Case Report: Zoonotic Filariasis in the Arabian Peninsula: Autochthonous Onchocerciasis and Dirofilariasis

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Abstract. We describe zoonotic filariasis in two patients from Kuwait; one with Onchocerca spp. and one with Dirofilaria spp. Case 1, a 12-year-old Kuwaiti woman who had visited Saudi Arabia, initially reported ocular symptoms. She later reported a nodule that appeared in the suprapubic area, which was resected. A coiled worm was observed in histologic sections and was identified as an Onchocerca spp., but could not be definitively identified. This patient represents the 15th reported case of zoonotic onchocerciasis in a country that is not endemic for human onchocerciasis. Case 2, a 34-year-old Indian woman from Kuwait City, reported a moving object in her left eye. A live worm was extracted and tentatively identified as an immature female Dirofilaria (Noctiella) repens. These two cases bring to four the number of reports of zoonotic filariasis in the Arabian Peninsula and suggest that zoonotic filariasis is not uncommon in the Arabian Gulf region.

INTRODUCTION

Filarial parasites of wild and domestic animals may infect humans and lead to a zoonotic infection.1 Such infections have been reported from a wide geographic range, most often in temperate countries that are not endemic for human filariasis. Kuwait and most parts of the Arabian Peninsula are tropical in location, but not endemic for human filariasis.

These infections are often relegated to medical curiosities as a result of the small number of cases. However, there is a need to recognize the nature of the infection, identify the worm, report the finding, and where possible, identify reservoir and intermediate hosts. Microscopic characterization and identification of the worm is crucial in this process and increases our knowledge of the biology and importance of filarial parasites, especially in the developing world where the facilities for such studies are non-existent or minimal because of limited personnel and resources.

We report our findings on two patients in whom we identified zoonotic filarial worms. These cases follow two initial reports of zoonotic Dirofilaria infection in 1994 from Kuwait and bring to four the recognized cases from the Arabian Peninsula.2,3

CASE REPORT

We describe two patients who had different symptoms. For each of the patients, we describe the worm, outline the anatomic features, and assign the parasite to the genus and/or species depending on the availability of the material. We then discuss relevant aspects of the parasites and compare the findings from those from other geographic areas.

Case 1. A 12-year-old Kuwaiti woman was seen initially for ocular complaints. During the course of clinical follow-up, the patient had recently reported a firm-to-hard swelling in the middle of the suprapubic region 5 cm from the symphysis pubis. Ultrasound examination showed a subcutaneous swelling that was not attached to the muscles.

A 1 × 1 cm mass was excised, sectioned, and stained with hematoxylin and eosin. A single, coiled, non-gravid, well-preserved female worm, with a maximum diameter of approximately 225 μm, was observed in fibofatty tissue (Figure 1A). The cuticle had prominent circular ridges that were readily evident in longitudinal sections (Figure 1B). Also evident was an inner layer of striae, with one under each ridge and one between each ridge (Figure 1B). In cross section, the cuticle was thick when cut through an external ridge but relatively thin when cut between the ridges. The hypodermis was prominent and underlined the muscle layer. There were a few somatic muscle cells (meromyarian) that were weak and poorly developed, lateral chords were well developed, and an intestine and two uterine tubes were recognized (Figure 1C).

Only nonfertilized ova were present in the reproductive tube, and no microfilariae were seen in the uteri or in the surrounding tissue. The worm was identified as an Onchocerca spp. The patient had visited Najran in Saudi Arabia on the border with Yemen, approximately three months earlier, where she had stayed for approximately two months.

Case 2. A 34-year-old Indian woman, a long-time resident of Kuwait City, came to the Ophthalmic Clinic at Al-Bahar Hospital. Two months before coming to the clinic, she had visited India for two weeks. She reported a history of pain in the left eye for four days, lacrimation, and a sensation of a moving object. On slit-lap examination, the eye was red with mild conjunctivitis. A subconjunctival mass was observed with a moving worm, which was extracted under local anesthesia.

A physical examination showed no nodules or any other abnormalities. The hematologic profile was normal and there was no eosinophilia. Results of liver and kidney function tests were in normal ranges.

The worm was placed in saline and immediately preserved in 70% ethanol and glycerol. It was cleared in glycerin, mounted, and examined microscopically. The worm was approximately 9 cm long and had a maximum diameter of 500 μm. Prominent longitudinal ridges were clearly visible; at mid-body level there were approximately 100 of them, and the distance between ridges was approximately 8–15 μm (Figure 2). Other features that aided identification were the lance-shaped anterior end, mouth without lips, small head papillae,
and a relatively short esophagus. The posterior end, which had a short tail, was blunt and rounded. The vulva, ovjector, and looped vagina were all readily evident. The uterus, which was paired with coiled uterine tubes, had no microfilariae. On the basis of these features, this worm was identified as a well-preserved, immature, infertile, female *Dirofilaria* spp. Based on the ocular location in the host, residence in Kuwait but with travel history to India, and size and cuticular ornamentation of the worm, it was identified as *Dirofilaria* (*Nochtiella*) spp., most likely *D. (N.) repens*, a natural parasite of dogs that is endemic in Kuwait and India.

