CASE 1.

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CLINICAL HISTORY

• 52-year-old woman from Šibenik, Southern Croatia, presented in March 2004

• Subcutaneous, slightly movable and painless nodule in the left breast, noticed one month before
• Ultrasonographic examination:
  • oval, well circumscribed hypoechogetic structure measuring 16:4 mm, located in subcutaneous tissue.

• Initial diagnosis: inflammed atheroma

• Surgical excision of the nodule was performed

• Gross examination:
  • nodular subcutaneous mass 1,6 cm in greatest diameter with a soft, yellow-white cut surface
Female filarial nematode of the genus *Dirofilaria*, enclosed in an inflammatory nodule. Number and organization of the ridges, separated by a space between them, are highly characteristic of *Dirofilaria repens*. 
The worm was female 436 μm in length, with a two oviducts in a coelomic cavity, a muscle layer and outer multilayered cuticle with external longitudinal ridges.
How to recognise D. repens?

Microscopic analysis should put emphasis on:

- thickness and the organization of the cuticle,
- number and organization of longitudinal ridges
- number of the ridges between 95 and 105 is specific features of D. repens,
- spaces between ridges are wider than the thickness of the ridge.

Filariasis is infestation caused by infection with the threadlike nematode of the superfamily Filarioidea.

Dirofilaria repens usually causes a subcutaneous infections in dogs and humans. It is the principal agent of human dirofilariosis.

Dirofilaria immitis causes a severe disease (heartworm disease in dogs) and occasionally infect humans.

• Filarial infestation due to *D. repens* is a zoonosis habitually parasitizing dogs, cats, and wild carnivores.

Microfilaremic dogs are the most important reservoir of infection

• In hosts the adult worms live in subcutaneous nodules, and release microfilariae in the blood

• Microfilariae are ingested by several species of mosquito vectors during their blood-feeding

• Within mosquitoes they are transformed in infective L3 during a period 2-3 weeks

• When mosquito takes another blood meal nematodes penetrates the body of new host

Capelli et al. Recent advances in Dirofilaria repens in dogs and humans in Europe. Parasites and vectors 2018: 11-663-84.
• The bite of the infected mosquito is the only mode of transmission.
HUMAN CASES

- Nodules usually occur singly in the subcutaneous tissue of the upper half of the body, or subconjunctivally.
- In rare instances nodules occur in the lung, the omentum, the epididymis, the spermatic cord and the breast
BREAST LOCATION FOR THE DIROFILARIA NODULE

Unusual - this part of the body is usually covered with clothes, preventing the mosquito bite.

Parasite in the breast was usually located subcutaneously, mimicking a benign lesion, particularly an inflamed epidermoid cyst, as it was in the case presented here, or an abscess.

A deeper breast location of the parasitic nodule combined with a mammographic finding of an ill-defined nodule raises the suspicion of malignancy.
• Diagnosis of parasites in tissue sections rests on the recognition of their microscopic anatomy.

• Without this knowledge, the pathologist may regard the parasite in a biopsy as an artefact or wrongly identify the species

• Upon host reaction, four categories of morphological features can be observed:
  • abscess formation surrounded with reactive granulation tissue;
  • granuloma formation;
  • regressed appearance of the nematode with scarring and occasional acute and chronic inflammatory cells;
  • surrounding of the nematode by a dense chronic inflammatory infiltrate forming lymphoid nodules with germinative centres.

WHAT HAPPENS WITH THE PARASITE IN HUMAN TISSUES?

Parasite usually die before maturation probably due to immunological rejection, producing an inflammatory nodule at the site of mosquito’s bite.

The life cycle of *D. repens* in human cases in almost all cases finishes inside the nodule.

In rare cases the worm may develop to a mature adult and even fertilized worms releasing microfilariae have been described especially in immunosuppressed patients.

How to treat *D. repens* in human?

Theoretically no special treatment is necessary. Surgical removing of the nematode is needed for the etiological diagnosis and to exclude other diseases.

After surgical excision no further medical treatment is required unless the patient is immunosuppressed.

There is not a single report of fatality or of a permanent body damage.

Capelli et al. Recent advances in *Dirofilaria repens* in dogs and humans in Europe. Parasites and vectors 2018: 11-663-84.
New cases of human dirofilariasis due to *D. repens* have been increasingly reported in Mediterranean parts of Europe, Asia and Africa. The prevalence of subcutaneous dirofilariasis is probably even higher because of its innocuous clinical presentation that does not require excision and histopathologic examination.

Capelli et al. Recent advances in *Dirofilaria repens* in dogs and humans in Europe. Parasites and vectors 2018: 11-663-84.

First two cases of human dirofilariasis recorded in Croatia.


A 52-year-old woman with a subcutaneous, slightly movable and painless nodule in the left breast.


Subcutaneous Dirofilaria infection in Female Public Region - Case Report.

Diarovski I, Lenikić T, Birk B, Krkalić Z, Kuna I, Bužinac D.


Dirofilaria repens infection in a ten-year-old boy from the Istria Peninsula: case report.

Gliavnić N, Pešanić S, Bosaččak A, Gacarini L, Abram M, Jokić N.


Subcutaneous dirofilariosis caused by Dirofilaria repens diagnosed by histopathologic and polymerase chain reaction analysis.

Manarski Z, Stadnic T, Kolar I, Skapanić D, Krudić R, Tomašić D.


Subcutaneous dirofilariosis caused by Dirofilaria repens diagnosed by histopathologic and polymerase chain reaction analysis.

Manarski Z, Stadnic T, Kolar I, Skapanić D, Krudić R, Tomašić D.


A case of lacrimal gland dirofilariasis.

Jurić J, Kuzman T, Stožmayer N, Tojačić M.


Dirofilaria repens as a cause of subconjunctival infection in a 77-years old female patient from Croatia--a case report.

Svoben M, Mestrovic T, Nemec K, Bartulović KP, Skara R, Galinović OM.


[Ocular dirofilariasis: a case report].

Janičević Z, Arar ZV, Paradžik MT, Sapina L, Bitunjac M, Lojen G, Marinčulić A.
Reason for the increasing number of reported cases in Mediterranean region?

• Change in climatic conditions (temperature, relative humidity, rainfall) in the Mediterranean region in recent times

• Favors development of the carrier mosquitoes

HOW TO PREVENT DIROFILARIOSIS IN HUMANS?

• Intensification of the battle against mosquitoes
• Protecting people from the bites of mosquitoes - use of repellents
• Reducing the prevalence of D repens in dogs, the principal reservoir of parasites
  • information campaigns aimed at dog owners with prophylactic treatment with macrocyclic lactones and using a contact repellent insecticides for prevention of infection

Capelli et al. Recent advances in Dirofilaria repens in dogs and humans in Europe. Parasites and vectors 2018: 11-663-84.
It is important that histopathologists familiarize themselves with the histological aspects of *D. repens* infestation, considering it in differential diagnosis during examination of solitary nodules of uncertain nature in the subcutaneous tissue.
THANK YOU FOR ATTENTION