

# Ocular Dirofilariasis in Bosnia and Herzegovina: A Case Report and Review of the Literature

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## Abstract

**Purpose:** To report a rare occurrence of ocular dirofilariasis in Bosnia and Herzegovina and provide a short overview on clinical characteristics and treatment options for ocular dirofilariasis.

**Methods:** A 75-year-old woman was admitted to the University Clinical Centre Tuzla with pain and redness in her left eye. A live, white, coiled, and active worm was noticed in subconjunctival space of bulbar conjunctiva.

**Results:** After successful surgical extraction, the parasite was identified as the adult form of *Dirofilaria repens*. There were no signs of intraocular or systemic inflammation.

**Conclusion:** Ophthalmologists should have in mind a possible infestation, especially in cases with repeated inflammatory reactions and swelling of the ocular region, which does not respond to conventional therapy.

**Keywords:** Conjunctiva, *Dirofilaria*, Eye, Zoonosis

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## INTRODUCTION

Human dirofilariasis is a vector-borne zoonotic disease caused by nematodes of the superfamily *Filarioidea* and transmitted by blood-feeding mosquitoes from animals to man. Humans are the accidental hosts, and these worms are not capable to reproduce in human body.<sup>1-3</sup> The clinical picture of dirofilariasis depends on the type and location of the parasite in the human body. Ocular dirofilariasis is rare and can affect the orbit and periorbital region, the skin of the eyelids, the conjunctiva, the Tenon membrane, a retrobulbar space, or have intrabulbar localization.<sup>3,4</sup>

The distribution of *Dirofilaria repens* is limited to the Old World, with highly prevalent areas (prevalence in dogs of >10%) in southern and eastern Europe, Asia Minor, Central

Asia, and Sri Lanka.<sup>5-7</sup> In recent years, an increasing number of ocular dirofilariasis cases has been reported from neighboring countries Croatia<sup>8-10</sup> and Serbia,<sup>11-13</sup> but rarely from Bosnia and Herzegovina.<sup>1,3,4,14</sup>

The purpose of this article is to present a rare case of ocular dirofilariasis from Bosnia and Herzegovina and to give an overview on clinical characteristics and treatment options for ocular dirofilariasis.

## CASE REPORT

A 75-year-old woman had been presented to the Department of Ophthalmology of the University Clinical Centre Tuzla with a

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history of ocular redness, irritation, and foreign-body sensation in her left eye for the past 10 days. The patient was treated with topical antibiotics, gentamicin 0.3% eye drops, and chloramphenicol 1.0% ointment, prescribed by a local ophthalmologist. However, the symptoms worsened, and the patient was referred to the University Clinical Centre Tuzla. The patient was of a good socioeconomic status with no history of preceding ocular trauma, previous travel, or any animal contact. She had her cataract successfully operated in both eyes 6 years ago.

Clinical examination revealed visual acuity of 20/20 in both eyes. Slit-lamp examination was normal in the right eye with regular pseudophakia. The left eye demonstrated significantly hyperemic but transparent conjunctiva, with the extremely active and mobile white worm, wrapped in concentric circles in the subconjunctival space on the temporal side of bulbar conjunctiva [Figure 1]. The anterior segment also presented regular pseudophakia, and there were no signs of intraocular inflammation. The fundus examination in both eyes was normal, with measured intraocular pressure of 15.0 mmHg bilaterally. The pupil reaction was normal, and extraocular movements were full in both eyes.

Informed consent was obtained and immediate surgical intervention in topical anesthesia was performed. An incision of approximately 3 mm in the temporal part of the bulbar conjunctiva was made. Immediately, a part of the parasite emerged from the incision, and filaria was gently pulled out with the pair of tweezers [Figure 2]. The wound and surrounding subconjunctival space were cleaned with povidone-iodine 0.5% and vancomycin 1 mg/0.1 mL solutions.

The parasite was put into formalin and sent to the Institute of Microbiology of the University Clinical Centre Tuzla for identification. Morphological examination showed that the specimen was a mature female worm of *D. repens*, with 11.5 cm in length and the maximum width of 600  $\mu\text{m}$  [Figure 3]. Laboratory tests, including the inflammatory markers, were normal, and peripheral blood smear presented no signs of microfilariae. Stool and chest X-ray findings were also

normal. The patient was treated postoperatively with topical moxifloxacin 0.5% eye drops and a combination of neomycin 0.3%/polymyxin B sulfate/dexamethasone 0.1% eye drops and ointment for 2 weeks. Since the parasite was already identified early the next day, systemic antibiotics and anti-helminths were not used. Control examination one and six months after the intervention revealed a completely normal anterior segment of the left eye, with discrete conjunctival scarring in the temporal conjunctiva, while all systemic and inflammatory parameters were normal.

