

*Prikaz slučaja/
Case Report*

ULTRASOUND DIAGNOSTICS OF HUMAN
SUBCUTANEOUS DIROFILARIASIS - *Case
report and review of the literature*

ULTRAZVUČNA DIJAGNOSTIKA HUMANE
SUBKUTANE DIROFILARIJAZE - *Prikaz
slučaja i pregled literature*

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Key words

human subcutaneous dirofilariasis, ultra-
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Ključne reči

humana subkutana dirofilariaza, ultra-
zvuk, kolor Dopler.

Abstract

Introduction: Human dirofilariasis is a rare zoonotic disease caused by parasite *Dirofilaria species*. It usually presents as a nodular lesion in the subcutaneous tissues, lung or eyes. The natural hosts for the *Dirofilaria species* that most frequently cause disease in humans are mainly dogs and cats as well as other carnivores like wolves, bears, foxes and raccoons. Humans are infected with *Dirofilaria* larvae through mosquito bites. Subcutaneous dirofilariasis have been reported from endemic areas in Europe countries such as Italy, France, Spain and from India mostly from the state of Kerala. Autochthonous cases of human subcutaneous infection had been found in Poland, Slovakia, Czech Republic Montenegro and Serbia. **Purpose:** Display of ultrasonography possibilities in the diagnosis of subcutaneous changes caused by *Dirofilaria repens*. **Material and methods:** 43-year-old patient, from Belgrade, came for an examination because of a swelling in the region of the left Achilles tendon, accompanied by itching. It is alleged that the swelling appeared a year ago in the left upper thigh and descended to the region of the left Achilles tendon where it has remained in the last two months with an emergence of itching. **Results:** During examination of the left Achilles tendon region, a swelling of about 2 cm in diameter was observed with a livid colouring of the skin. Through ultrasound, in the subcutaneous adipose tissue above the Achilles tendon, an oval, clearly circumscribed, avascular change, of 12x10x5 mm diameter was observed. Inside of the lesion there are curvilinear echogenic structures with a diameter of 0.7 mm, which are moving. The change was removed in its entirety, while parasitological analysis has proven that it was *Dirofilaria repens*. **Conclusion:** Subcutaneous dirofilariasis can mimic various benign and malignant lesions. The difficulties arise in the differential diagnosis because subcutaneous nodules are suspected to be malignant neoplasm or other pathologies such as sebaceous cysts, tuberculosis, fungal infections, abscesses, and so on. High resolution ultrasound is very helpful in the differential diagnosis of these changes.

INTRODUCTION

Dirofilariasis is a zoonotic infection caused by filarial nematodes from the genus *Dirofilaria* ⁽¹⁾. Humans are accidental hosts in the cycle of *Dirofilaria*. Most cases of dirofilariasis are asymptomatic, while the symptomatic form mainly manifests as subcutaneous nodules in the variety parts of the body or lung parenchymal disease. In animals dirofilariasis is severe disease which can cause death of the animal ^(2, 3). Diagnosis is usually based on a physical exam, High resolution ultrasound, color and power Doppler techniques, Enzyme- linked immunosorbent assay (ELISA), and

parasitological and histopatological examination after excision as well as polymerase chain reaction (PCR) for the identification of *Dirofilaria species* ^(4, 5, 6).

The aim of this study is to present one case of a patient with subcutaneous dirofilariasis and examine the relevant literature.

Case report

A 43 year-old patient, from Belgrade, came for an examination because of a swelling in the region of the left Achilles tendon, accompanied by itching. It is alleged that the swelling appeared a year ago in the left upper thigh and

descended to the region of the left Achilles tendon where it has remained in the last two months with an emergence of itching. Laboratory analyses were conducted, including complete blood count, erythrocyte sedimentation rate, urinalysis, and liver and renal function tests, and all results were normal.

During examination of the left Achilles tendon region, a swelling of about 2 cm in diameter was observed with a livid colouring of the skin (Figure 1).

