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## Case Report

## Subconjunctival dirofilariasis: a case report from the United Arab Emirates and review of literature from the Arabian Gulf region

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## ABSTRACT

We report the second case of ocular dirofilariasis from the United Arab Emirates in a 53-year-old Indian male. In this case, the patient had no travel history and presented with severe ocular pain and redness. Clinical examination raised the suspicion of a parasitic infection, and a microscopic examination confirmed the diagnosis of *Dirofilaria repens*. Surgical intervention was performed, and the patient had good postoperative outcomes. To our knowledge, this was the fifth case of human dirofilariasis and the third of ocular dirofilariasis to be reported from an area where the parasite is not known to be endemic – the Arabian Gulf region.

## Introduction

*Dirofilaria* species are natural parasites of mammals and are transmitted to humans by zoonophilic mosquitoes (Nadgir et al., 2001). Although there are about 40 recognized species of *Dirofilaria*, only a few have been identified to infect humans, such as *Dirofilaria repens*, *Dirofilaria immitis*, *Dirofilaria tenuis*, *Dirofilaria subdemata*, *Dirofilaria Spectans*, and *Dirofilaria ursi* (Nadgir et al., 2001; Stoyanova, 2018). Infection with the parasite has been recorded in 71 different anatomical locations, including the lung, heart, blood vessels, eyes, or subcutaneous tissue, and, less commonly, brain, testes, and mammary gland (Simón et al., 2021; Stoyanova, 2018). Out of 567 cases reported in the literature, only 22% were classified as Ocular dirofilariasis (Simón et al., 2021). In the eye, the parasite is most commonly located in the subconjunctival tissue — in about two-thirds of the cases — while multiple cases have been reported in the periorbital and intraocular tissues (Kalogeropoulos et al., 2014). Although many cases of ocular dirofilariasis have been reported around the globe, there is a scarcity of reports from the Arabian Gulf region. To our knowledge, this was the third case from the Arabian Gulf and the second case to be reported from a country where the parasite is not known to be endemic — the United Arab Emirates (Hira et al., 2008; Mittal et al., 2008).

## Case presentation

A 53-year-old Indian male patient presented with severe ocular pain, redness, and irritation in the left eye. The symptoms started 1 week be-

fore presenting, and were exacerbated in the last 2 days. The patient had no significant history of travel or trauma. Slit-lamp examination revealed left-eye conjunctival congestion and edema. High magnification revealed a curled, concentric mobile worm in the subconjunctival space; no other abnormalities were noticed. The team decided to proceed with surgical excision. First, a small nick was made on the conjunctiva under local infiltration block. The whole worm (parasite) was then removed (Figure 1A), and sent to the laboratory for identification. The worm was white-cream in colour and 12 cm in length. A cross-section of the worm revealed morphology consistent with a female *Dirofilaria repens* (Figure 1B). Because of the worm's typical morphology and location, the team decided not to confirm the diagnosis by molecular tests. The immediate postoperative course was uncomplicated, and the patient received topical steroids and antibiotics in addition to starting systemic anthelmintics with albendazole 400 mg for 3 weeks to ensure worm debulking and to avoid any systemic symptoms. Instantly, the symptoms were relieved, and the patient felt well. On day one post-intervention, the conjunctiva seemed healthy, with no hyperemia.

## Discussion

Human *dirofilariasis* has been reported in various territories worldwide — mainly Europe, Africa, the Middle East and Asia. The high prevalence of the parasite in the Mediterranean region is attributed to the warmer climate facilitating the development of infectious larvae in mosquitoes, with an expanding geographical distribution due to climate change and the movement of dogs, while it is less reported where there

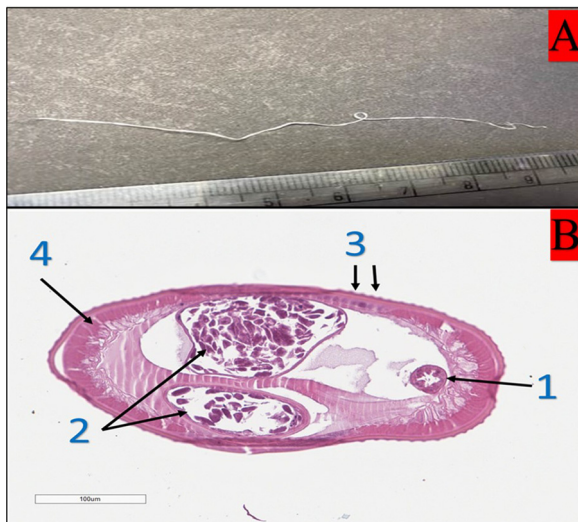
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**Figure 1.** (A) Extraction of the *Dirofilaria* worm. (B). Cross-section of the parasite. Note the gut (1), uteri (2), longitudinal, evenly spaced external ridges on the surface of the cuticle (3), and the abundant musculature (4).

