

Case Report

Solitary subcutaneous nodule: From mosquito to man – A case report of human dirofilariasis

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ABSTRACT

Human dirofilariasis is a rare zoonotic infection caused by filarial worms of the genus *Dirofilaria*, commonly transmitted by mosquito vectors. While dogs and other canines serve as the natural hosts, humans are accidental dead-end hosts. The most frequent clinical manifestation is subcutaneous involvement, typically presenting as a solitary nodule. The anterior abdominal wall is an unusual site of presentation. We report a case of subcutaneous human dirofilariasis in a 21-year-old male presenting with an abdominal wall nodule.

Keywords: Abdominal wall nodule, *Dirofilaria repens*, Subcutaneous dirofilariasis, Zoonotic infection, Zoonotic

INTRODUCTION

Dirofilaria spp. are filarial nematodes that primarily infect dogs and other canines, with mosquitoes acting as intermediate vectors. Humans acquire infection as incidental hosts through mosquito bites. In humans, the parasite cannot complete its life cycle, yet it may localize in subcutaneous tissues, lungs, or ocular structures. Clinically, subcutaneous dirofilariasis usually manifests as a solitary, firm, painless swelling that may mimic benign tumors, cysts, or granulomatous lesions. The abdominal wall is an uncommon site of involvement, and such cases can easily be mistaken for other soft-tissue conditions. Imaging findings are often nonspecific, further complicating diagnosis. Histopathology, therefore, remains the gold standard for confirmation, with demonstration of the parasite being diagnostic.

CASE REPORT

A 21-year-old male presented with complaints of pain and swelling in the lower anterior abdominal wall at the level umbilicus for a month [Figure 1a]. There was no history of fever/abdominal surgery/trauma. There were no other swellings elsewhere in the body. The medical and other surgical history was unremarkable. No history of diabetes/other immunocompromised status, including human immunodeficiency virus infection. Ultrasound of the anterior abdominal wall reveals a small cystic lesion in the subcutaneous plane on the right side at the level of the umbilicus [Figure 1b]. Within the cyst, a tubular serpiginous structure with parallel echogenic walls and an anechoic center is identified [Figure 1c and d]. No definite motility of the structure is demonstrable on real-time scanning. The lesion is associated with minimal surrounding inflammatory fat thickening and mild vascularity. Possibilities of a parasitic infection or suture granuloma were considered; however, in the absence of any prior surgical

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history, the likelihood of a suture granuloma was excluded. To further evaluate, a complete blood count was obtained, which demonstrated eosinophilia (8.8%), supporting the suspicion of parasitic infestation. A surgical consultation was obtained, and the patient underwent excision of the lesion. The specimen [Figure 2a], measuring $2.5 \times 1.5 \times 1$ cm, was sent for histopathological examination. Gross examination revealed a piece of fibrofatty tissue with gray-white areas. Microscopy showed fibroadipose tissue with dense inflammatory infiltrate composed predominantly of eosinophils, surrounding cut sections of a parasite [Figure 2b and c]. Features were consistent with parasitic infestation (*Dirofilaria*) with a surrounding dense eosinophilic response. No evidence of malignancy was noted.

DISCUSSION

Human subcutaneous dirofilariasis is a rare zoonotic infection caused by filarial nematodes of the genus *Dirofilaria*, most commonly *Dirofilaria repens* in Asia and Europe.^[1] Dogs and other canines serve as the natural hosts, while humans are accidental dead-end hosts, acquiring the infection through mosquito bites. In humans, the parasite cannot complete its life cycle but may lodge in subcutaneous tissues, lungs, or ocular structures.^[2] *D. repens* is a filarial nematode primarily infecting dogs and cats, which act as the definitive hosts. The intermediate hosts are mosquitoes – mainly *Culex*, *Aedes*, and *Anopheles* species. When a mosquito feeds on an infected animal, it ingests microfilariae that mature into infective third-stage larvae (L3) within the vector over 10–14 days. On the next blood meal, these larvae are transmitted to another host through the bite wound. In humans – an accidental, dead-end host – the larvae fail to complete their development. They migrate within subcutaneous tissue, where they die and provoke a localized granulomatous nodule. Because humans

do not develop circulating microfilariae, transmission terminates at this stage.