Through ultrasound, in the subcutaneous adipose tissue above the Achilles tendon, an oval, clearly circumscribed, avascular change, of 12x10x5 mm diameter was observed. Inside of the lesion there are curvilinear echogenic structures



Figure 1. Swelling and a livid colouring of the skin

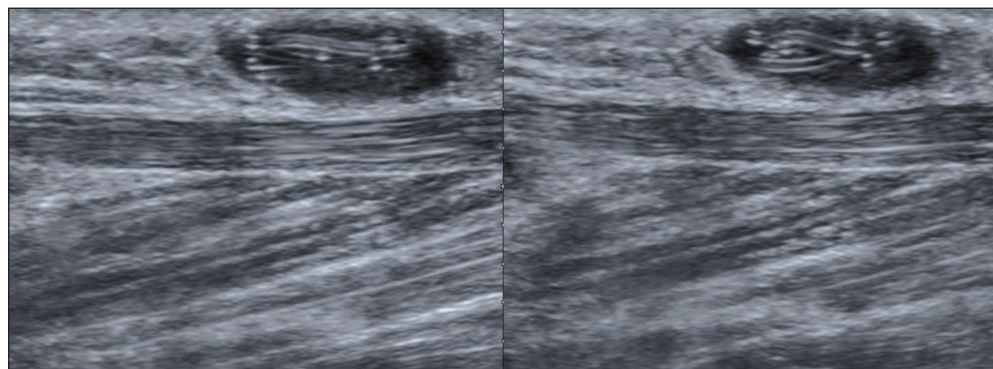


Figure 2. Ultrasound appearance of subcutaneous change



Figure 3. The change was removed in its entirety

with a diameter of 0.7 mm, which are moving (Figure 2). The change was removed in its entirety (Figure 3), while parasitological analysis has proven that it was *Dirofilaria repens* (Figure 4).

DISCUSSION

Only six of about 40 recognized species of *Dirofilaria* can cause accidental infections in humans i.e., *Dirofilaria immitis*, *Dirofilaria repens*, *Dirofilaria striata*, *Dirofilaria tenuis*, *Dirofilaria ursi* and *Dirofilaria spectans*. Humans are infected, mainly by *D. repens* and *D. immitis*. *D. repens* usually resides subcutaneous and ocular

form, while *D. immitis* frequently ends up in the lungs (4, 7). The natural hosts for this nematode are animals, such as dogs and other carnivores. *Dirofilariae* are transmitted from natural hosts to humans via mosquitoes from the genera *Aedes*, *Armigeres*, *Culex*, *Anopheles* and *Mansonia* species. Mosquitoes *Culex* and *Anopheles* are the vectors for *D. repens*. Some species of fleas, lice, and ticks can also be vectors, which depend of geographical region. The incubation can be very long even up to several years (4, 8).

The adult dirofilarial worms release microfilaria into the host's blood. Mosquitoes take up microfilarias and infect humans by biting them. *Dirofilariae* are mosquito-transmit-

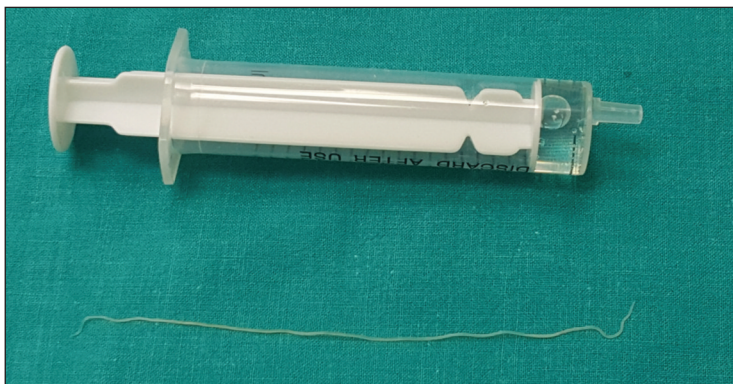


Figure 4. *Dirofilaria repens*- macroscopic appearance

ted between animals and from animals to humans. Adult worms do not reach maturity in humans and do not produce microfilaria (8, 9).

Accidental human infection results in the subcutaneous mass anywhere in the body. Human dirofilariasis is frequently mild, sporadic and asymptomatic disease. Complications in humans are very rare. The most common presentations of dirofilariasis are subcutaneous and submucosal form. Subcutaneous form of the disease is presented as a firm, painless, pruritic and well defined nodule under the skin. It can be visible with naked eyes or found by palpation, located in the hypodermis or deeper, measuring a few centimeters in length, with mild redness surrounding. Sometimes it can be accompanied by severe pain, burning and erythema of adjacent skin. A complete examination reveals a subcutaneous foreign body, which showed a filarial appearance and seemed to crawl under the skin (5, 7).