are no carriers of *Dirofilaria* or definitive hosts, such as in the far north and highlands (Genchi et al., 2011; Klintebjerg et al., 2015). In particular, *D. repens* has been reported in patients living in 39 countries on four continents, except for America (Simón et al., 2021). Definitive hosts of *Dirofilaria repens* include domestic dogs and other carnivores (e.g. foxes, wolves, cats, and coyotes), in which the female worm sexually matures and releases microfilariae in the peripheral blood, which are picked up by a mosquito, the intermediate host, during the blood meal. In cases of transmission to the accidental hosts — humans — the worm life cycle is interrupted, and no further transmission happens (Capelli et al., 2018; Dujic et al., 2003).

Historically, the first case of ocular dirofilariasis in humans was reported in 1885 (Choure et al., 2015). During the last decade, cases of ocular dirofilariasis have been increasingly reported in non-endemic areas (Kalogeropoulos et al., 2014). In 2015 Klintebjerg et al. reported the first case of human dirofilariasis in a non-endemic country (Denmark); the patient had periorbital *Dirofilaria* and had a recent travel history to Crete (Klintebjerg et al., 2015).

Limited data are available on the epizootology of *Dirofilaria* in Saudi Arabia; a recent surveillance study for the region revealed that antibodies against *Dirofilaria immitis* antigens were detected in 13.61% of dogs and 2.11% of cats, with a significant increase in the seroprevalence of antibodies in dogs in the summer compared with the winter (Omar et al., 2018). The Gulf Region constitutes an area where *Dirofilaria* is not known to be endemic due to the absence of local data and the scarcity of reported cases in the literature. To our knowledge, only four cases of human dirofilariasis have been reported in the Arabian Gulf region. Only two of these were cases of ocular dirofilariasis, and only one was reported from the United Arab Emirates. These cases were limited to *Dirofilaria repens* species (Supplementary Table S1) (Chopra et al., 2004; Hira et al., 2008, 1994; Mittal et al., 2008). In 1994, Hira et al. described the first case of human subcutaneous *Dirofilaria* in the region, in a 50-year-old Kuwait man presenting with an elongated fixed abdominal mass, which was excised. The worm was identified in an abscess in tissue sections (Hira et al., 1994). In 2004, another case of subcutaneous *Dirofilaria* was reported in a 60 year-old male in Saudi Arabia, who presented with forearm swelling and reported a recent travel history to Syria, United Arab Emirates, Kuwait, and Iraq (Chopra et al., 2004). Interestingly, in 2008, a live worm was extracted from the subconjunctiva of a 34-year-old Indian woman in Kuwait, who complained of a moving object in her eye at presentation. The worm was later identified as an

immature female *Dirofilaria repens* (Hira et al., 2008). In the United Arab Emirates, only one case of subconjunctival *Dirofilaria* has been identified — in a 53-year old Indian male, based on microscopic examination and histopathology. This was excised under topical anesthesia in the outpatient clinic, with favorable outcomes (Mittal et al., 2008). While a travel history is suspected when a diagnosis is made in non-endemic areas, many cases (including ours) have emerged in non-endemic, geographically distant regions, with the patient reporting no recent travel history (Klintebjerg et al., 2015; Mittal et al., 2008; Simón et al., 2021).

Ocular symptoms may include swelling, subconjunctival cysts, redness, excessive lacrimation, foreign body sensation, hyperemia, and localized pruritus. Our patient featured some of these symptoms. Geographical location, symptoms, and history of exposure may raise the suspicion of this infection. However, ocular dirofilariasis is less likely to be suspected at the initial presentation. In a recent analysis of 94 cases of ocular dirofilariasis, an initial suspicion of parasitic infection was made in 67 of the cases, with only three being attributed to *Dirofilaria*, while in the rest of the cases, granuloma, tumors, and other ocular pathologies were suggested among the differential diagnoses (Simón et al., 2021).

Morphological histology of the whole worm or its sections is considered the gold standard for confirmation of diagnosis (Simón et al., 2021). Nevertheless, there is an increasing trend for utilizing effective molecular analysis techniques. In this case, morphological features were consistent with a female *Dirofilaria repens*. Surgical extraction of the worm is the treatment of choice for dirofilariasis. This was feasible in our case, and the worm was extracted, with good postoperative outcomes (Mittal et al., 2008).

## Conclusion

With the emergence of many cases of human dirofilariasis in non-endemic areas, we report the second case of ocular dirofilariasis in the United Arab Emirates. Histological features may identify the parasite, while molecular tests can help identify the exact species. Prompt intervention can relieve patient symptoms and improve the prognosis.

## Declaration of Competing Interest

None

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## Ethical approval

Not required

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.ijregi.2022.03.014](https://doi.org/10.1016/j.ijregi.2022.03.014).

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