

SUBCONJUNCTIVAL INFECTION WITH *DIROFILARIA REPENS*

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The first case of *Dirofilaria repens* (*D. repens*) parasite in Turkey was detected by Unat in 1944,¹ and human infection with *D. repens* in the subconjunctiva was also first reported from Adana in 1993 by Soyulu et al.² Since then, no other cases of human subconjunctival infection with *D. repens* have been reported in this region.

D. repens is a mosquito-borne filaria, a parasite of the subcutaneous tissue of domestic and wild carnivores such as dogs, cats and foxes.³ *Dirofilaria* species may be divided into two groups: subgenus *Dirofilaria* represented by *Dirofilaria immitis*, which is characterized by a relatively smooth cuticle and normally found in the right heart and pulmonary vessels of dogs, the natural hosts; and subgenus *Nochtiella*, which parasitize the subcutaneous tissue. Species of this group have longitudinal ridges on the cuticle. Representative species are *Dirofilaria (Nochtiella) repens* found in dogs and cats, and *Dirofilaria (Nochtiella) tenuis* found in racoons.⁴ As there are no racoons in Turkey, this parasite is not found here.²

The mature *D. repens* live in the tissues and organs of vertebrates, while their immature stages prefer the blood and lymph vessels. *D. repens* is a subdermal parasite in dogs. It has been proven that the parasite, called *D. conjunctivae* and normally found in humans, is not a different species from *D. repens*.^{5,6}

The main cause of *D. conjunctivae* cases is *D. tenuis*, which occurs mostly in America, and *D. repens*, which occurs mostly in Europe (especially in the southern and eastern parts), Russia and Sri Lanka.⁵ It is reported that *D. conjunctivae* is the immature type of *D. repens*, therefore, the main infection source of human dirofilariosis is dogs having *Dirofilaria*.^{2,5}

D. repens infection, rarely seen in humans, is a zoonotic illness. Humans get infected through blood-sucking arthropods such as mosquitoes, fleas and ticks. During blood sucking, these arthropods receive the immature stages of the parasite called microfilaria. After becoming mature in the arthropods' body, microfilaria is transferred

FIGURE 1. An immature *Dirofilaria repens*.

into human or other vertebrates by the blood-sucking arthropods. For *D. repens* settling in the subconjunctiva, the human body is not an appropriate host, and therefore, no mature stages of the parasite are found in humans.⁵

The correct diagnosis of the parasite is usually made with histological examination, based on the identification of the nematode, using the morphological characters of the species to differentiate it from the other *Dirofilariae*.⁵ It is important to identify *D. repens* by microscopic evaluation of tissue cross section, as well as through its macroscopic characteristics.^{7,8} The dyes used in examining the cross transverse sections are hematoxylin-eosin (HE) and periodic acid-Schiff (PAS).⁵

The only cure currently known is surgical excision. No other protective method is known. Mosquitoes should be controlled and dogs having microfilaria should be treated with antihelminthics.⁵

Reports of *D. repens* infections in humans in Turkey are limited. This report represents the second case of *D. repens* infection diagnosed in the human subconjunctiva in Adana, and discusses the possibility of the presence of this zoonotic filarial worm in Turkey.

Case Report

A 50-year-old man from Adana, Southern Turkey, presented at the Balcali Hospital because of eye irritation with symptoms and signs of itching, swelling and redness of the right eye. Slit-lamp examination disclosed a moving

Nemathelminthes. An incision was made into the cystic mass and a living worm was noticed. A complete nematode was extracted from the subconjunctival space and the worm was sent to the parasitology laboratory. Parasitological examination identified the worm as a member of *Nemathelminthes (Dirofilaria repens)*.

The worm was 44 mm in length, with a maximum width of 320 µm. The anterior rounded end of the worm was observed to be wider than its posterior rounded end, and microscopic examination showed that the parasite had an unsegmented cuticle. The worm was identified as an immature *D. repens* on the basis of its macroscopic and microscopic characteristics (Figure 1) and cross-transverse

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sections. The subconjunctival location and the epidemiological data of the worm supported this finding.

Discussion

Subconjunctival human infection with *D. repens* has been reported in only six previous cases in Turkey.^{2,6,9-12} Since dogs and cats are definitive hosts for filaria, these animals have important public health implications. Cases of *D. repens* infection in the Mediterranean Basin have been reported from Greece, Italy, France, Spain and Israel.^{3,5,7,13,14} In most cases, patients were known to be keeping a pet dog at home.

The first *D. repens* case is said to have first been reported by Angelo Pace in Palermo in 1867.⁵ The prevalence of *D. repens* is said to be 42.3% in Italy, 13.3% in France, 7.8% in Sri-Lanka, and 4.3% in Turkey.⁵

Human and animal cases of dirofilariasis in Turkey have been diagnosed all over the country.^{1,2,6,9-12,15,16}

Epidemiological investigations made in the south and other parts shows that this emerging zoonotic filaria is becoming established in Turkey.

Diagnosis of this parasite should include blood smear evaluation for the presence of microfilaria, serology for the presence of antibodies reactive with *D. repens* in domestic and wild carnivores, and a polymerase chain reaction (PCR) test on mosquitoes to detect microfilarial DNA. Although most of the literature report that *D. repens* is 95-140 mm in length, the parasite was only 44 mm long in our case. In another previous case reported from Thailand, the parasite was observed to be 44 mm long. It is important to identify the nematode as *Dirofilaria repens*, based on both microscopic and macroscopic characteristics to avoid treatment with antihelminthic agents. The surgical removal of the worm is the sole recommended treatment.⁷ Our patient made a good recovery after surgery.

Although rare, dirofilariasis should be taken into account in epidemiological and parasitological studies. Because of the variety of locations of the worm and the symptoms produced, cases of dirofilariasis in humans and animals may attract the attention of veterinarians, ophthalmologists, dermatologists, radiologists and general practitioners.

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