



Human *Dirofilariasis* Infection in the Forehead: A Case Report

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Abstract

Human dirofilariasis is currently considered a zoonotic infection, a mosquito-borne disease caused by the filarial nematodes of dogs, mainly *Dirofilaria repens* and *D. immitis*. Human dirofilariasis has been reported from many parts of the world, including Africa, Australia, the Americas, Europe, and Asia. The climate of Bandar Abbas in Hormozgan province, Sothern of Iran, has favorable conditions for the growth and reproduction of different types of vector mosquitoes. A 20 yr old woman from Bandar Abbas, visited a surgeon where the presence of a nodule was diagnosed in the forehead. In histopathological examination, cross-sections of a worm surrounded by necrotic tissues were observed. By evaluating the sections, *Dirofilaria sp.* was the probable diagnosis. To our knowledge, in Iran, this is the first human dirofilariasis occurring in the forehead. Human cases of dirofilariasis need to be reported so that physicians could consider dirofilariasis in their differential diagnoses.

Keywords: Dirofilariasis; Forehead; Iran

Introduction

Human dirofilariasis is currently considered a mosquito-borne nematode, caused by the genus *Dirofilaria* (1). *Dirofilaria immitis* and *D. repens* are more prevalent infections in humans than the other species, which include a variety of complications; they are responsible for human pulmonary, subcutaneous, or ocular dirofilariasis, respectively (2).

The definitive hosts of these parasites are carnivores, especially dogs and to a lesser extent, cats. However, other animals such as wolves, foxes, bears, ferrets, and raccoons can be considered reservoirs of parasites (3, 4). Mosquitoes of the genera *Aedes*, *Anopheles*, and *Culex* are suitable intermediate hosts and vectors (5). Due to the life

cycle phase of these parasites' failure in the human body and lack of microfilariae, their removal from the infected tissue is a definitive treatment (6). However, in rare cases, microfilariae are found in subcutaneous areas (7). A technique using PCR amplification can differentiate between *D. immitis* and *D. repens* infections rather a molecular detection technique in human blood is unusual because humans are dead-end hosts for the parasite (8), although these techniques are needed for the epidemiologic surveys.

Many cases of dirofilariasis have been reported in the conjunctiva, eyelid or around the eye (1, 9, 10), but the infection inside the forehead is ab-



normal, which likely makes this case the first report conducted in Iran.

Case report

A 20-yr-old woman with a complaint of nodule in the forehead was admitted to Khalij- e-Fars Hospital in Bandar Abbas, Iran in Jan 2022 (Fig. 1). The patient was a housewife with a low economic status. The nodule had developed slowly over the past year. She complained of itching,

irritation, and mild pain in the nodule area. The other symptoms included headache, nausea and swelling of the face and forehead. There was no history of trauma, recent traveling experience, contact with the animals, or mosquito bites. None of the woman's relatives had these symptoms.

Ethics Committee of Hormozgan Uaniversity of Medical Sciences, Bandar Abbas, Iran, approved the study (IR.HUMS.REC.1401.081).

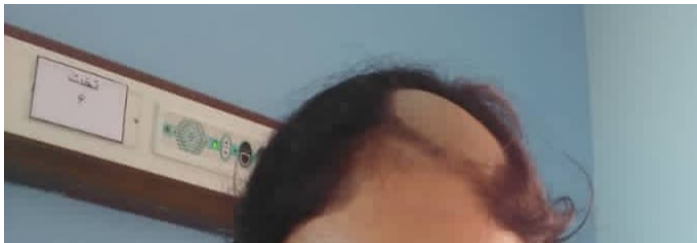


Fig.1: Clinical picture before the surgery. Note the position of the nodule in the forehead

Before the surgery, magnetic resonance imaging (MRI) of the head was also made. By the MRI, the doctor diagnosed a clot in the nodule, and ordered surgery for its removal. After the surgery,

it was placed in 10% formaldehyde and sent to the pathology laboratory. The nodule size was approximately 1.2×0.8×0.5 cm.



Fig. 2: Histopathological sections of the parasite with different magnifications. Sections were stained using hematoxylin-eosin. Typical features of *Dirofilaria sp.* are the thick cuticle, and the well-developed musculature (polymyarian type). The body cavity showed cross-sections of genital tubules

Grossly, the tissue was a creamy–brown mass. In histopathological examination, the cross- sections of a worm were observed morphologically suspicious to *Dirofilaria sp.* (Fig. 2), due to the body cavity, external longitudinal ridges, the thick cuticle, and the well-developed musculature (polymyarian type) (1, 3, 11, 12). Laboratory findings showed no evidence of eosinophilia. The patient was treated with antibiotics and corticosteroid, then followed up for 1 month. The post-surgery

symptoms included only feeling of pain in the surgical area, no more complication was reported.

Discussion

Nematodes of the genus *Dirofilaria*, mosquito-borne pathogens, are currently considered by some authors as an emerging zoonotic infection (5, 13). The number of human cases of dirofilariasis increased in recent years, unlikely due to the

global climate changes (13-16). Mosquitoes play a key role in completing parasitic life cycles, so temperature and environmental conditions are essential for the mosquito growth and larva development to the infective third stage (L3) (17). The climate of Bandar Abbas has favorable conditions for the growth and reproduction of different types of mosquitoes as a vector (18). The abundance of stray dogs and cats in the city can also cause the spread of these parasites. Other cases of human dirofilariasis from Bandar Abbas have already been reported (6, 19).

Although definite diagnosis requires surgical removal and evaluation of the worm as well as PCR reaction, the presence of thick laminated cuticles, large muscle cells, wide lateral cords and external longitudinal ridges are incriminating agents for *Dirofilaria* sp. (1, 11, 12, 20).

In our case study, unusual clinical symptoms were reported as headache, nausea, swelling of the face and forehead as well as itching, irritation and mild pain in the area. These allergic reactions maybe triggered by parasite antigens. Therefore, visceral infection is more likely to occur, however no microfilariae were found in the blood sample.

In Iran and the other countries, human dirofilariasis with *D. immitis* and *D. repens* have been often reported in subcutaneous tissues and eye, (1, 3, 6, 12, 19) however, the infection in the forehead has rarely seen. Species identification based on molecular sequences can support the result of this study, but PCR test has not been done on patient's tissue and this can be addressed as a limitation of this study.

Conclusion

Human cases of dirofilariasis are increasing in Iran and the world, so collecting stray animals and regular examination of pets as well as personal protection against insect bites, is necessary. In addition, human cases of dirofilariasis need to be reported so that physicians can consider dirofilariasis in their differential diagnoses.

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Conflict of interests

The authors declare that they have no competing interests.

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