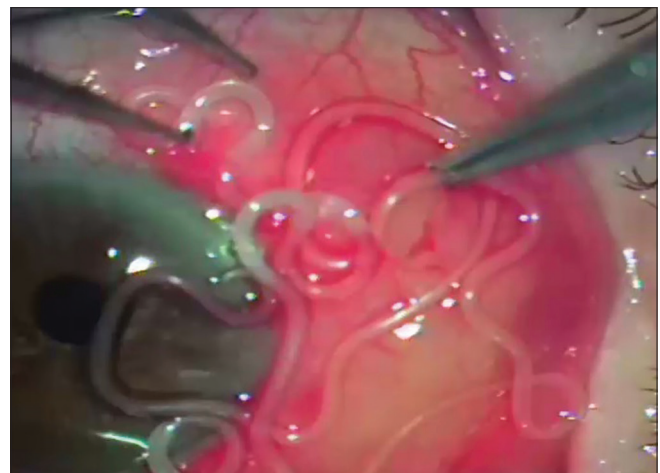
## DISCUSSION

According to the classification of the genus *Dirofilaria*, there are more than 40 described species, but only a few of them cause human infections: immitis, tenuis, repens, inermis, and ursi.<sup>1,4</sup> Human ocular dirofilariasis is typically caused by *D. repens*, while reports of *Dirofilaria immitis* as an agent of ocular dirofilariasis are extremely rare.<sup>2,3</sup> Human infections due to *D. repens* appear to be increasing throughout the world, and it should be considered an emerging zoonosis.<sup>1,3</sup> More than 1500 cases of human subcutaneous or ocular dirofilariasis caused by this pathogen have been documented worldwide.<sup>6</sup> It is important to note that the published reports of human *Dirofilaria* infections are based on clinically manifest disease, and it is likely that the infections are much more frequent considering the serological data.<sup>1,3,4</sup>

Cases of *D. repens* in dogs are reported in the whole Balkan region, with high variations of prevalence in different countries.<sup>1,3</sup> Two neighboring countries of Bosnia and Herzegovina, Croatia, and Serbia reported prevalence up to 47.3% and 49%, respectively, while in Bosnia and Herzegovina it is 1.9%.<sup>1</sup> In the Balkan Peninsula, only a few studies have presented risk areas in Romania, Serbia, and Albania, although, from published data, it is difficult to obtain a clear idea where the infection is endemic in the canine population.<sup>1,4</sup> Several factors including climate changes with the global rise of the temperatures, introduction of new competent vectors, and



**Figure 1:** External photograph of subconjunctival dirofilariasis before extraction

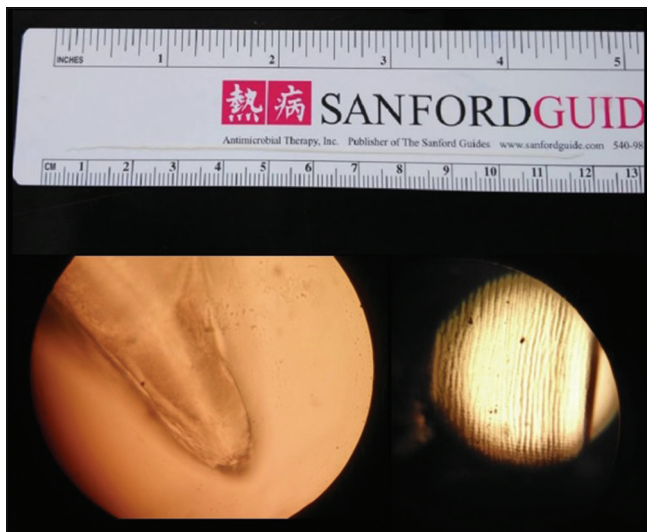


**Figure 2:** Surgical removal of the parasite

relocation of infected microfilaremic dogs, which are the main reservoirs of infection, have allowed the spread of *Dirofilaria* infections from the endemic areas.<sup>1,3,15</sup>

A detailed analysis of the literature in English has been performed. The following keywords: filariasis, zoonosis, *Dirofilaria*, eye, ocular, conjunctiva, Bosnia and Herzegovina, and the following Medical Subject Headings: ophthalmology, microbiology, parasitosis, and eye were used for literature review. The analysis revealed a total of two cases describing ocular filariasis in patients from Bosnia and Herzegovina. The first case was reported from our institution, while the second one was reported in Austria on a patient that had previously traveled to our country [Table 1].<sup>16,17</sup>

