ejpmr, 2020,7(7), 773-775

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Case Study

ISSN 2394-3211

EJPMR

DIROFILARIA-A RARE PARASITIC INFESTATION

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Article Received on 03/05/2020 **Article Revised on 24/05/2020** **Article Accepted on 14/06/2020**

ABSTRACT

Dirofilaria is a genus of nematodes or roundworms, in the family Onchocercidae.[1] It includes various species that are natural parasites of dogs, cats, foxes, and wild mammals. Dirofilariasis is a zoonotic infection which can be found world-wide. It is caused by *D. repens*, *D. immitis*, *D. tenuis* and *D. ursi*. *D. repens* is commonly encountered in the subcutaneous tissue of dogs, foxes, and cats, while *D. immitis* in the right ventricle and pulmonary artery of the dogs and cats. Human dirofilariasis due to *D. repens* has not been widely recognized in India, but there is probably a focus of infection in Kerala. The disease is relatively common in Sri Lanka which is geographically close to southern India.[2] Here we present a case of dirofilaria in 40yr old female.

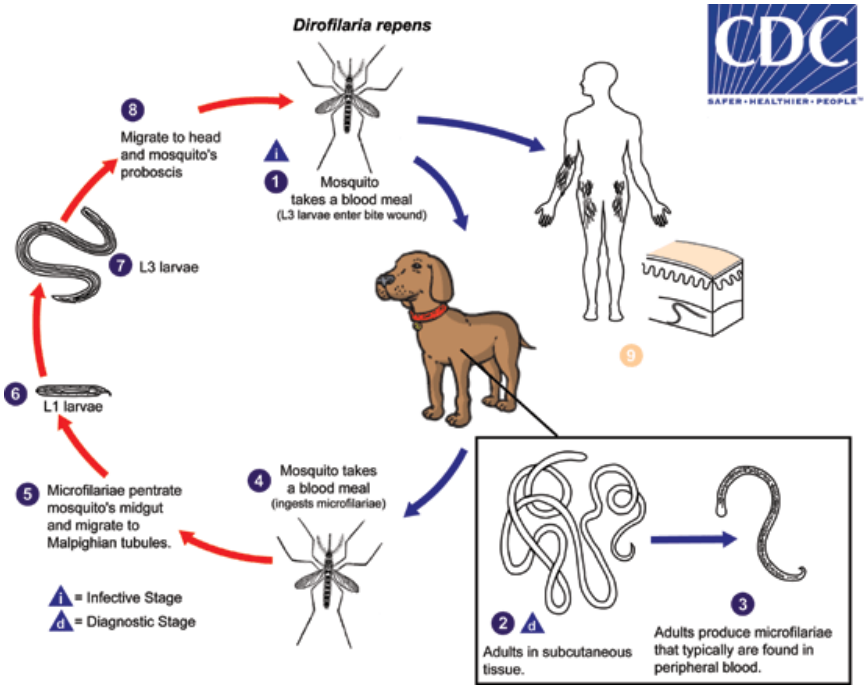
KEYWORDS: Dirofilaria repens, zoonotic infection, swelling.

INTRODUCTION

Dirofilariasis is understood as a group of parasitosis caused by species of the genus Dirofilaria transmitted by vectors.[1] Filarial nematodes of genus Dirofilaria, naturally infects several domestic and wild animals, though canines are the principal reservoir hosts. There are about 40 recognized species of Dirofilaria and at least six of them i.e., Dirofilaria immitis, Dirofilaria repens, Dirofilaria striata, Dirofilaria tenuis, Dirofilaria ursi and Dirofilaria spectans are known to cause accidental infections in humans. Mosquitoes belonging to the genra Aedes, Armigeres, Culex, Anopheles and Mansonia species are generally involved in its transmission. Some species of fleas, lice, and ticks are also presumed to act as vectors. Among all Dirofilaria species, the most relevant are D.immitis and D.(Nochtiella) repens due to their severe pathological effects and their high prevalence and incidence. D. immitis produces both canine and feline cardiopulmonary dirofilariasis, whereas D.repens causes both canine and feline subcutaneous dirofilariasis. In addition, D. immitis and D. repens are responsible for human pulmonary and subcutaneous/ocular dirofilariasis, respectively, throughout the world.[1] Therefore, these infections represent a zoonotic mosaic, which in practice includes two main filarial species that have adapted to canine, feline, and human hosts to various degrees.

