Several Cases of Ocular Dirofilariasis in Bulgaria

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Abstract

Objectives: In this study, we describe ocular dirofilariasis in Bulgaria. Materials and Methods: We studied 7 patients with a subconjunctival or periorbital form of Dirofilaria repens infection during 2010–2019. Morphological, serological, and paraclinical diagnostic methods were used. Results: The patients (6 females, 1 male) were aged between 23 and 72 years. In 3 patients, subcutaneous nodules were detected in the area of the upper eyelid, in 1 patient the location was suborbital. In 3 other patients, a subconjunctival location was found. All patients were cured definitively by removal of the larva, without etiologic treatment. Conclusion: The most reliable and easily accessible diagnostic method is morphological analysis by microscopy of histological preparations of the parasite. In dirofilariasis, ocular location is the most common in humans, and it deserves special attention of clinicians.

Introduction

Dirofilariasis is a widespread zoonosis caused by nematodes of the genus Dirofilaria. It includes species that are natural parasites in dogs and other wild animals. They are all transmitted by mosquitoes; Dirofilaria repens and Dirofilaria immitis have the most zoonotic potential. Both nematode species are common among wild animals in Eurasia, and the Mediterranean countries are considered to be endemic areas [1, 2]. In Bulgaria, all reported cases of infected individuals are of D. repens. Harizanov et al. [3] summarized 47 cases in different centers during 1973–2011. Velev et al. [4] describe the first case of a child with epididymal dirofilariasis caused by D. repens.

D. immitis can cause severe heart disease by locating in the pulmonary artery of dogs and other carnivores. D. immitis is less common in humans [5]. Dirofilaria repens is a major cause of non-pathogenic subcutaneous infections in dogs, more rarely in other carnivores, and is a major cause of human dirofilariasis in Europe. In final hosts, adult parasites are most commonly located in the...
skin or the subcutaneous tissue, and microfilariae circulate in the bloodstream. Microfilaremic dogs are the major reservoir from which infection is spread by vectors from the order Diptera [5–7].

**Materials and Methods**

Data were collected by observation and study of 7 patients with subconjunctival or periorbital dirofilariasis, from different regions of Bulgaria, treated at the University Hospital “Prof. Iv. Kirov”, Sofia, during 2010–2019. The patients were from 7 out of 28 regions in Bulgaria. Patients were classified by demographic, clinical, and laboratory parameters. Morphological methods were used for species determination of the parasite in all patients; the macroscopic method in the case of a preserved worm, and microscopic examination of the histological preparation of the parasite in all cases. In one case, we also applied a serological method using a commercial ELISA kit for the detection of Dirofilaria-specific antibodies based on purified somatic antigen of immature female *D. repens* (Bordier Affinity Products SA, Crissier, Switzerland). Complete blood counts were done in all patients for determination of eosinophil numbers.

**Results**

In the period 2010–2019, we examined and described 7 patients with a subconjunctival or a periorbital form of dirofilariasis. The patients (6 females and 1 male) were aged between 23 and 72 years. Four patients lived in rural areas, and 3 in urban areas.

In 3 patients, subcutaneous nodules were detected in the area of the upper eyelid, in 1 patient the location was suborbital, immediately below the left eyelid, and in 3 other patients, a subconjunctival location was found (Fig. 1). None of the patients had an orbital location of the parasite. The patients sought medical attention when they noticed a moving parasite or less often a calcified subcutaneous larva. This was the case with our patients as well. However, all 3 patients with subconjunctival larvae had sought medical attention early because of unpleasant sensations in their eyes and noticing an intact, moving worm. Complaints included eye irritation, blurred vision, photophobia, conjunctival reddening. In all patients, microscopic examination of histological preparations prepared from the extirpated larvae was performed. In one of the patients, with a subconjunctival larva, a native living worm was removed. All patients with subconjunctival larvae were examined by an ophthalmologist using a slit-lamp, and their eye fundi and eye vision were examined (using Snellen’s optotypes). No pathologic abnormalities were observed in the eye fundi and vision. Histologically, attention must be paid to the longitudinal ridges of the cuticle, which is a typical morphological characteristic of *D. repens* [8]. In one of the cases with subcutaneous dirofilariasis of the eyelid, we also applied a serological method using a commercial ELISA kit, but it was negative. No abnormalities were observed in the complete blood counts, including eosinophil levels, in any of the patients.

All 7 patients underwent surgical extirpation of the larva or parts of it. None of the patients was treated with antihelmintic medications, and there is no evidence of relapse of the disease. The 3 patients with subconjunctival larvae received topical treatment with tobramycin/dexamethasone eye drops for 3 days postoperatively.

![Fig. 1. Larva within the upper eyelid (a), subconjunctival larva with conjunctival reddening (b), and histological preparation of the cross-section of the extirpated larva. (HES, ×20) (c).](image-url)
**Discussion**

The increasing trend of dirofilariasis worldwide is usually explained by the warming of the climate and the increased activity of the parasite vectors as well as faster development of larvae in mosquitoes [9]. The most common locations of *D. repens* larvae are subcutaneous location in the upper body, including the eyelid, predominantly the upper eyelid, and, at the second place, the subconjunctival location [3, 10]. Ocular location is most commonly subconjunctival (about 60%), followed by eyelid and orbital (each about 25%) [10]. Patients with subconjunctival location seek medical attention most early, possibly due to subjective symptoms and easily visible larvae. Subjective symptoms or local inflammatory reactions have not been reported in patients with subcutaneous location. Initial diagnoses can sometimes be different, such as lipomas, lymphadenopathy, allergic conjunctivitis, etc. Serological testing was negative, and this is consistent with other reports [10, 11]. The absence of eosinophilia can be explained by the fact that patients had only one larva each, and thus antigenic stimulation was insufficient. However, slightly elevated eosinophil levels have been rarely reported [10]. For us, this diagnostic method is nonspecific and uncertain. For extracted larvae not placed in formalin, molecular analysis by conventional PCR and pan-filarial primers is recommended for the identification of the filarioid species [12].

As far as treatment is concerned, we suggest that surgical removal of the larva is sufficient; if necessary, subsequent anti-inflammatory and antibacterial treatment may be administered in subconjunctival and orbital dirofilariasis. Although the larva is perfectly visible in most cases, after the removal of a subconjunctival larva, we consider that instrumental examination of eye fundi is obligatory [6, 10].

**Conclusion**

Dirofilariasis has become endemic in many European countries. Although a common disease in dogs, it is still a rare and poorly known disease in humans. Here, we described 7 cases of ocular (peri-orbital and subconjunctival) location, which are particularly frightening for patients, as opposed to subcutaneous locations in other parts of the body. Such clinical case reports, are useful in order to draw the attention of clinicians in Europe.

**Statement of Ethics**

The study was conducted in accordance with the Declaration of Helsinki 2000.

**Disclosure Statement**

The authors have no conflicts of interest to disclose.

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