In recent years, an increasing number of human subcutaneous and especially human ocular dirofilariasis cases with different clinical presentations has been reported from the neighboring countries of Croatia<sup>8-10</sup> and Serbia.<sup>11-13</sup> On the other hand, in the majority of recent reports, Bosnia and Herzegovina is still a country with no epidemiologic data about human dirofilariasis.<sup>1,3,4,14</sup> Although we have found two cases of ocular dirofilariasis, considering the above-mentioned facts, the estimated number of unreported cases in Bosnia and Herzegovina is probably much higher.<sup>1,3,7</sup> The main reason for under-reporting of dirofilariasis in Bosnia and Herzegovina may be due to the poor knowledge and still low awareness of possible infestation among health workers.<sup>3</sup>



**Figure 3:** Top: photograph of *Dirofilaria* following subconjunctival removal. Bottom left: anterior end of the adult female. Bottom right: longitudinal striations in the form of ridges on the surface of the cuticle

Presenting symptoms are variable, depending on the worm location, including orbit and periorbital region, the eyelids skin, the conjunctiva, the Tenon membrane, a retrobulbar space, or intrabulbar localization.<sup>4</sup> In most cases with ophthalmic infection, the patient presents with ocular pain, eyelid and conjunctival redness and swelling, sometimes blurred vision, and rarely proptosis and diplopia.<sup>8,18</sup> It is also important to note that most of these patients had been previously unsuccessfully treated with local antibiotics and corticosteroids, just like in our case.

There are no valid diagnostic blood tests for ocular dirofilariasis. In these cases, serological fluorescent antibody test, enzyme-linked immunosorbent assay technique, and the polymerase chain reaction are negative.<sup>2-4,8,18</sup> Peripheral blood smears, as in our case, are mostly negative for microfilaria, and only one case of circulating diromicrofilaremia in humans has been reported.<sup>19</sup> Eosinophilia occurs in < 15% of cases with *D. immitis* and rarely with *D. repens*.<sup>18</sup> The diagnosis is most commonly made by clinical presentation depending on the ocular localization. However, the only proper diagnosis can be made by the microbiologist and pathologist after an excisional biopsy. The species identification of *Dirofilaria* is based on morphological characteristics of the helminthic cross-section. *D. repens* is identified by the presence of external longitudinal cuticular ridges and transverse striations, which are absent in *D. immitis*.<sup>4,18</sup>

Surgical removal of the worm is the treatment of choice in cases with ocular dirofilariasis. Depending on the parasite localization, different surgical approaches can be used. In cases of subconjunctival or localization in the lacrimal gland, surgery is technically simple with good results. During the surgery, it is possible to paralyze the parasite's movements by application of the local anesthetic.<sup>13</sup> The recovery after surgical intervention is generally good without severe ocular complications. However, in cases of intraocular localization, the surgical approach is more challenging and might require surgery in general anesthesia with the use of vitreoretinal surgical procedures.<sup>18</sup> In addition, these patients require longer follow-up due to possible postoperative complications such as endophthalmitis, cataract, and glaucoma.<sup>18,20</sup>

Oral anti-helminthic drugs are considered ineffective in the management of ocular dirofilariasis.<sup>2,20</sup> Thus, *D. repens* cases must be differentiated from *D. immitis*, which requires the use of anti-helminthic agents. Furthermore, in a small number of cases of *D. repens*, ivermectin and/or diethylcarbamazine have been tried with good results. Oral therapy with diethylcarbamazine 2 mg/kg destroys others not yet visible

**Table 1: Summary of reported cases of ocular dirofilariasis in Bosnia and Herzegovina**

Cases	Age/sex	Side	Localization	Ocular symptoms and duration	Systemic findings	Parasite/size
Nurkic et al., 2008 <sup>16</sup>	61/female	Right	Bulbar conjunctiva	Ocular redness, no pain, 2 days	Eusinophilia 17%	<i>D. repens</i> /10.5 mm
Ritter et al., 2012 <sup>17</sup>	45/female	Right	Bulbar conjunctiva	Eyelid swelling, no pain, 1 day	None	<i>D. repens</i> /11.0 mm
Present case	75/female	Left	Bulbar conjunctiva	Ocular redness, pain, 10 days	None	<i>D.s repens</i> /11.5 mm

*D. repens*: *Dirofilaria repens*

worms although human dirofilariasis is usually regarded as an infection by a single worm.<sup>4,18</sup>

We present a rare case of ocular dirofilariasis in Bosnia and Herzegovina. It is important to note that in our country as an endemic area, we can expect an increasing number of patients with dirofilariasis. Therefore, ophthalmologists should have in mind a possible infestation, especially in cases with repeated inflammatory reactions and swelling of the ocular region, which does not respond to conventional therapy.

### **Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### **Conflicts of interest**

There are no conflicts of interest.

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