Epidemiologically, human dirofilariasis is uncommon, with most cases reported from tropical and subtropical regions, including India. In India, the majority of reported human dirofilariasis cases originate from the southern states, particularly Kerala, Tamil Nadu, and Karnataka, where the warm and humid climate favors mosquito breeding and the prevalence of *D. repens* infection in domestic dogs serves as a major reservoir for human transmission. There is no clear

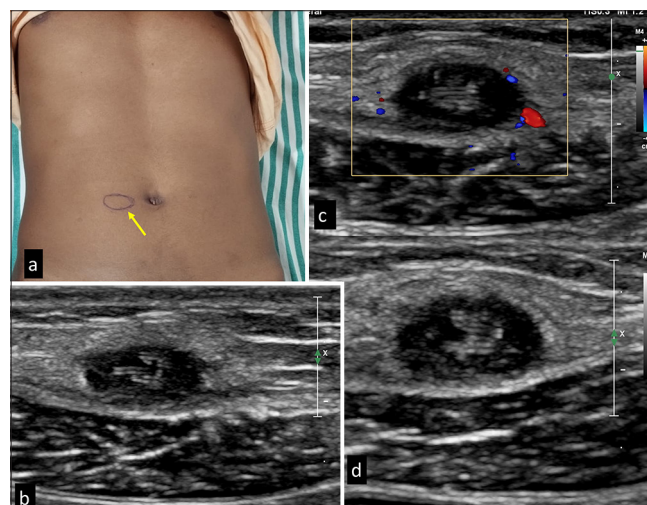


Figure 1: Clinical and sonographic images of the anterior abdominal wall lesion. (a) Clinical photograph showing a small, localized swelling (yellow arrow) in the periumbilical region marked for sonographic evaluation. (b-d) High-resolution grayscale ultrasound image reveals a well-defined, oval, hypoechoic lesion in the subcutaneous plane with a central parallel echogenic line and central hypoechoogenicity and minimal peripheral vascularity around the lesion.

Table 1: Differential diagnosis of abdominal wall nodules.

Differential diagnosis	Clinical features	Imaging findings	Distinguishing features
Abscess	Painful, erythematous swelling; may have fever	Hypoechoic cavity, internal echoes, peripheral vascularity	Purulent aspirate; systemic signs
Cysticercosis	Firm nodule, may be painful	Cyst with central echogenic scolex	“Dot-in-hole” sign; calcification in chronic stage
Filarial granuloma	Hard nodule; endemic regions	Ill-defined hypoechoic lesion; possible filarial dance sign	Microfilariae on smear; eosinophilia
Suture granuloma	History of surgery; firm nodule near scar	Hypoechoic lesion with echogenic suture material	Foreign-body reaction; prior surgery
Ventral hernia	Swelling increases on straining; reducible	Defect in the abdominal wall with bowel/omentum protrusion	Positive cough impulse; reducibility
Dermatofibroma	Firm, painless skin nodule	Dermal hypoechoic lesion without vascularity	Dimple sign; fibrohistiocytic on biopsy
Subcutaneous dirofilariasis	Solitary, mildly painful or migratory nodule	Tubular echogenic structure with anechoic center	Parasite with cuticular ridges on histopathology

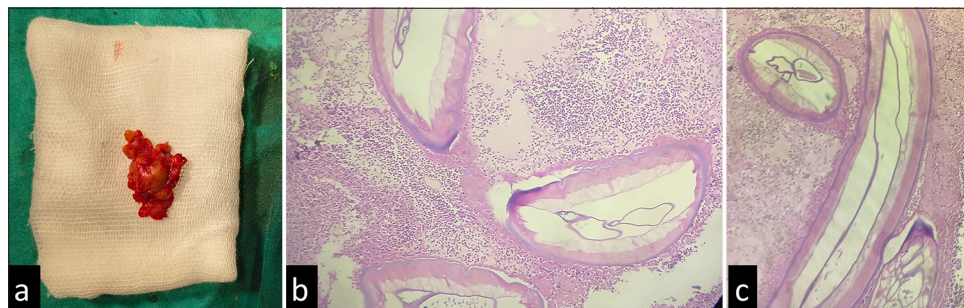


Figure 2: Gross and histopathological correlation of the excised lesion. (a) Gross specimen following surgical excision showing a small, encapsulated soft-tissue mass. (b) Histopathological section showing a parasitic structure with a thick, laminated cuticle, internal musculature, and surrounding inflammatory infiltrate composed of eosinophils on [hematoxylin and eosin stain (H&E, ×100)]. (c) Higher magnification view highlighting diagnostic structures (H&E, ×400) features consistent with dirofilariasis.

gender predilection, and cases have been reported across a wide age range, though adults in their second to fourth decades are commonly affected. Immunocompromised status is not a major risk factor, as the infection primarily depends on exposure to infected mosquito vectors.

