment of canine ocular thelaziosis involves removing worms manually from the eyes and then, applying anti-parasitic drugs such as macrocyclic lactones including milbemycin oxime, ivermectin, and moxidectin (Bianciardi and Otranto, 2005; Vieira et al., 2012; Marčić et al., 2016).

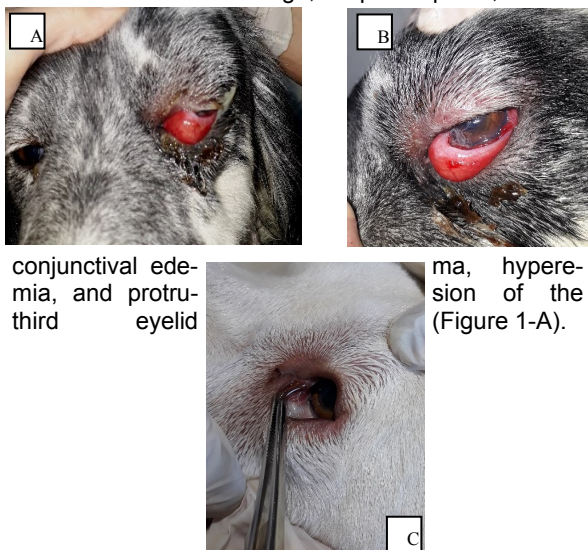
This study describes two cases of canine ocular thelaziosis presented to our training and research hospital clinics in Istanbul, Turkey, between 2018 and 2020.

Cases

In this case report, two dogs with chronic conjunctivitis, one with unilateral and the other bilateral ocular thelaziosis, were presented to Istanbul University-

Cerrahpaşa Veterinary Faculty, Department of Surgery.

Case 1: In December 2018, a 6-year-old, non-sterilized, male, English Setter (17 kg) was presented to our training and research hospital clinics from Kırklareli with clinical complaints such as weakness, fatigue and ocular swelling for 2 weeks. According to the history, the dog was kept near some farm animals in dirty environment. An anti-parasitic drug had never been used until then. This case had no known history of travelling abroad. Ophthalmic examination revealed unilateral discharge, blepharospasm, severe



conjunctival edema, and protrusion of the third eyelid

ma, hyperemia, hyperelevation of the (Figure 1-A).

Figure 1. A. Mucopurulent discharge, conjunctival hyperemia and oedema in infected dog (Case 1). B. High *T. callipaeda* parasitic infection in the left eye of a hunting dog (Case 1). Several nematodes under the nictitating membrane of the left eye (Case 2).

The schirmer tear test (STT) measurements were 18 and 24 mm/min in the right and left eyes, respectively. Fluorescein test was negative on the left eye. The intraocular pressure was measured with a rebound tonometer and results were in normal reference range. Acute, unilateral occurrence of the lesion in a hunting dog suggested the presence of an ocular foreign body, so local anesthetic was applied to the eyes for a detailed ocular examination. But, no foreign body was detected in the conjunctival fornix. At the examination of the third eyelid membrane, the worms were detected. They were mobile and hidden under the nictitating membrane (Figure 1-B). Eleven nematodes (3 male, 8 female) were detected in the first case. Also, other physical examination findings were not well. The dog did not appear healthy and was in a poor clinical condition. The mucosa of the conjunctiva and mouth was very pale. This case had leukocytosis (25.14 K/ μ L), low MCV (57.3 fL), low MCH (20.0 pg), other parameters were within the normal ranges. The dog was referred to the internal medicine clinic for the

consultation. After removing the visible worms, imidacloprid and moxidectin spot-on dermal formulation was applied to kill the remaining parasites. Topical tobramisin and dexamethasone (Tobradex®, Alcon, Turkey) 4 times a day and fusidic acid (Fucithalmic®, Abdi İbrahim, Turkey) 2 times a day were applied to the eyes for two weeks in both cases. Collected parasites were transferred in 0.9% NaCl solution and submitted to parasitology laboratory for identification. They were cleared with lactophenol for morphological identification. All the worms were examined individually via microscopy. Each worm was identified as *T. callipaeda* based on morphological features described in Otranto and Dutto (2008). Collected nematodes had notched cuticle and hexagonal mouth opening. In females, vulvas were located anterior to the oesophago-intestinal junction, and had a gravid uterus, in males, uneven spicules and short spicules were crescent in shape (Figure 2 A,B,C).

