

## An Unusual Case of *Dirofilaria conjunctivae* Infection Suspected to be Malignancy of the Spermatic Cord

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Dirofilariasis is an infection by filarial nematodes of the genus *Dirofilaria*. In addition to the ocular form, there are two others: pulmonary dirofilariasis caused by *Dirofilaria immitis*, the dog heart-worm; and subcutaneous dirofilariasis caused by *D. tenuis* (*D. conjunctivae*) and *D. repens*. *D. conjunctivae* is more frequent in Southern Europe and eastern Mediterranean countries. Sporadic cases of human zoonotic filariasis have been reported in Africa, Asia and South America, but most reported cases occurred in inhabitants of the southern United States.

To date, four cases of human dirofilariasis have been reported from Israel. The first two cases, in 1976, involved the conjunctiva [1]. In the third case, reported in 1981 [2], the worm was found in a cervical lymph node, and in the fourth case, reported in 1995 [3], it was found in a facial nodule. The present report of dirofilariasis in Israel constitutes a fifth case worldwide where the worm was found in the spermatic cord.

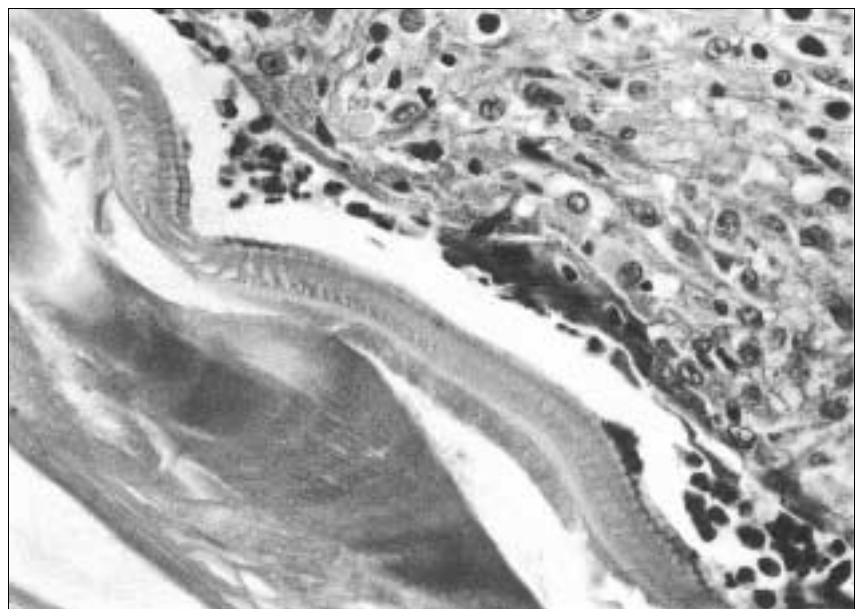
### Patient Description

A 36 year old man, previously healthy, complained of a painless mass in the left testicular area, which he had detected 1 week prior to hospitalization. There were no other complaints. The patient, a native Israeli, had visited Egypt 2 years earlier.

During the physical examination, a small lump, 2 x 1 x 1 cm in size, was

palpated on the left side of the scrotum. It was of hard consistency and without any overt signs of inflammation. The skin over the lump was normal. No other pathologic findings were detected. Routine laboratory studies, including white blood count with differential analysis, were within normal limits. The mass attached to the left spermatic cord was removed for biopsy under epidural anesthesia. The tentative diagnosis was adenomatoid tumor or malignant tumor. Macroscopically, the specimen consisted of fibrotic tissue with some abscesses measuring 2 x 1 x 0.5 cm. Bacteriologic

cultures from these abscesses did not yield any findings. Histologic section showed fibrotic tissue with acute inflammation and abscess formation, and an increased number of eosinophils. In three consecutive cross-sections, worm-like structures were found that were identified as *Dirofilaria conjunctivae* on the basis of morphologic features, such as transverse striation and coarse longitudinal ridges. The granulomas surrounding the sectioned worm consisted of epithelioid cells, foreign body giant cells, histiocytes and eosinophils. The postoperative recovery was uneventful.



Longitudinal section of *Dirofilaria conjunctivae*. The fine transverse striation and marginal crests are discernible. There is also an inflammatory reaction around the lesion. (Hematoxylin and eosin stain, x 400).

## Parasitological findings

The histologic material comprised transverse (cross) sections of the worm, a few sagittal sections, and one that appeared nearly longitudinal [Figure]. The latter measured 2,130  $\mu\text{m}$  in length and 340  $\mu\text{m}$  in its largest diameter. In other sections, worm width ranged from 136 to 340  $\mu\text{m}$ . Thickness of the cuticle proper ranged between 16 and 48  $\mu\text{m}$ . The cuticle was characterized by tuberculations on the outermost layer and distinct radial striation of the layer immediately underneath it, thus strongly suggestive of the marginal crests (or fine, regularly spaced, low longitudinal ridges) and transverse striation typical of the cuticle of *Dirofilaria conjunctivae* (or *D. repens*). The dimensions of the organism and the absence of any genital organology (with just a hint of a possible rudimentary ovary in one section) clearly identify it as a fourth-stage larva in its early developmental phase. As is known for various *Dirofilaria* species, the adult stages of the parasite well exceed 10 cm in length, whereas the fully developed fourth-stage larva attains a length of up to 25 mm, and the preceding third-stage larva, which is the infective stage introduced by the mosquito, is about 900  $\mu\text{m}$  long. Since the third molt (third-stage to fourth-stage larva) occurs 9–12 days after the introduction of the parasite into the body of the dog (or human), it can be surmised that the duration of the parasitic infection in this case was at least 3 weeks. Most likely, the developing fourth-stage larva became entrapped shortly after its molt, since it only attained a length of 21.3

mm and it probably did not travel far from its point of entry – the scrotal sac.

## Comment

Dirofilariasis in the spermatic cord is a rare occurrence, although three cases have been described recently: one in France, one in Italy and one in Hungary [4]. The present case is the first in Israel.

The lesion presents as a subcutaneous nodule that develops over a period of several weeks. Nodules may be tender, painful, erythematous, and occasionally migratory. As long as the worm is migratory in the subcutaneous tissues and encounters little obstruction, there is little inflammatory reaction. However, once it loses its vitality, it becomes localized and a granulomatous inflammatory reaction develops around it. The occasional worm encountered in humans is usually solitary and most of the described cases comprise a single nodule. *D. conjunctivae* produces subcutaneous lesions in humans, which have been described as a swelling, lump, cyst, nodule, abscess, boil, tumor or granuloma. Subcutaneous lesions have been described as occurring on the lower extremities, arms, abdomen, breast and neck. There has even been a report of a single lesion on the penis of an infant boy [5].

Several species of mosquitoes transmit both *D. tenuis* and *D. repens* to natural hosts. The means by which our patient became infected with the described species of *Dirofilaria* has not been elucidated, but it seems probable that the infection involved an insect vector, most likely a mosquito, although

the patient did not remember being bitten in the scrotum.

Surgical removal of the worm seems to be the only available treatment for human dirofilariasis. Details regarding the pathologic potential of human *Dirofilaria* infections, epidemiologic information on infective species, host reservoirs, geographic distributions and arthropod vectors are helpful, but cannot replace the anatomic characterization of the parasite. Identification of *Dirofilaria* from tissue sections is difficult, but knowledge of the parasite's geographic distribution and the patient's history, including travel, is helpful.

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