

Human Pulmonary Dirofilariasis

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Questions

1. What is *Dirofilariasis*?
2. What is Human Pulmonary *Dirofilariasis*?
3. How is it transmitted?
4. Where is it found?
5. What are the signs and symptoms of *dirofilariasis*?
6. How is it diagnosed?
7. Can it be transmitted person to person?
8. Can it be transmitted from person to mosquito to person?
9. How can I prevent *dirofilariasis*?
10. What is the treatment?

Answers:

Dirofilariasis- Infection with nematode
Dirofilaria sp.

Rare zoonosis in humans from *bite of infected mosquito: Anopholes, Aedes , Culex*

Parasite: *D. imitidis*. *D. repens*. *D. tenuiis*

Human dirofilariasis usually divided into:

- Pulmonary Dirofilariasis (*D.imitidis*)
- Subcutaneous Dirofilariasis (*D. repens*, *D. tenuiis* and others)

Source: CDC

Geographical Distribution

D. imitidis- cosmopolitan in dogs *in* North and South America, Australia, Japan, Europe- prevalent in warmer areas- transmission throughout the year

D. repens- Old World; dogs, cats: Europe, Asia, Africa. Mediterranean region highly endemic; spreading to Finland and Russia (climate change)

D. Tenuiis: raccoons in Florida

Sym/ Signs of HPD. Prevention

Asymptomatic- Most cases of D. imitiss.

Symptomatic:

- Cough (+/- with blood)
- Chest pain
- Fever
- Pleural effusion
- Malaise

Outside of lungs: Brain, eye, testicle- D. imitiss

Conjunctiva, skin nodule- D. repens, tenuiis

Source: CDC

Transmission/

No Transmission to person to person

No transmission from person to mosquito to person

- production of microfilaria does not occur in humans

Prevention: reduce Mosquito Breeding sites

Protection from bites: insecticide treated bed net, full clothes, repellent, screens

