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Case Report

Dirofilariasis presenting as subcutaneous nodule: a case report and review of literature

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ABSTRACT

Dirofilariasis is an emerging rare zoonotic disease in which man is a dead-end host and it is transmitted by mosquitoes. The cases of dirofilariasis are increasing over the past few years. Several species of the genera *Culex spp.*, *Aedes spp.*, and *Anopheles spp.* are involved in the transmission of this parasite. These species represent a constant risk of infection because they feed on both animal and human hosts. For this reason, dirofilariasis is considered an emerging public health problem because of its zoonotic potential. Most of the cases are ocular and subcutaneous presentations are rare. Here, we present a rare case of dirofilariasis presenting as a subcutaneous swelling near the knee joint. Dirofilariasis should be kept in mind as one of the differential diagnosis of subcutaneous nodule. In endemic areas, it can present in atypical forms like rash similar to this case; therefore, clinicians should be aware about this disease.

Keywords: Dirofilariasis, Subcutaneous nodule, Zoonotic, *Dirofilaria repens*, Heartworm

INTRODUCTION

Dirofilariasis is a zoonotic infection that accidentally affects humans. This emerging helminthic disease is caused by filarial nematodes of the genus Dirofilaria, which are transmitted by female mosquitoes of the Culicidae family, including *Aedes*, *Culex* and *Anopheles*.[1]

The species of filarial nematodes which are known to cause human dirofilariasis are *Dirofilaria (D.) repens* and *D. immitis*. The latter is particularly endemic in tropical regions and responsible for pulmonary dirofilariasis, whereas *D. repens* causes subcutaneous nodules in Africa, Europe and Asia.[2]

Appearance of symptoms takes 3 months to 1-year time. Here, we present a rare case of dirofilariasis presenting as a subcutaneous swelling near knee joint.

CASE REPORT

A 50-year-old businessman presented to the dermatology outpatient department with complaints of itchy rash intermittently since 1 year. During the course of treatment with antihistaminics, he found a painless nodule behind his right knee. It was well defined, non-tender, and subcutaneous in location. Soft tissue ultrasound showed a 1.2×0.6 cm lesion in subcutaneous fat inferomedial to knee joint with echogenic coiled structure within suggestive of parasitic granuloma. On examination, the swelling was on the right side behind the knee and measured 2.5×1.0 cm. Blood investigations including complete blood count were normal. Complete excision of the subcutaneous cystic swelling was done. On gross examination, the cyst size was 0.7×0.3 cm. On microscopic examination, the mid dermis and subcutaneous fat showed adult parasitic worm in cross section comprised of multilayered ragged cuticle, tall prominent muscle layer, and tubular reproductive and intestinal structures. These were surrounded by granulation

tissue and moderate to severe mixed inflammatory cells infiltrate of neutrophils, eosinophils, lymphocytes, plasma cells, and histiocytes. Thus, histomorphological picture was consistent with dirofilariasis.

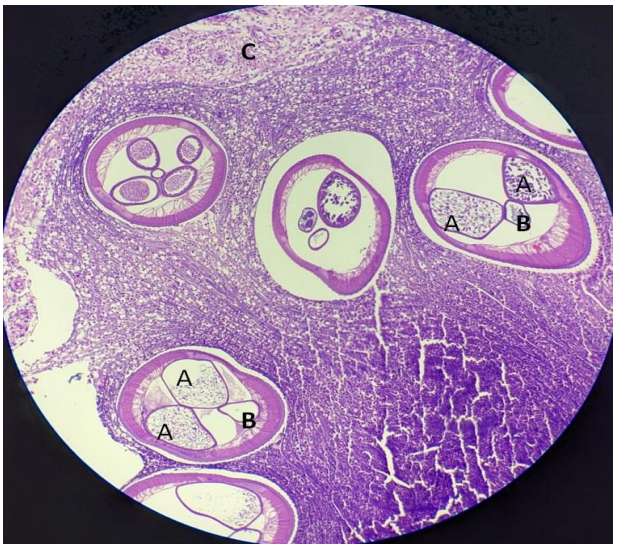

Figure 1: (A) Histological cross section of subcutaneous nodule showing dirofilarial worm, paired uterus; (B) intestine; and (C) inflammatory tissue response of human.

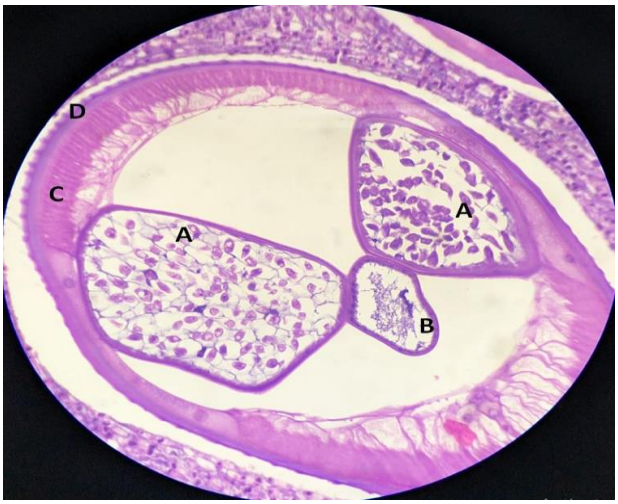

Figure 2: (A) Histological cross section of subcutaneous nodule showing dirofilarial worm, paired uterus; (B) intestine (B), coelomyariam muscle; (C); and (D) thick ragged cuticle.