LIFE CYCLE

The life cycle of *Dirofilaria* species comprises a definitive vertebrate host and a vector. Both *D. immitis* and *D. repens* demonstrate poor vertebrate host specificity given that they can infect numerous mammalian species. Among mammalian hosts, they are best adapted to domesticated and wild dogs, which function as reservoirs.[1] During a blood meal, an infected mosquito *(*Aedes, Anopheles, Culex, Mansonia*)* introduces third-stage(L3) filarial larvae of Dirofilaria repens onto the skin of the canine definitive host/ humans, where they penetrate into the bite wound . In the definitive host, the L3 larvae undergo two more molts into L4 and adults, the latter of which resides in subcutaneous tissues. In subcutaneous tissue, the female worms are capable of producing microfilariae over their lifespan. The microfilariae are found in peripheral blood. A mosquito ingests the microfilariae during a blood meal. After ingestion, the microfilariae migrate from the mosquito's midgut through the hemocoel to the Malpighian tubules in the abdomen. There the microfilariae develop into first-stage larvae and subsequently into third-stage infective larvae. The third-stage infective larvae migrate to the mosquito's proboscis and can infect another definitive host when it takes a blood meal. In humans, *D.* repens usually manifests as either a wandering worm in the subcutaneous tissue or a granulomatous nodule, although there are reports of pulmonary dirofilariasis with this species.[1]



CASE REPORT

A 40yr old female presented with a subcutaneous swelling in lower abdomen since 1 months. The patient was asymptomatic. On examination the swelling was soft to firm in consistency, nontender measuring 3x2x1cm.The hemogram was normal. The lesion was excised. Grossly the tissue was grey white and granular. Microscopy revealed a smooth thick multilayered cuticle. The outer most layers had prominent wavy longitudinal ridges, each separated from the next by a distance greater than the width of the ridges and also transverse striations. The muscle layer below the cuticle was well developed and the body cavity showed uteri and intestinal tube. The surrounding soft tissue showed infiltration by eosinophils, lymphocytes, and occasional foreign body giant cells. Based on these features, the worm was morphologically identified as an adult female *D. repens*.

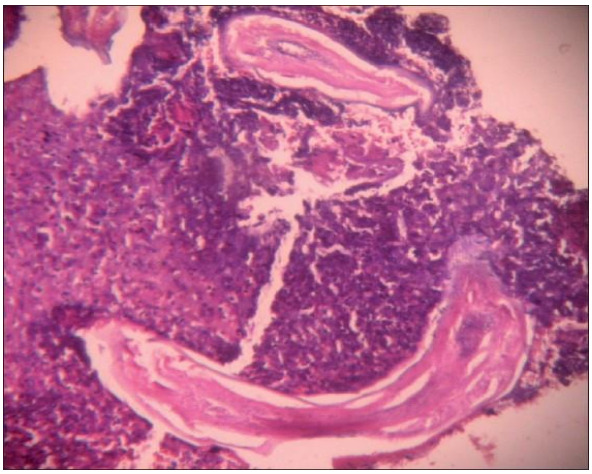


Fig. 1: HPE section of subcutaneous nodule showing longitudinal section of dirofilaria (H&E X100).