Keep pet heart-worm free

Treatment

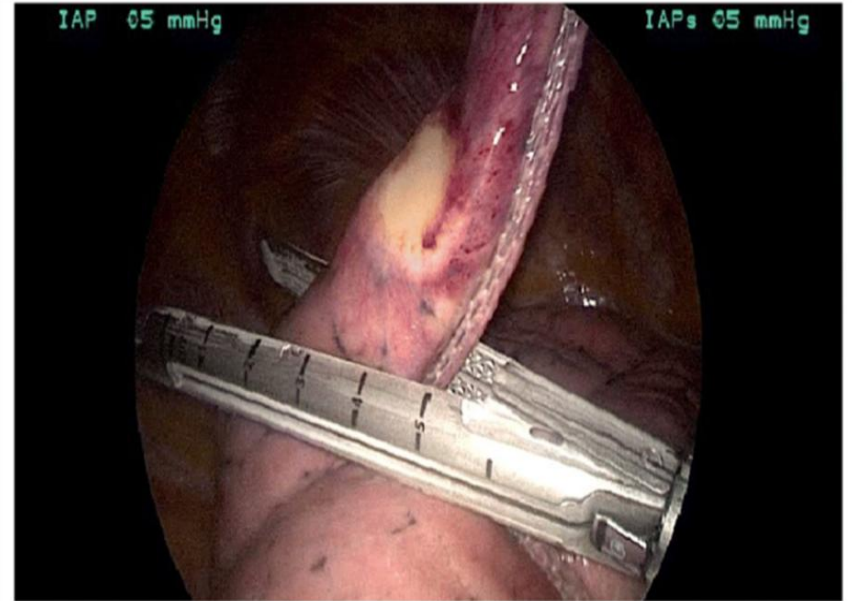
Curative

Surgical removal of lung granulomas

Surgical removal of nodules under the skin

In many cases, no treatment with medicines is necessary

Source: CDC



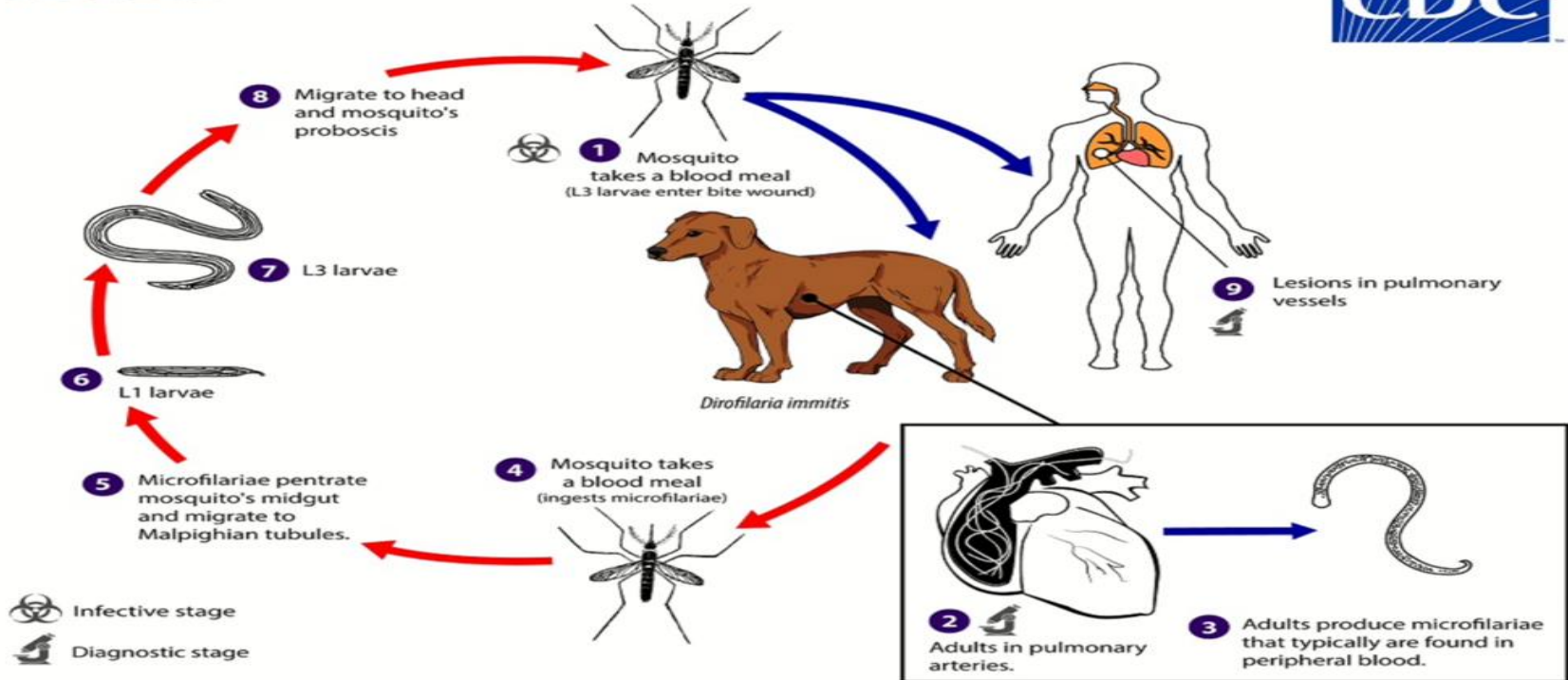
Thoracoscopic pulmonary wedge resection

Journal of Cardiothoracic Surgery, 13, 2018

Human Pulmonary Dirofilariasis

4DPDx

Pulmonary Dirofilariasis



Approach considerations

CBC- eosinophilia in up to 20% of HPD cases

Overall blood eosinophilia and elevated serum IgE rarely observed - not useful

Sputum cytology- presence of eosinophils
May support Dx of HPD in presence of coin lesion on CXR- lacks specificity

Serologic studies:using ELISA may yield +ve in 75% HPD patients

Polymerase chain rxn assay-successful to ID *D. imitidis* and *D. repens* infections

PCR- duplex real time discriminates and quantifies *D. imitidis* vs *D. repens* in blood samples

Imaging studies- CXR, CT, MRI, U/S

Pulsed-field gel electrophoresis

Biopsy- including surgical biopsy and fine needle aspiration (transthoracic needle aspiration +/- CT guidance- prevent invasive Sx)

