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PARASITOLOGICAL CLASSIFICATION OF THE *DIROFILARIA REPENS* NEMATODE AND ITS EFFECTS ON THE HUMAN BODY

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Abstract *This article provides information on the parasitological classification of the nematode Dirofilaria repens and its effects on the human body.*

Keywords *Dirofilaria repens, mosquito, microfilaria, Canis familiaris, C. lupus, C. aureus, Vulpes vulpes, C. azarae (Canidae family), Genetta tigrina (Viverridae family), Felis catus, F. silvestris, F. viverrinus, Panthera Leo, Lynx canadensis.*

Dirofilariasis is caused by two types of parasites: Dirofilaria immitis (parasitizing the heart and pulmonary arteries) and Dirofilaria repens (inhabiting subcutaneous tissue and the visual organs). Mosquitoes infect parasite larvae. The larvae enter through the bite of an animal mosquito; Humans can be infected in the same way. Humans are facultative hosts, where they develop to invasive sexual maturity[1]. The first description of Dirofilariaz was given in 1855 by the Portuguese physician Lusitano Amato, who took a worm from the eye of an infected girl and described the parasite. Subsequently, similar clinical observations were frequently recorded in France and Italy. The first clinical observation of ophthalmophilyarosis in Russia was described in 1915 in Yekaterinodar by the physician and scientist A.P. Vladichensky. As early as 1930, the founder of the school of helminthology, K.I. Skryabin, and his students began a careful study of

this problem. In 2015, 129 cases of Dynofilariaz were registered in 37 entities of the Russian Federation; in 2014, 169 cases (0.12 per 100,000 population) were registered in 42 entities of the Russian Federation [4].

The Dirofilaria repens nematode has a small mouth opening that leads into a short, narrow funnel-shaped mouth. There are four pairs of submedullary cephalic papillae; the amphid papillae are convex and lateral. The esophagus is short, and its division into muscular and glandular parts is almost imperceptible. In the area of the neural ring, the esophagus is slightly narrowed. The cuticle has longitudinal lines; the presence or absence of lateral wings has not been established.

Hosts: Canis familiaris, C. lupus, C. aureus, Vulpes vulpes, C. azarae (Canidae family), Genetta tigrina (Viverridae family), Felis catus, F. silvestris, F. viverrinus, Panthera leo, Lynx canadensis (Felidae family), humans.

In living organisms, microfilariae are found in the subcutaneous tissue, between the leg tendons, in the kidneys, lymph nodes, and in the eyes and under the skin of humans, as well as in the blood.

The male has a body length of 51 mm and a maximum width of 0.32 mm. The nerve ring is 0.24 mm from the apex. The length of the esophagus is 0.75 mm; the length of the right spicule is 0.13 mm, and the length of the left spicule is 0.30 mm, but it appears to be fractured. The tail length is 0.08 mm. The caudal papillae were not examined in detail. The left spindle is very thin and its lateral wings are not visible when pulled back.

The female has a body length of 106 mm and a maximum width of 0.53 mm. The nerve ring is 0.27 mm from the apex of the head, and the vulva is 1.4 mm. The length of the esophagus is 0.91 mm. Tail length is 0.09 mm.

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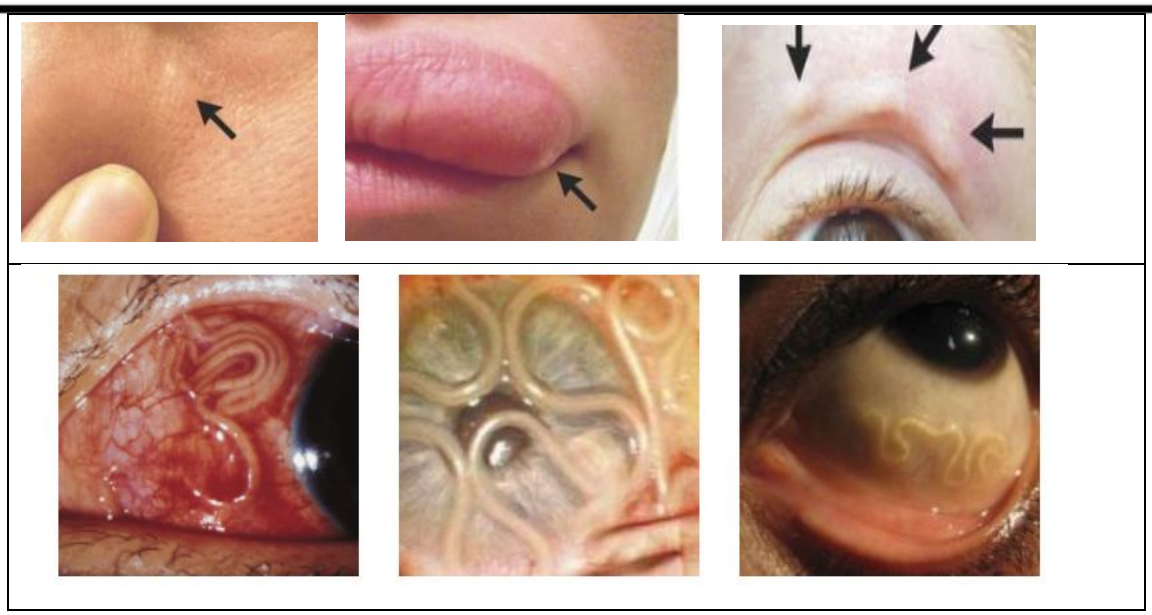