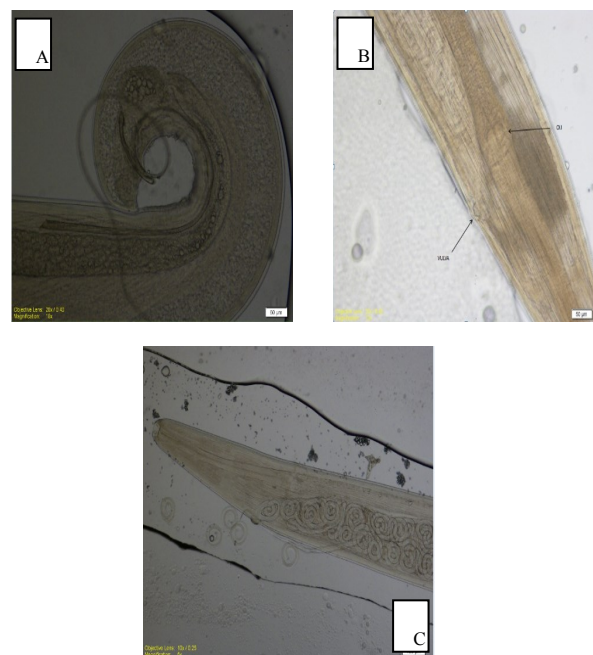


Figure 2. A. Uneven spicules of male *T. Callipaeda*. B. Female of *T. callipaeda* with vulva and oesophago-intestinal junction (OIJ). C. First stage larvae in uterus (arrow).

Case 2: In March 2019, a 1.5-year old, non-sterilized, female, crossbreed dog was referred from a veterinary clinic to our training and research hospital clinics with the complaint of unilateral severe ocular discharge and chronic conjunctivitis in the left eye. The dog was in clinically good physical condition. The owners reported that the dog had a history of travelling to Bulgaria seven months previously in summer and anti-parasitic drugs were not administered regularly. The dog had spent the summer in Bulgaria and

housed in the garden with fruit trees by the lake. Ophthalmologic examination revealed blepharospasm, ocular discharge, blepharitis, conjunctival hyperemia and protrusion of the third eyelid membrane in the bilateral eyes. After the instillation of local anesthetic drop to the both eyes, adnexal structures of the eyes were examined in detail. Mobile, white parasites were detected in the upper fornix of the conjunctiva and on the bulbar surface of the third eyelid (Figure 1-C). Also, lymphoid follicles were inflamed and there were some holes where the parasites had penetrated in the both eyes. All visible parasites were removed mechanically with atraumatic forceps from the eyes of the dog. Four nematodes (1 male, 3 females) were detected in the second case. After ophthalmic examination, complete blood count (CBC), blood parasite tests were performed. CBC test results were not remarkable. The parasites collected from the ocular surface were sent for parasitological examination and the laboratory procedures applied to the parasites collected from the first case were performed in the same way in the second case. When the second dog was re-examined after one week, conjunctival edema and hyperemia were diminished and there was no parasite in the eyes. Regular application of preventive drugs against ectoparasites was suggested to the owners (Table 1).

above are common. For these reasons, people and animals traveling to or staying in these areas may have serious health problems.

The vector flies that transmit parasites to the hosts are more active in warm and humid seasons such as summer and autumn in rural area-forests (Marčić et al., 2016; Graham-Brown et al., 2017; Vieira et al., 2012). Also, this infection is more common in hunting dogs, because they spend a long time outside during these warm and humid periods. So, this condition increases the risk of ocular infection in these dogs (Bojan et al., 2014). One of our cases was crossbred and the other was a hunting dog as reported in the publications (Bojan et al., 2014; Balicka et al., 2018) and was detected in winter (December and March), but one (case: 2) was reported to have ocular complaints present since summer (Bojan et al., 2014).