Histology-

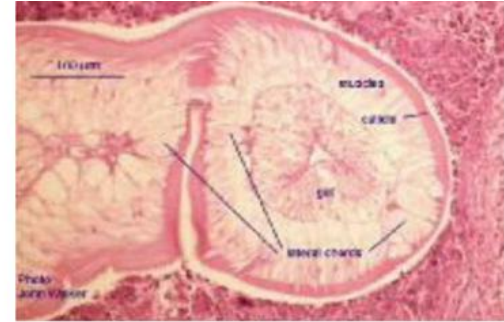
(source- emedicine- October 2015, A. Klochko)

Histologic Findings

Histologic Findings

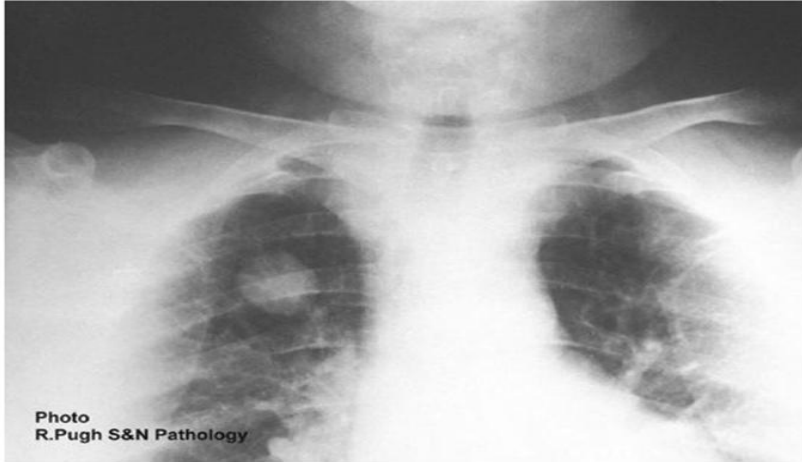
Differentiating *D repens* from *D immitis* in microscopic sections is based on the diameter of the parasites, the thickness of the cuticle, the number and distribution of the fibers in the muscular layer, and other morphologic details, including the presence or absence of external cuticular ridges (found in *D repens* but not in *D immitis*). [76]

Diagnosing dirofilariasis based purely on histopathology has its pitfalls, however, especially when the morphology of the nematode is altered owing to inflammatory response or surgical artifact. (See the images below.) [77]



Transverse section through an immature adult *Dirofilaria immitis* removed from the right chest wall of an 18-month-old child in Sydney, Australia. The large lateral chords and multilayered cuticle are typical of *Dirofilaria*. The smooth cuticle is a feature of *D immitis*.

Chest X-Ray-



Plain chest radiographic appearance of pulmonary coin lesion secondary to *Dirofilaria immitis* infection in a man.

Incidental finding on CXR is usual presentation of HPD

Usually well-circumscribed, peripheral coin lesion or nodule

Up to 90% cases -solitary nodule

Less than 30 mm, Subpleural (68%)

Right side (76%), right lower lobe (46%)

Multiple lesions- involve same lobe or multiple lobes

(Source-emedicine 2015- A. Klochko)

CXR

Pulmonary lesions can be transitory

Coin lesion-end-stage result of parasites's death in vascular bed of lungs- stimulation of a pneumonitis followed by granuloma formation

May go unrecognized by radiologist because developing nodule is obscured by lung inflammation

Shortest reported time from normal CXR to coin lesion due to D. Immitis is 5 months

Pleural effusions in 13% (Miyoshi)

The diagnosis in children may be under appreciated - coin lesions mistakenly labeled as Ghon focus secondary to pulmonary TB, and may not be followed or treated

Source: emedicine, Oct. 2015, A. Klochko

Summary

Although benign, this zoonosis, HPD, of which *D. imitidis* is the major etiological agent:

- Represents a medical problem since symptoms can be confused with neoplasia and may subject patients to unnecessary surgery.
- Highly favorable conditions exist for its transmission to man, not many reports in medical literature, and it may be under- diagnosed.
- It is part of the differential diagnosis when solitary, subpleural coin-shaped lesion is present on CXR
- PCR is useful to distinguish it from other pathological conditions and avoid unnecessary surgery. May reveal true prevalence of HPD.

THANK YOU