Pathogenesis involves the migration of the parasite into subcutaneous tissues, provoking a localized inflammatory response.^[3] This results in the formation of a firm, often painless, solitary nodule. Unlike bacterial infections, dirofilariasis rarely causes systemic symptoms, lymphadenopathy, or widespread tissue infiltration. Clinically, these nodules can mimic benign tumors, cysts, or other granulomatous conditions, which can complicate diagnosis. Definitive diagnosis requires histopathological examination demonstrating the parasite within the lesion.^[4]

Radiological evaluation, particularly high-resolution ultrasonography, can provide useful clues in characterizing subcutaneous nodules. Table 1 summarizes the important differential diagnoses for subcutaneous abdominal wall nodules, which may mimic dirofilariasis clinically or sonographically. The characteristic finding is a tubular serpiginous structure with parallel echogenic walls and an anechoic center within the cyst, sometimes demonstrating the filarial dance sign, which reflects the motility of the worm. Although the “filarial dance sign” on ultrasound is considered a characteristic finding of active lymphatic filariasis, it was not demonstrated in our case. This can be explained by the fact that the parasite was encysted within the subcutaneous tissue and surrounded by a dense eosinophilic inflammatory granulomatous reaction, as confirmed on histopathology. In such circumstances, the worm is non-viable and lacks motility, thereby precluding the classical sonographic appearance. Moreover, the filarial dance is typically described in dilated lymphatic channels, whereas our patient had a localized subcutaneous lesion caused by *Dirofilaria*, which behaves differently from *Wuchereria bancrofti*-related lymphatic filariasis. Magnetic resonance imaging (MRI) and computed tomography are

generally nonspecific but may help delineate the lesion from adjacent structures. Awareness of these imaging features allows radiologists to suggest dirofilariasis as a differential diagnosis, preventing unnecessary extensive investigations or interventions.

Treatment of subcutaneous human dirofilariasis is primarily surgical excision, which is both diagnostic and curative.^[5] Post-removal management in subcutaneous dirofilariasis is straightforward. Surgical excision is curative in the vast majority of cases because humans are accidental, dead-end hosts and do not harbor circulating microfilariae. Therefore, the risk of recurrence is extremely low. Anti-filarial medications such as ivermectin or albendazole are generally not required after complete removal of the lesion. Patients typically recover well with simple wound care, and long-term follow-up beyond routine postoperative assessment is not necessary unless symptoms persist or a new lesion appears, which is uncommon. A long-term follow-up is generally not necessary after complete excision, as recurrence is rare.

Human dirofilariasis is increasingly reported from southern India. For example, a 2025 case of subconjunctival *Dirofilaria* from Madurai, Tamil Nadu, illustrates local transmission and underlines the need for clinician awareness in this region.^[6] Although human subcutaneous dirofilariasis remains rare, increasing reports from endemic areas highlight the need for clinicians and radiologists to consider it in the differential diagnosis of solitary subcutaneous nodules. Early recognition and surgical management lead to excellent outcomes with minimal morbidity.

Human dirofilariasis, though uncommon, carries important public health implications in regions where mosquito density and canine reservoirs are prevalent. Effective vector control measures – including reduction of stagnant water sources, community-level mosquito surveillance, and personal protection against mosquito bites – are essential to limit transmission. Regular deworming of domestic dogs, which

serve as the primary reservoir for *D. repens*, can further reduce the local parasite burden. Increasing awareness among clinicians and radiologists in endemic areas such as South India facilitates early recognition of this zoonotic infection, helps avoid unnecessary investigations, and supports timely surgical management.

CONCLUSION

A solitary subcutaneous lesion with an internal parallel tubular hyperechoic structure with a central hypoechoic area, with or without the filarial dance, in the absence of systemic symptoms, should raise the suspicion of human dirofilariasis. Correlation of imaging, laboratory findings, and histopathology is essential for accurate diagnosis and management. Recognition of its characteristic clinical and imaging features by radiologists is essential to differentiate it from neoplastic or other infective conditions. Early diagnosis not only prevents unnecessary investigations and interventions but also allows timely surgical excision, which is both diagnostic and curative.

TEACHING POINTS

1. Human dirofilariasis should be considered in solitary subcutaneous nodules, especially in endemic regions, even in the absence of systemic symptoms.
2. Recognition of the characteristic imaging features, such as a tubular serpiginous structure with parallel echogenic walls and an anechoic center with or without filarial dance, can help avoid unnecessary investigations and guide timely surgical excision.
3. Solitary subcutaneous lesions mimicking neoplastic or granulomatous masses in unusual locations should raise the possibility of human dirofilariasis.

MCQs

1. The most common route of human infection with *Dirofilaria* spp. is as follows:
 - a. Direct contact with dogs
 - b. Ingestion of contaminated water
 - c. Mosquito bite
 - d. Airborne transmission
- Answer: c
2. The typical imaging feature of subcutaneous dirofilariasis on ultrasound is as follows:
 - a. Hypoechoic cystic lesion with posterior acoustic shadow
 - b. Tubular hyperechoic structure with or without motility
 - c. Homogeneous hyperechoic mass with calcification
 - d. T2 hyperintense infiltrative lesion on MRI
- Answer: b
3. Preferred treatment for human subcutaneous dirofilariasis is as follows:
 - a. High-dose albendazole therapy
 - b. Surgical excision of the nodule
 - c. Corticosteroids
 - d. Ivermectin oral therapy alone
- Answer: b

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Declaration of patient consent: Patient's consent not required as there are no patients in this study.

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