

CASE REPORT

ZOOBOTIC SUBCUTANEOUS DIROFILARIASIS IN IRAN

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Zoonotic dirofilariasis has been reported sporadically from many parts of the world, but there are few reports of this condition from Iran. In this article, we present a case with subcutaneous infection due to *Dirofilaria repens* and discuss the significant aspects of the disease. The patient was a 22-year-old man who acquired the infection during his conscription in Karaj and was referred to us with a mass containing a viable filarial nematode in subcutaneous tissues of the forehead. The nematode was misidentified as *Wuchereria bancrofti* in a local laboratory, based on its macroscopic appearance. Cross-sectional studies and anatomic characterization of the parasite were essential to make an accurate diagnosis, although the parasite's geographic distribution and the patient's travel history were also helpful.

Keywords *Dirofilaria repens* dirofilariasis subcutaneous nodule

Introduction

Human infections of the subcutaneous tissues by species of *Dirofilaria* are not uncommon and have been reported from many parts of the world,^{1, 2} including Iran.³ The worms are usually localized in subcutaneous nodules but, on rare occasions, are removed intact from periorbital tissues, conjunctiva and breast.^{2, 4, 5} The size of the adult worm varies from a few to 35 centimeters in *D. immitis*, the prevalent canine heartworm; female worms are usually larger than the males, and females from different species are often indistinguishable.⁶

The life cycle of *Dirofilaria* is the same as that of other filariids: the microfilaria occur in the blood, and several species of mosquitoes, *Simuliids*, and other blood-sucking arthropods are the usual intermediate hosts. Many species of *Dirofilaria* have been found in wild and domestic animals such as raccoons, bears, dogs and cats.⁷

The well-known zoonotic *Dirofilaria* species found in subcutaneous tissues of humans are *D. repens*, *D. tenuis*, *D. ursi-like* and *D. striata*.⁸

Case Report

A 22-year-old man, a lifetime resident of Chalus, a city in Mazandaran Province in the north of Iran, was admitted to a private clinic in 1999 with a transient nodule measuring 2 cm within the subcutaneous tissues of the forehead. When questioned further, the patient recalled staying in Karaj, a city in central Iran, within the past 18 months, during his conscription period, and recalled being bitten by mosquitoes during this time.



Figure 1. An intact living *Dirofilaria* emerging from subcutaneous tissues.

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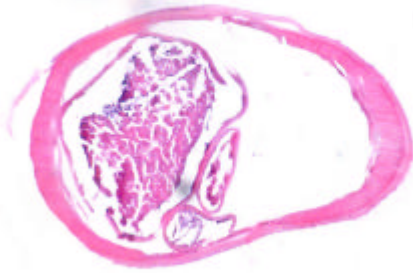


Figure 2. Transverse section of *Dirofilaria*, showing prominent longitudinal cuticular ridges on the external surface (arrow), polymyarian type muscle cells and tall lateral cords (X 400).

He had no systemic complaints except a mild headache, weakness and paresthesia of both lower limbs. Physical examination revealed a non-itchy, non-painful, inflamed and slightly movable nodule, 2 cm in diameter, that had been noticed 10 months ago, when it appeared as a round and red papule on his skin. The complete blood cell count at admission was normal and no eosinophilia was noted. The patient had no microfilaria in his blood. The nodule was surgically removed under local anesthesia and a living and coiled filarial worm, more than 12 cm long, emerged intact from the lesion (Figure 1). The worm was fixed in 10% formalin and was sent to a local laboratory where a diagnosis of *Wuchereria bancrofti*, a non-endemic filaria in Iran, was made based on the gross morphological features. One week later, the specimen was sent to our department in Shaheed Beheshti University of Medical Sciences to confirm the diagnosis. The worm was transferred to a 70% ethyl alcohol solution containing 5% glycerin by volume and was cleared in pure glycerin for microscopic study.

The worm

The worm was a non-gravid female, about 12 cm in length and 0.50 mm in maximal diameter. The diameter was the same through most parts of the worm, except in the two extremities, where the worm became thin. Microscopically, the cuticle consisted of several layers and was about 5 – 10 μm thick, except at the lateral cords, where a thickening of the innermost layer formed an inwardly directed ridge on either side of the body (Figure 2). On the outermost layer, there were fine striations and distinct rounded longitudinal ridges.