Subcutaneous dirofilariasis can mimic various benign and malignant lesions, so should be considered as a differential diagnosis in patients presenting with subcutaneous nodules (9).

Diagnosis could be effectively performed by high clinical suspicion in patients from endemic areas, physical exam and High resolution ultrasound with color and power Doppler techniques which can visualise live motile worms in real time. Peripheral blood eosinophilia is a non-specific criteria which depends on the host's immune response. Molecular analysis such as ELISA and PCR are useful additional methods in endemic areas with a strong clinical suspicion prior to surgery.

It is more often described in the literature that surgical excision and parasite isolation were a diagnostic and therapeutic method at the same time. In the presented case main diagnostic procedure was ultrasound, which is a very confident method for diagnosing subcutaneous filariasis. It also, with great certainty, can solve the differential diagnosis of the subcutaneous nodule, although the definitive confirmation of the diagnosis comes after the parasitological and pathohistological analysis (4, 5, 6).

Surgical excision is the treatment of choice. Complete excision of the nodule with extraction of the worm is successful in most cases. The parasites can not attain maturity in humans so they are unable to express larvae in the blood stream causing filaremia, so that, antibiotics are not necessary in the therapy (5).

CONCLUSION

Due to climatic changes and global warming *D. repens* has become an emerging infectious agent in Europe countries, as well as increasing worldwide health problem. Traveling and outdoor living in the endemic countries, global warming, changes in social conditions, increase of mosquito vectors have take consequence in spreading of human dirofilariasis. It requires higher awareness and better collaboration among clinicians, parasitologists and public health service in newly endemic countries.

Sažetak

Uvod: Humana dirofilarijaza je retka zoonoza uzrokovana parazitom *Dirofilaria species*. Uobičajeno se javlja u formi nodularne promene u potkožnom tkivu, plućima ili očima. Prirodni domaćin za *Dirofilaria species*, koje najčešće izazivaju bolest kod ljudi, najčešće su psi i mačke, ali i drugi mesožderi kao što su vukovi, medvedi, lisice i rakuni. Larva dirofilarije se prenosi na ljude najčešće ujedom komarca. Subcutana forma dirofilarijaze registrovana je u endemskim područjima Evrope: Italija, Francuska, Španija, i u Indiji, najčešće u državi Kerala. Autohtoni slučajevi humane subkutane infekcije prijavljeni su i u Poljskoj, Slovačkoj, Češkoj, Crnoj gori i Srbiji. **Cilj:** Prikazati mogućnosti ultrazvuka u dijagnostici subkutanih promena uzrokovanih parazitom *Dirofilaria repens*. **Materijal i metode:** pacijent starosti 43 godine, iz Beograda, dolazi na pregled zbog otoka u regiji leve Ahilove tetive, udruženog sa svrabom. Navodi da se otok pojavio pre godinu dana u gornjoj natkolenici odakle se spuštao do regije leve Ahilove tetive gde se nalazi poslednja dva meseca, kada se pojavio i svrab. **Rezultati:** tokom pregleda regije leve Ahilove tetive uočava se otok promera oko 2 cm sa lividnom prebojenošću kože. Ultrazvučnim pregledom, u potkožnom masnom tkivu iznad Ahilove tetive, uočava se ovalna, jasno ograničena, avaskularna promena promera oko 12x10x5 mm. Unutar opisane promene uočava se lučna, linearna, hiperehogena struktura promera oko 0.7 mm, koja se tokom pregleda pokreće. Promena je hirurškim putem odstranjena u celosti, a parazitološkom analizom je dokazano da se radi o parazitu *Dirofilaria repens*. **Zaključak:** Subkutana dirofilarijaza može imitirati veći broj benignih i malignih promena. Problem nastaje u diferencijalnoj dijagnozi pošto subkutani čvorovi mogu biti suspekti na maligne tumore, ali i na druga patološka stanja kao što su sebacealne ciste, tuberkuloza, gljivične infekcije, abscesi, itd. Ultrazvučni pregled visokofrekventnim sondama je od velike pomoći u diferencijalnoj dijagnozi ovakvih promena.

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