DISCUSSION

The definitive host of dirofilariasis is dog, but it can also infect cats, wolves, coyotes, jackals, foxes, ferrets, bears, seals, sea lions.[3] There are around 40 species of dirofilaria.[4] These include *D. immitis* and *D. repens* (affecting dogs and cats), *D. tenuis* (raccoons) and *D. ursi* (bears).[5] The most commonly seen species in human patients are *D. repens*, *D. tenuis*, and *D. immitis* (the dog heartworm). Rare human infections with other species such as *D. striata* and *D. ursi*-like species (*D. ursi* or *D. subdermata*) have been reported.[1,6] Humans are infected through bites of infected mosquitoes of genus *Culex*, *Aedes* or *Anopheles*. Other vectors like fleas, lice and ticks may also transmit the infection.[1] Infections with female worms are three times more common than infections with male worms.[7]

Human cases of dirofilariasis have been reported from Southern and Eastern Europe, Sub-Saharan Africa, Asia particularly Sri Lanka, Malaysia and India.[8,9] Italy has the highest prevalence of human dirofilariasis (66%) followed by France (22%).[4] Southern part of India is known to have majority of cases.[10] Cases have also been reported from Assam, Kerala, Tamil Nadu and Karnataka.[11-13] There is a wide variation in age groups affected, ranging from 14-70 years. Available literature has shown that infection with *D. repens* is found to be a common zoonosis in Srilanka where children younger than nine years are most likely to be affected.[14]

The adult female worm releases microfilaria into the circulation in the animal host, which are ingested by the vectors (mosquitoes, ticks and fleas) during their meal of blood. After ingestion, the microfilariae migrate from the mosquito's midgut through the hemocoel to the Malpighian tubules in the abdomen.[15] There, the microfilariae develop into first-stage larvae to third stage larvae and infect the definitive hosts.[1] Humans are accidental dead-end hosts of the nematode.[16] The organisms mature into adults in humans and rarely cause microfilaremia.[17] The disease is self-limited as the parasite is unable to complete its life-cycle in the human host.[18] However; detection of microfilaria in the peripheral blood is extremely rare.[1] The transmission of the disease from the human host has not been reported. Adult worms can live for 5–10 years.[5]

D. immitis presents as subcutaneous nodule and also is known to cause lung infarcts. Lung infarcts are seen as coin lesions on chest radiography. Infection with *D. immitis* is rare in man. More than 50% of cases are asymptomatic and coin lesions are detected only on routine chest radiography. Others presented with cough, chest pain or hemoptysis due to pulmonary infarction. *D. repens* usually presents as either a wandering worm in the subcutaneous tissue or a granulomatous nodule.[15] D. tenuis may be found around the eye or on the conjunctiva Most subcutaneous nodules are benign, unless the nodules are situated at a lymph node or adjacent to major blood vessels.[1] Only few cases present with systemic symptoms.

Eosinophilia occurs in 15% of cases. The diagnosis is made only by biopsy. The serological tests are not adequate alone to rule out the potential complications.[7] As subcutaneous dirofilariasis due to *D. repens* can mimic various benign and malignant lesions; histopathological examination remains the gold standard for confirmation. Subcutaneous infection may be under-reported as the condition usually subsides without treatment.[19]

Only ocular worm can be diagnosed by slit lamp examination.[20] *D. immitis* can be differentiated from *D. repens* by the absence of longitudinal ridges and transverse striations. Pan filarial PCR can be used for the diagnosis.[7,21] For definitive diagnosis biopsy is a must. In the most of the cases pharmacological treatment is not indicated as dirofilaria cannot develop into adult worm in humans. Oral administration of diethylcarbamazine (DEC) (2 mg/kg thrice a daily) for 4 weeks may be added after surgical treatment. For additional benefit, this can be preceded by oral ivermectin given as single dose (150 mg per kg).[22]

CONCLUSION

Since only isolated case reports of human subcutaneous dirofilariasis are available, we present this case to create awareness about the condition and relevance to public health. Thus, dirofilariasis should be considered in any patient presenting with an acute or chronic, single, often asymptomatic, subcutaneous nodule. This is especially significant because of the world-wide distribution of the nematode and the frequent absence of a history of contact with animals. Though it often resolves spontaneously, surgical removal is recommended for persistent lesions, resulting in an excellent outcome.

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