**DISCUSSION**

In case 1, morphologic features of the worm were compatible with an immature female *Onchocerca* spp., although a complete description of this worm and accurate species identification were not possible. Of the *Onchocerca* species that are either known to occur or might occur in the Arabian Peninsula, we were able to narrow the list of possible species. *Onchocerca gutturosa* of cattle and *O. fasciata* of camels have three or four striae per ridge and can be excluded. Several species have similar configurations, i.e., two striae per ridge. These species include *O. gibsoni*, *O. armillata*, and *O. lienalis*. 

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**FIGURE 1.** A, Single, coiled, non-gravid, well-preserved female worm approximately 225 μm in diameter from case 1. B, Longitudinal section with cuticular ridge (long arrows) and the inner layer of striæ (short arrows), one striæ under each ridge, and one between each ridge. Trichrome stain. C, Transverse section through a female *Onchocerca* spp. Note the prominent lateral chord and the low, weak, poorly developed muscle layer, the two uterine reproductive tubes, and the intestine in the body cavity.

**FIGURE 2.** Cuticle of a worm from case 2 with prominent longitudinal ridges at mid-body level. There are approximately 100 ridges and the distance between ridges is approximately 8–15 μm.
of cattle, *O. reticulata* of horses, *O. dukei* of antelope, and *O. volvulus* of humans. Of these, *O. gibsoni* and *O. dukei* are restricted to Australia and central Africa, respectively. For *O. lienalis* and *O. volvulus*, although the number of striae per ridge is compatible, the relatively thin cuticle in these species excludes them because the specimen in this case had a relatively thick cuticle. Furthermore, the patient did not visit or reside in an area endemic for human onchocerciasis in Yemen. The two remaining species, *O. reticulata* of horses and *O. armillata* of cattle, have morphologic features that are not entirely consistent with the worm in the present case. With the limited material available, it is not possible to say with certainty what species the recovered worm most likely represents.

Coincidentally, this patient had a concurrent diagnosis of ophthalmic toxoplasmosis. We were aware from the outset that the ocular complaint the patient reported was not related to the *Onchocerca* spp. infection; during several eye examinations to evaluate toxoplasmosis, no microfilariae were seen. Furthermore, sections also confirmed that the worm was immature; there were no microfilariae in the uteri or in the surrounding tissue. However, as a precaution, ivermectin was administrated with no adverse effects. Ocular complaints of toxoplasmosis and zoonotic onchocerciasis are interesting, not merely as a peculiarity, but add to the pool of knowledge on the subject in this geographic area where there is a paucity of such information.

Zoonotic *Onchocerca* cases are rare; 13 previous cases have been reported from the United States, Canada, Switzerland, Hungary, Russia, and Japan. The species involved in these infections were tentatively identified as *O. gutturosa*, *O. cervicalis*, *O. reticulate*, and *O. dewittei japonica* on the basis of morphologic features. A recent report (case 14) identified *O. jakutensis* by molecular techniques in a patient from the United States who had traveled throughout Europe.

In case 2, the worm was observed in the conjunctiva of the patient and identified as a *Dirofilaria* spp. The genus *Dirofilaria* has two subgenera. The first subgenus is *Dirofilaria*, which is characterized by a smooth cuticle. The most widely recognized species in this group is *D. immitis*, the dog heartworm, which is a common cause of zoonotic infection. The second subgenus is *Dirofilaria* (*Nochtiella*). Members of this group are characterized by having pronounced longitudinal ridges on the external surface of the cuticle, and as adults, the worms typically reside in subcutaneous tissues. The two most widely recognized species in this group that cause zoonotic infections are *D. tenuis* of raccoons in North America and *D. repens* of dogs in most other areas of the world. These two species account for most zoonotic human infections. *Dirofilaria tenuis* and *D. repens* take 6–9 months to develop to maturity. On the basis of the residence of case 2 in Kuwait, her recent visit to India, and the morphologic features of the worm, the specific diagnosis in this case was infection with an immature female *D. repens*. It is unclear in which country she acquired this infection. However, the size and development of the worm suggest that it was more than one month of age, which suggests that the infection was actually in Kuwait before her visit to India.

The number of cases of zoonotic dirofilariasis continues to increase. Identification and/or confirmation of the species are closely correlated with the areas where the infection was suspected to have taken place.

We have described two zoonotic filariasis cases in Kuwait caused by *Onchocerca* spp. and *Dirofilaria* spp. and have speculated on the most probable species responsible for these infections. The case of onchocerciasis is the first reported in Kuwait and the Arabian Peninsula. The case of dirofilariasis is the second case reported from Kuwait and the third from the Arabian Peninsula. We believe that continued interest in such infections is needed to document not only where they are occurring, but also to identify the responsible species. Although identification may be incomplete, even partial identification is essential and needs to be recorded so that these cases can be tracked.

Received June 11, 2008. Accepted for publication August 6, 2008.

Acknowledgment: We thank the physicians and surgeons of the district general hospitals for helpful discussions.

Financial support: This study was supported by Kuwait University (Project MI 0303).

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REFERENCES