These images show parasites found in the facial area, the ecological basis of which is that the mosquito infects the parasite to the part it bites, and infects one parasite with one bite.

In 2019–2020, the Rostov Research Institute of Microbiology and Parasitology, the leading institution dealing with dynofilariasis, analyzed 52 epidemiological examination cards collected in Rostov in 2019 and 2020. Almost half of the dynofilariae removed from humans are located on the head (44.2%). The most common site of infection was the eye (25%). One dynofilaria was removed from the subcutaneous tissue of the neck (1.9%), three from the mammary gland (5.8%), and one each from the pleural region, bladder wall, axillary region, and inguinal region. Seven дирофилярии (13.6%) were found in the scrotum.

Most often, only one Dirofilaria is detected in a person. Since fertilization is almost impossible, adult development takes about 8-9 months, and the parasite rarely leaves its primary site (i.e., the nodule it forms under the skin) [6].

In the international literature, rare locations of dynofilariasis are described, which are of interest to the urological community. A case of human Dirofilariaz associated with Dirofilaria repens, located in the vas deferens, was reported in a 52-year-old male from Lugo di Romagna (province of Ravenna, Northern Italy). A 37-

year-old Hungarian man with a right testicular tumor underwent an orchiectomy. Histological microscopic examination revealed a nodule attached to the spermatic cord, consisting of granulomatous tissues surrounding the nematode. The worm has been identified as Dirofilaria repens, a rare parasite in Hungary [8]. In Slovakia, a patient approached a general practitioner about a palpable subcutaneous mass in the scrotum. Ultrasound examination followed by surgical removal of the right epididymis was indicated. Based on histological microscopic examination and PCR determination, the helminth was identified as Dirofilaria repens [9].

Derophyllariasis of the scrotum can be diagnosed using ultrasound examination of the scrotum. Ultrasound imaging of the characteristic dynofilariasis of the scrotum is characterized by the identification of an oval or spindle-shaped lesion occupying an additional area, ranging in size from 5 mm to 30 mm, heterogeneous in structure, with echo-dense linear inclusions in the center, and no signs of blood flow in the color Doppler image [10]. We present a unique clinical case of D. repens localization in the spermatic cord, which has led to difficulties in diagnosing dyrofillyaria and identifying the parasite. 45-year-old patient S. was admitted to the urology department of the Novosibirsk Regional State Clinical Hospital with complaints of a mass and discomfort in the left scrotum. About a month ago, during a self-examination, he discovered a tumor in his left testicle. I consulted a urologist at the Novosibirsk Regional Clinical Hospital. Upon examination, a solid, mobile, painless tumor up to 1 cm in size was identified near the testis, on the left side, in the area of the spermatic cord. Ultrasound examination revealed a soft tissue tumor measuring 7.5 x 5.8 mm in the left testicle with suspicious blood flow. HCG, AFP, and LDH tests were performed, and the results were within the range of acceptable records. Upon further examination using MRI data from the genitalia and pelvis, a fluid-filled tumor was identified in the area of the left testis, which was dyroflora.

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In this case, a painless, firm, immobile mass of up to 1 cm is felt only in the lower part of the left testicle, where the external genitalia are normally formed. A standard approach was applied to the left testicle under spinal anesthesia and aseptic conditions. During the surgery, the cyst wall opened, cutting it off and forming a muddy secretion. A mobile, elongated, white helminth approximately 7 cm long emerged from the cyst. Based on the morphological characteristics of the nematode, the helminth genus D. repens was identified as female (Fig. 3).

When collecting an additional epidemiological history of this patient, it was established that the patient, who is a serviceman, had been in Uzbekistan for a long time and was also on leave in Abkhazia. This unique clinical observation of a parasitic infection of the male genital organs is of great interest to doctors of various specialties (urologists, oncologists, infectious disease specialists, and epidemiologists). It is important to be aware of the rare diseases that should be included in the differential diagnosis. Manifestations of dynofilariasis at this site include a small local infiltrate in the testis. Sometimes even modern imaging methods fail to provide a precise diagnosis. A thoroughly compiled epidemiological history can guide the correct diagnosis.

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