



A Case of Migratory Subcutaneous Nodule Caused by *Dirofilaria immitis*

KEYWORDS

Dirofilariasis, subcutaneous nodule, *Dirofilaria immitis*

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ABSTRACT

Human subcutaneous dirofilariasis is a rare zoonotic filarial infection caused by filarial worms of the genus Dirofilaria. In recent, there has been a rise in human Dirofilaria infections in several regions of the world and is considered as emerging zoonotic infection transmitted to man by zooanthophilic blood sucking insects. Cases of subcutaneous Dirofilariasis are majority caused by Dirofilaria repens. Here we present a case of migratory subcutaneous swelling of the left leg in a 28 year old male patient. Patient underwent surgical removal of a live filaria worm which was then sent for microbiological evaluation and revealed filarial worm of the immitis species.

Introduction

Human dirofilariasis is a zoonotic filarial nematode infection caused by members of the genus *Dirofilaria* (order Spiurida). The most frequently implicated dirofilariae are *D. immitis* and *D. repens*. A wide variety of natural definitive hosts includes canines and felines, both wild and domestic. There are two main groups of *Dirofilaria* spp. parasites – those that inhabit the heart and blood vessels of the natural host (e.g. *D. immitis*, agent of heartworm disease of dogs), and those that live in the subcutaneous tissues (e.g. *D. repens*, causing subcutaneous infection in dogs and cats).

The mammalian hosts are infected via mosquito vectors. Mosquitoes implicated in transmission are mainly *Aedes* and *Culex* species. Infective larvae gain access to human tissues through a blood meal of the vectors, and mature into the adult stage over several months, typically presenting as ocular, subcutaneous or pulmonary reactive nodules containing the worms. The presence of microfilariae in the blood is not a feature of human infections. Most worms that enter in the human system fail to undergo maturation and remain in a stage of filarial worm. In patent infections in the natural animal host, bloodstream microfilariae are the infective stage for the mosquito intermediate host and vector.

Globally, dirofilariasis is widespread but the geographic distribution of individual *Dirofilaria* species varies. While *D. immitis* affects animal and human hosts in tropical and temperate regions in many parts of the world.

Case report

A 28 year old male patient, teacher by occupation and hailing from Bantwal, Mangalore presented to our department with complaints of a migratory swelling over the left leg since 2 months. Swelling was non progressive and noted to have migrated from the area around the ankle to an area closer to the knee joint. Patient gives a history of the swelling notably migrating following a thorough massage of the affected area. Swelling is also associated with com-

plaints of itching. No history of fever/ cough. No history of any similar swellings over the body. Previous medical history was unremarkable and patient gave no significant travel history.

Clinical examination revealed a 5x2 cm solitary swelling over the proximal aspect of the left leg. Swelling was well defined and on palpation noted to be mobile and in the subcutaneous plane. Ultrasonography was done for the swelling which revealed a soft tissue reaction surrounding a live mobile worm in the subcutaneous plane. This was later correlated with a magnetic resonance imaging study. Patient underwent complete excision of the swelling along with excision of a live worm which was housed within the subcutaneous mass. Routine blood investigations along with AEC (absolute eosinophil count) were normal.

Macroscopic study of the worm identified it as belonging to the species *Dirofilaria*. Microscopic study following serial glycerol preparation of the worm revealed a filarial stage of *Dirofilaria immitis*. Hematoxylin and eosin stained sections of the surrounding tissue showed inflammatory granulation tissue composed of eosinophils, lymphocytes, and occasional foreign body giant cells.

Following identification of the causative worm, patient underwent a chest radiograph at follow up which was within normal limits.

Discussion

There are about 40 recognized species of *Dirofilaria* and at least six of them, that is, *D. immitis*, *D. repens*, *D. striata*, *D. tenuis*, *D. ursi*, and *D. spectans* are known to cause accidental infections in humans¹. Mosquitoes belonging to the genera *Aedes*, *Armigeres*, *Culex*, *Anopheles*, and *Mansonia* species are reported to be involved in its transmission.

Human dirofilariasis presents typically as subcutaneous or ocular masses (*D. repens*), or as pulmonary nodular lesions (*D. immitis*). Recently, however, more atypical sites have

been reported where *D. immitis* has been found in cranial, hepatic and intra-ocular tissue, while *D. repens* has been identified from the lungs, scrotum, penis and female mammary glands.

The clinical presentation varies from asymptomatic to sometimes fatal. Transient reactive swelling to migrating parasites may occur before they localise to produce inflammatory masses. Nodular lesions may be misdiagnosed as tumors.

Morphology and geographical distribution has been the traditional method of dirofilarial species determination. The diameter of the nematode and smooth cuticle in our cases make the most likely identification to be *D. immitis*, as *D. repens* has prominent longitudinal ridges.

Species identification of dirofilariae may be challenging. The worm is not always submitted as a whole specimen, or may have been damaged at surgery. Immature, dead and degenerate worms in biopsies may not be identifiable. Some morphological features are shared between zoonotic *Dirofilaria* species, confounding definitive identification in histological sections⁴. Geographical distribution is seen to be more in temperate and tropical climate. Adjunctive diagnostic laboratory methods include serological tests, such as enzyme-linked immunosorbent assays (ELISAs), and molecular tests. DNA amplification and sequencing methods have the highest specificity, with the advantage of not requiring a complete or mature worm for species identification³. Role of serological and molecular testing can be argued bearing in mind the added cost, as the basis of treatment remains and unchanged.

Anti-helminthic therapy is not recommended for human dirofilariasis, as surgical excision is adequate.

Conclusion

Human dirofilariasis is uncommon, and therefore lack of awareness of this entity amongst clinicians frequently results in misdiagnosis and underestimation of the actual disease burden.

Increased awareness of disease burden in the natural reservoir in the country and of the clinical entity of human dirofilariasis can prevent inappropriate chemotherapeutic and surgical interventions for patients.



Figure 1. MRI showing defined fluid intensity in the antero-medial aspect of the proximal leg



Figure 2. Coiled live filarial worm of *Dirofilaria immitis*



Figure 3. Filarial worm measuring 11 cms in length

REFERENCE

1. Kramer LH, Kartashev VV, Grandi G, Morchón R, Nagornii SA, Karanis P, et al. Human subcutaneous dirofilariasis, Russia. *Emerg Infect Dis.* 2007;13:150-2.
2. Khurana S, Singh G, Bhatti HS, Malla N. Human subcutaneous dirofilariasis in India: A report of three cases with brief review of literature. *Indian J Med Microbiol.* 2010;28:394-6.
3. Rishniw M, Barr SC, Simpson KW, et al. Discrimination between six species of canine microfilariae by a single polymerase chain reaction. *Vet Parasitol* 2006;135:303-14.
4. Gutierrez Y. Diagnostic pathology of parasitic infections with clinical correlations. 2nd ed. New York: Oxford University Press; 2000.
5. Orihel TC, Ash LR. Parasites in human tissues. Chicago: American Society of Clinical Pathologists; 1995.
6. Srinivasamurthy V, Sudha RM, Thejaswini MU. Yoganand Human subcutaneous Dirofilariasis. *Ann Trop Med Public Health.* 2012;5:349-51.