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Orbital Dirofilariasis: MR Findings

Reinhard Groell, Gerhard Ranner, Martin M. Uggowitzer and Hannes Braun

Summary: Dirofilariasis is a helminthic zoonosis occurring in many parts of the world. We report the findings in a 61-year-old woman who had painless right exophthalmos caused by orbital dirofilariasis. A vivid worm was embedded inside an inflammatory nodule in the right orbit. On T1-weighted MR images, the parasite was visible as a discrete, low-intensity, tubular signal in the center of the nodule surrounded by contrast-enhancing inflammatory tissue.

Dirofilariasis is a worldwide helminthic zoonosis. The species *Dirofilaria repens* is endemic in southern-middle Europe and in some parts of Asia and Africa (1). Dogs are the primary hosts of this parasite, humans are rarely affected. We report the case of a 61-year-old woman with orbital dirofilariasis and describe the MR imaging findings.

Case Report

A 61-year-old woman had a 6-month history of progressive painless exophthalmos of her right orbit. On MR examination, a 2.5-cm mass was visible in the right lower-medial retrobulbar part of the orbit, adjacent to the medial orbital wall. The center of the lesion showed high signal on T2-weighted images (Fig 1A). On T1-weighted images, the center of the lesion had a discrete tubular structure of low signal intensity within it (Fig 1B). The lesion was surrounded by a 3-mm-thick capsular structure with low signal intensity on T1- and T2-weighted images. After intravenous administration of contrast material, this capsule and parts of the contents of the lesion showed marked contrast enhancement, except for the above-mentioned central low-signal tubular structure (Fig 1C). These MR findings led us to suspect an inflammatory pseudotumor.

The patient reported having made several trips to Italy and Greece within the preceding 5 years; however, all relevant laboratory findings were negative (eg, eosinophilic granulocytes; parasitologic testing for helminths in urine, feces, and sputum; and serum enzyme-linked immunosorbent assay (ELISA) screening for filarial antigen).

The lesion was resected, and a live, moving worm (length, 12 cm; diameter, 0.3–0.5 mm) appeared in its center (Fig 1D). The worm was classified as *D. repens*. The lesion capsule consisted of unspecified granulomatous and fibrous tissue. The center of the lesion contained granulomatous tissue and putrid liquid that, upon culture, proved to contain *Streptococci viridans* and *Propionibacterium acnes*. The exophthalmos resolved, and no further treatment was necessary.

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Discussion

Dirofilariasis is a worldwide helminthic zoonosis. The species most relevant to humans are *D. immitis*, *D. tenuis*, *D. ursi*, and *D. repens*. *Dirofilaria (Nochtiella) repens* is endemic in southern-middle Europe and in some parts of Asia and Africa. Approximately 400 cases of human dirofilariasis due to *D. repens* have been reported in the literature (1). The imaging features of dirofilariasis are not well known, and, to our knowledge, MR findings have not been described.

Dirofilaria is a common parasite of dogs, which constitute the main source of infection. Adult worms reside in the right side of the heart and the pulmonary vessels of the dog, where they produce larvae (microfilariae). The larvae circulate in the blood and may be ingested by mosquitos, which serve as vectors, infecting other dogs. Once the larvae have penetrated the final host, they develop into adult worms within 6 months (2, 3).

Humans are infected only accidentally, and many are asymptomatic. In humans, the nematode causes a subcutaneous or superficially located inflammatory reaction, trapping it within a nodule, where it may survive for many years (3–5). Occasionally, the nematode may invade the vascular system and lead to visceral, mainly pulmonary, forms of dirofilariasis. On chest radiographs and CT scans, these pulmonary manifestations have been described as sharply defined lesions in the periphery of the lungs, resembling neoplasms (“coin lesions”) (6, 7). In addition to the lungs, dirofilariae have been detected in the heart and in the abdomen (4). This visceral dirofilariasis has to be distinguished from the visceral manifestation of toxocariasis (a parasitosis caused by *Toxocara* species) also known as visceral larva migrans.