The clinical complaints of the dog owners are variable and the severity of these are not directly related to the number of parasites (Graham-Brown et al., 2017). Infection may sometimes be asymptomatic, despite the presence of parasites (Otranto and Traversa, 2005). It often causes conjunctival hyperemia in the affected eyes and so is confused with the other ocular lesions by the veterinarians. Misdiagnosis and thus incorrect treatment, leads to the prolongation of therapy. In our study, both cases had severe conjunctival

Table 1. Breed, age, sex, clinical examination findings and treatment results of patients

No	Breed	Age	Sex	Ocular Complaints	Ophthalmic Examination						Worms	Results
					FT		STT		IOP			
Case 1	ES	6 yrs	M	D, BS, CE, CH, TEP	R	L	R	L	R	L	8 F, 3 M	+
					(-)	(-)	18	24	14	17		
Case 2	CB	1.5 yrs	F	D, BS, BL, CH, TEP	R	L	R	L	R	L	3 F, 1 M	+
					(-)	(-)	16	22	18	16		

ES: English Setter, CB: Crossbreed, M: Male, F: Female, D: Discharge, BS: Blepharospasm, BL: Blepharitis, CE: Conjunctival edema, CH: Conjunctival hyperemia, TEP: Third Eyelid Protrusion, FT: Fluorescein test, STT: Schirmer tear test, IOP: Intra-ocular pressure.

Discussion and Conclusion

Thelazia callipaeda is a zoonotic pathogen that affects many mammalian species (Otranto and Traversa, 2005). It is common in numerous countries including European (Italy, Switzerland, Germany, Spain, France etc.) and the Balkans (Greece, Bulgaria, Romania, Bosnia) countries and it has been reported that its incidence is on the rise in Eastern European countries such as Bulgaria and Romania (Marčić et al., 2016; Graham-Brown et al., 2017; Papadopoulos et al., 2018). In Turkey *T. callipaeda* infection in dogs was published by Eser et al. (2018) in a single case. Our case report is the second publication in Turkey reporting ocular thelaziasis in dogs. According to the case history, the second case stayed in Bulgaria, where the incidence of infection is high. The other case never stayed abroad, but lived in one of the regions in our country where the vectors mentioned

hyperemia and one of the cases had been treated by referring veterinarian for conjunctivitis for a long time but had not improved. On the ophthalmic examination, at the outset, we did not notice the parasites because they were hidden on the inner surface of the third eyelid and the conjunctival fornix. Except corneal lesions, eye problems were observed as reported in the literatures (Miró et al., 2011; Graham-Brown et al., 2017).

In the cases of ocular thelaziasis the recommended treatment is usually a single dose of subcutaneous ivermectin or oral milbemycin oxime with ivermectin or spot on application of imidacloprid and moxidectin (Vieira et al., 2012; Graham-Brown et al., 2017; Balicka et al., 2018). Using oral tablets has been reported to be successful, but parasites have been

reported to be seen up to 2 weeks (Balicka et al., 2018). Imidacloprid and moxidectin were found to be quite effective drugs against nematodes, ascarids, hookworms and heartworms (Bianciardi and Otranto, 2005). It is much easier to use this dermal formulation than other oral and injectable formulations (Bianciardi and Otranto, 2005; Papadopoulos et al., 2018). In both of cases, spot on the formulation was preferred depending on the practicality. Positive results were obtained with topical application. Also, topical anti-inflammatory and antibacterial eye drops were used with systemic treatment as previous studies (Graham-Brown et al., 2017; Balicka et al., 2018).

The goal of our study was to increase awareness of these parasites among human ophthalmologists and veterinarians and to emphasize the importance of accurate diagnosis and treatment in the control of this zoonotic infection in humans and animals. In addition, the efficacy of the spot-on formulation containing 10% imidacloprid and 2.5% moxidectin in treatment of ocular thelaziasis was evaluated.

We believe that the use of topical anti-parasitic drugs as prophylaxis in dogs planned to travel to the hot and humid areas will play a preventive role in the pathogenesis of Thelaziasis.

It is very important to inform dog owners about prophylaxis and treatment against vectors for environmental and public health. The use of protective macrocyclic lactones is recommended at regular intervals in the treatment of ocular thelaziasis in dogs.

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