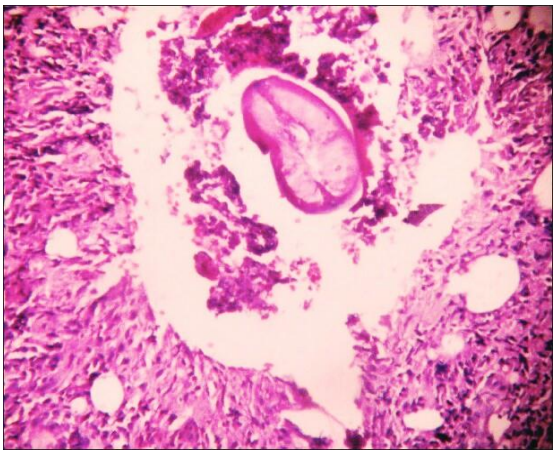


Fig. 2: HPE section showing D.repens with surrounding inflammatory reaction.(H&E X100).

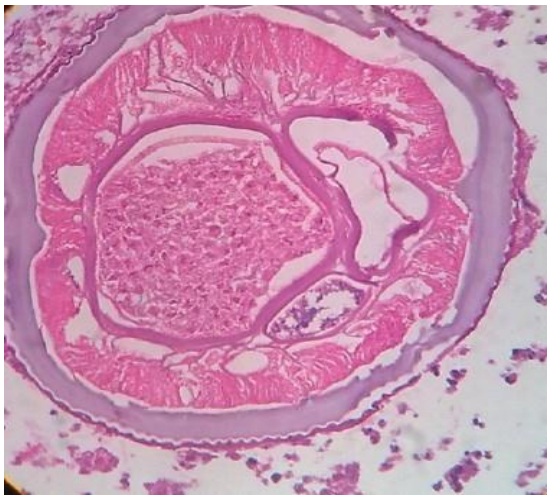


Fig. 3: Cross section of D. repens adult worm consisting thick multilayered cuticle, transverse striations, longitudinal wavy ridges and gravid uterus.(H&E x400).

DISCUSSION

The human dirofilariasis caused by D. repens, have been reported widely throughout Asia, Europe, and Africa with less reported cases in India.[3] However, D. repens is the most common causative agent of human dirofilariasis in India, only few cases caused by D. immitis have been reported. Most parasitologists believe that *D. tenuis* is restricted to the U.S.A. However, *D. tenuis* infection is also reported from India.[4] Exact identification of the species is possible after studying the fully matured worm. D. repens has a cuticle of 20µm thickness, transverse striations, and large numbers of external longitudinal ridges which is absent in D.immitis. In order to confirm the diagnosis of D. repens infection, DNA extraction followed by panfilarial polymerase chain reaction (PCR) may be performed. However in developing countries like India, owing to the low prevalence rate, standard antibody detecting tests and PCR methods are not available for the diagnosis of *D. repens*. Generally, Human dirofilariasis is detected many years after the initial infection, when the worm dies and is enveloped in a foreign body granuloma. Patients usually present with single migratory nodule which may or may not be tender. Surgical removal of the worm or the lesion is the treatment of choice. Most cases are diagnosed retrospectively, when the histopathological sections of biopsy or excision material are viewed. There is no need for chemotherapy as microfilaraemia is extremely rare. The few reported cases of meningoencephalitis secondary to *D. repens* microfilaraemia, were treated with the anti-helminthic drug albendazole plus methylprednisolone and showed good response.[2] Dirofilariasis should be considered as a differential diagnosis for single migratory subcutaneous swellings.[4]

CONCLUSION

Human cases of dirofilariasis are mostly underreported because many of them remain undiagnosed or unpublished.[4] The differential epidemiology of D. repens and D. immitis is still poorly understood due to the lack of a diagnostic method which would make possible the routine identification of these parasites as developing larvae either in the vector or in unsuitable hosts, including man.[5] Hence, there is need for increased awareness about this infection and diagnostic serological tests, which would improve the prevalence rate and patient care.[2] Systematic epidemiological surveys, developing suitable molecular diagnostic tools for species identification and more intensive studies on vectors, natural hosts, and environmental factors will help in assessment of the exact prevalence of this emerging zoonotic infection and in devising appropriate control measures.

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