In humans, the worm cannot reach maturity and is therefore unable to express larvae into the blood system, which is why serologic results are of little value. Only occasionally patients may have moderate eosinophilia (3). In the reported case, all relevant tests were negative, however.

In general, the diagnosis of human dirofilariasis is based on histologic examination. Therapy with systemic antibiotics has proved useless, and surgical removal of the worm is the only known treatment. Usually, the clinical symptoms disappear after the parasite is removed, and no adjunct therapy is necessary.

In our patient, the parasite caused a painless inflammatory retrobulbar nodule, leading to exoph-

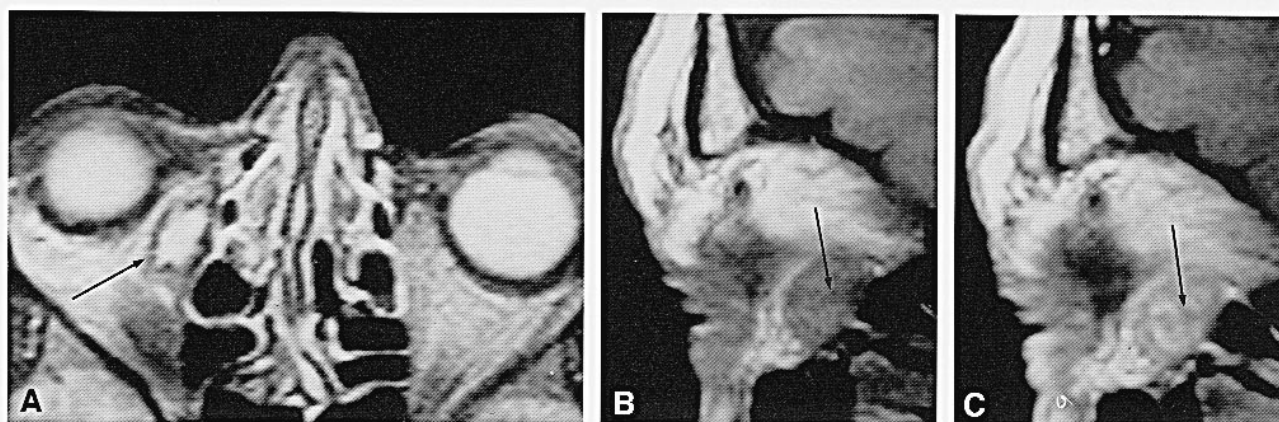


FIG 1. 61-year-old woman with human dirofilariasis.

A, Axial T2-weighted MR image (1800/90 [TR/TE]) shows an encapsulated lesion (arrow) of central high signal intensity in the medial right orbit.

B, A tubular central structure (arrow) of intermediate signal intensity is visible within the lesion on sagittal T1-weighted image (452/25).

C, After intravenous administration of contrast material, the capsule and the surroundings of the central tubular structure (arrow) show a marked enhancement on T1-weighted image (452/25).

D, Photograph of the worm (*Dirofilaria repens*, length, 12 cm; diameter, 0.3–0.5 mm) after it was removed from the capsule.

thalmos. Among other neoplastic, granulomatous, or inflammatory diseases, the differential diagnosis includes other parasitoses with potential orbital manifestations, such as cysticercosis, hydatid cyst, and onchocerciasis. As in most other cases of human dirofilariasis, the exact time and location of infection could not be determined in our patient. Because the parasite matures within 6 months, it is likely that she was infected during one of her journeys to southern Europe.

Conclusion

On MR examinations of our patient with dirofilariasis, the inflammatory nodule embedding the parasite appeared as a thick-walled semiliquid structure on T2-weighted images. On T1-weighted images, the lesion showed a discrete, tubular, central signal, which obviously represented the worm. The tissue surrounding the tubular structure, as well

as the capsule, showed considerable enhancement after contrast administration, consistent with a reactive inflammatory process. The parasite, which appeared as a tubular pattern of low signal intensity on T1-weighted images, could not be delineated on proton density- and T2-weighted sequences.

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