Dirofilaria repens is a mosquito-borne filaria, a parasite of the subcutaneous tissue of domestic and wild carnivores such as dogs, cats, and foxes.1,2 The filaria is prevalent in Europe, mainly in the Mediterranean basin, sub-Saharan Africa, and southern Asia.3 An increasing number of zoonotic infections with the filaria from different parts of the world have been reported.1,3 Humans are accidental hosts for the filaria in whom the life cycle cannot be completed.1 As the filaria dies in human tissue, it provokes a local inflammatory response manifested as a subcutaneous nodule, and it has often been confused with a tumor.1,4

Canine infection with D. repens was first reported in Palestine under the British mandate (now Israel) in 1934, when one of 30 dogs surveyed was found to be infected with the filaria.2 Since then, no other cases of canine, feline, or other carnivore infection with the filaria were reported in this country. However, four cases of human infection with D. repens have been documented in Israel to date, three ocular cases (swelling near the inner canthus of the eye in two6,7 and subconjunctival abscess in one8) and one localized to the cervical lymph node.9 Another three human cases were diagnosed in Israel between June 1996 and February 1997, two subcutaneous and one paraorbital (Scherbakov A and others, unpublished data). This report represents the second case of D. repens infection diagnosed in a dog in Israel, and discusses the possibility of this zoonotic filarial worm becoming established in Israel.

CASE REPORT

A 12-year-old male Doberman from northern Israel was admitted to the Veterinary Teaching Hospital of the Hebrew University of Jerusalem, Israel (VTH-HUJI). The dog was born in Israel and was never taken abroad. Its medical history included a cutaneous nodular lesion that was excised by a local veterinarian a year before admission. Present history included weight loss, depression, and anorexia for the last month, and facial and submandibular swelling and salivation for the last week prior to admission. A physical examination revealed cachexia and generalized lymphadenomegaly. A complete blood count was unremarkable; however, numerous microfilariae were seen in the peripheral blood smear (Figure 1A, B, and C). Abnormal biochemical findings included a mild increase in alanine aminotransferase, alkaline phosphatase, and creatine kinase levels (136 U/L, 150 U/L, and 130 U/L, respectively, reference range = 8–50 U/L, 10–140 U/L, and 13–100 U/L, respectively). Lymph node aspirations revealed numerous atypical lymphoblasts (more than 80%), with a high mitotic-figure index, large nuclei, and multiple nucleoli. Microfilariae were also noticed in the lymph node aspirations (Figure 1D). Chest radiography as well as echocardiography showed no pathologic findings. A canine antigen test kit result for D. immitis (IDEXX Laboratories, Westbrook, ME) was negative. A polymerase chain reaction (PCR) for D. immitis and D. repens using specific primers for both filariae was performed, as previously described.5,9 A PCR product of 325 basepairs was amplified when specific primers for D. repens were used, indicating that the microfilariae were D. repens. A diagnosis of lymphoma and dirofilariasis was made and treatment for both conditions was offered. The owners declined treatment in spite of the potential zoonotic hazard of the dirofilariasis.

DISCUSSION

Animal infection with D. repens has not been reported in Israel for the last 65 years. During the same period, 7 cases of human infections were diagnosed in this country6–8 and due to the ease of international travel, the parasite could have been introduced into Israel by pets traveling from endemic areas, or by migration of infected mosquitoes from neighboring countries. Cases of D. repens infection in the Mediterranean basin have been reported from Greece, Italy, France, and Spain,1,3,12 and although the Middle East is considered endemic for D. repens, no reports other than the human cases in Israel6–8 and a single case in Kuwait9 have, to the best of our knowledge, been reported in this region. This may be due to a lack of awareness or due to low-grade infection in the definitive host population, therefore resulting in a low incidence of clinical cases. Since dogs, cats, and foxes serve as reservoir for the filaria,1 and these are abun-
Figure 1. *Dirofilaria repens* infection in a dog in Israel. A, two microfilariae of *D. repens* in a blood smear. (hematoxylin and eosin stained, original magnification × 200). B, microfilaria of *D. repens* in a blood smear (hematoxylin and eosin stained, original magnification × 500). C, microfilariae detected by the concentration Knott’s test. (methylene blue stained, original magnification × 200). D, microfilaria in a lymph node aspiration of the dog with lymphoma (arrow). The presence of the microfilariae in the lymph node aspirations was probably due to contamination of the aspirations with blood (hematoxylin and eosin stained, original magnification × 200). A higher magnification is seen in the inset (hematoxylin and eosin stained, original magnification × 300).

Distant in Israel, and mosquitoes of the genera *Culex and Aedes* (both of which occur in Israel and the Middle East) are vectors, the conditions for establishment of the filaria in Israel exist. Most human cases of dirofilarialis in Israel were diagnosed in the northern part of the country (Scherbakov A and others, unpublished data). The dog in our case was also from northern Israel (Kiryat Bialik). These findings warrant a thorough epidemiologic investigation in northern Israel and the neighboring countries to investigate the possibility that this emerging zoonotic filaria is becoming established in this region. This investigation should include blood smear evaluation for the presence of microfilariae, serology for the presence of antibodies reactive with *D. repens* in domestic and wild carnivores, and a PCR on mosquitoes to detect microfilarial DNA.

Numerous microfilariae were found in the blood smears in this case. It is possible that due to the lymphoma and associated immunosuppression (which could also be attributed to the old age of the dog) the microfilaremia was high, even at noon when blood samples were drawn, a time at which microfilaremia was expected to be low. Microfilariae were also found in the lymph node aspirations, this was probably due to contamination of the aspirations with blood.

The presence of a cutaneous nodular lesion in the dog a year prior to admission to the VTH-HUJI could have been due to subcutaneous dirofilariasis. However, since no biopsy was taken from the lesion, this assumption is speculative.

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