The spaces between the ridges were equal to or greater than the width of the ridges themselves. The muscle layer (of the polymyarian type) was well developed, particularly at the level of the lateral cords (Figure 3).

These characteristics are typical of the genus *Dirofilaria* and suggest a mature female of *D. repens*.

Discussion

The genus *Dirofilaria* is divided into two subgenera: *Dirofilaria*, with *D. immitis* as the type species, and *Nochtiella*, with *D. repens* as its type species.^{9, 10} Nematodes in the first group have a smooth cuticle and are typically found in pulmonary arteries, whereas those in the second group display longitudinal cuticular ridges and are usually found in subcutaneous tissues. Some of these filariids have been reported as *D. conjunctiva* because in many cases the worms were located in the conjunctiva or other external ocular structures. It seems that *D. repens* is the most prevalent agent of zoonotic dirofilariasis in many parts of the world including Africa,¹ Canada,⁵ Japan¹¹ and Kuwait.¹² In Iran, Siavashi and Masoud reported two cases of human dirofilariasis due to *D. repens*.³ Both of their patients had resided in northern parts of Iran. In the first case, there was a small nodule on the finger of a 23-year-old woman and in the second, a 25-year-old man had a swelling in the wrist of his left hand. In their study, the length of the worms was 117 mm, nearly the same as our case. In addition, the other morphological characteristics of the worm in their report were identical to the present case. Beaver

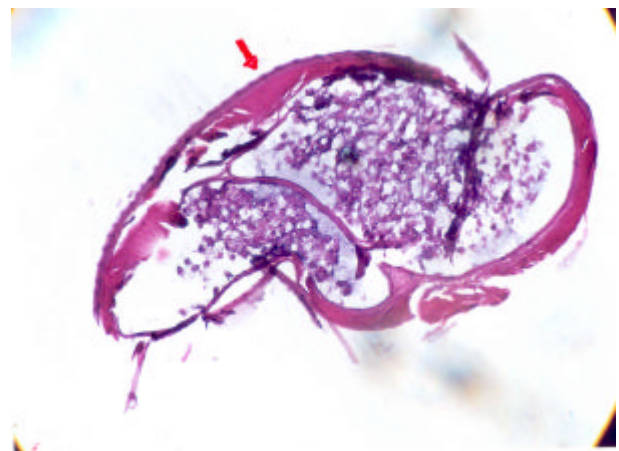


Figure 3. A cross-section of the worm illustrating the thick cuticle and developed muscle cells (X 250).

and co-workers reported two cases of subcutaneous dirofilariasis due to *ursi-like* species from the United States and Canada,¹³ and Billups described the same condition caused by *D. immitis* in Nebraska.¹⁴ De Carneri et al mentioned that, of 100 cases reported worldwide until the end of 1972, about one-third, occurred in Italy.¹⁵ He stressed that in most European cases, the causal agent was reported as *D. repens*. However, some authors were not able to identify the species of *Dirofilaria* because they lacked essential knowledge about the comparative microanatomy of filarial worms¹⁶ or the migratory nature of the lesion.⁸

The morphologic features used to identify intact *Dirofilaria* from natural hosts are not generally the same as the characteristics available in histologic sections. Besides, most *Dirofilaria* specimens from humans are immature, which causes some difficulty in diagnosis. Despite these problems, generic identification is made by noting the following:

- 1- presence of a thick, multilayer cuticle; presence or absence of longitudinal ridges on the cuticle and their arrangement;
- 2- prominent lateral cord;
- 3- well-developed musculature; and
- 4- location of nodule in the body.

The observations made in our unusual case indicate that this infection may occur in any part of the country, because both mosquito vectors (*Culex* and *Anopheles*) and the natural animal hosts are present in many parts of the country. Therefore, physicians and laboratory staff should be alerted to the possibility that zoonotic round worms may be the cause of subcutaneous lumps appearing anywhere on the body and may mimic neoplasms.

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