

Angiostrongylus vasorum

- Canine angiostrongylosis is a parasitic disease caused by *Angiostrongylus vasorum* ('French heartworm' or 'canine lungworm'), a metastrongylid nematode.
- The fox is a natural reservoir of the parasite. Other wild canids, e.g. wolves and jackals, can act as definitive hosts.
- Adult worms live in the pulmonary arteries and right side of the heart of dogs.
- Worm eggs hatch in the pulmonary capillaries and L1 pass through the alveolar walls. These larvae get coughed up and are swallowed. They can be found in the faeces.
- Slugs and snails are the intermediate hosts.
- Young dogs and dogs with indiscriminate feeding behaviour are predisposed to infection.
- The prepatent period is 6-7 weeks.



When to suspect infection?

- **Clinical signs**
 - Cough, dyspnoea, exercise intolerance
 - Clinical signs of coagulopathy: subcutaneous haematoma, melena, epistaxis, haemoptysis, anaemia
 - Neurological signs, e.g. paresis, seizures, ataxia
- **Clinical pathology**
 - Most haematological and biochemical parameters are within the normal range
 - Thrombocytopenia
 - Eosinophilia
 - Hypochromic anaemia
 - Altered coagulation profile
 - Unexplained positive *D. immitis* antigen test (cross reactivity)
- **Diagnostic imaging**
 - Thoracic radiography: Interstitial or mixed lung pattern
 - Ultrasonography: Sub-pleural nodules in the lungs.
- **Origin / travelling history**
 - Dogs that live in, originate from or have travelled to countries where the parasite is endemic are at risk.

How can it be confirmed?

- **Baermann test** (L1 in the faeces): good specificity and sensitivity (if performed on fresh, uncontaminated faeces). Time-consuming. The determination of *Angiostrongylus* larvae depends on operator expertise. Repeating the test with at least three different faecal samples will increase the sensitivity of the test. See overleaf for the Baermann test technique.
- **In-clinic antigen test** (AngioDetect®, Idexx): Serological detection of circulating antigens of *A. vasorum* worms. Highly specific, good sensitivity of clinically suspect dogs and easy to use.
- For optimal sensitivity, both tests should be used.

Disease management

- Imidacloprid 10%/moxidectin 2.5% (spot-on)
- Milbemycine oxime, 0.5 mg/kg, oral route, once a week for 4 weeks (reduction of parasitic burden)
- Fenbendazole, 25-50 mg/kg PO once daily for 20 days.
- Dogs should be rechecked by the Baermann test or serologically for antigen detection after 3-4 weeks.

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Countries in which canine angiostrongylosis has been reported.



Young dogs are more prone to angiostrongylosis due to their often indiscriminate feeding behaviour.

Canine angiostrongylosis

Drugs and dosages for the treatment of canine angiostrongylosis.

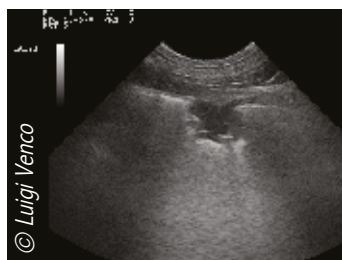
Drug	Dosage regimen
Imidacloprid 10% / moxidectin 2.5%	Spot on, two doses at a 28-day interval
Fenbendazole	25-50 mg/kg PO q24h for 20 days
Milbemycin oxime	0.5 mg/kg PO once a week for 4 weeks

Prevention

- In hyperendemic areas and endemic areas where dogs are at increased risk due to their lifestyle: year-round monthly administration of imidacloprid/moxidectin or milbemycin (dosage as for treatment) or regular parasitologic controls.
- Ingestion of snails and slugs should be prevented whenever possible.

Travel advice

- Dogs travelling to highly endemic areas and belonging to risk groups (indiscriminate feeding behaviour, young age) may require preventive monthly treatment.



Ultrasound of the lung of a dog with angiostrongylosis: subpleural hypochoic nodule.



Thoracic X-ray: abnormal pulmonary pattern.

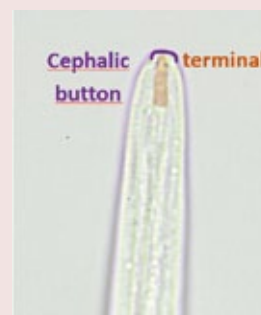
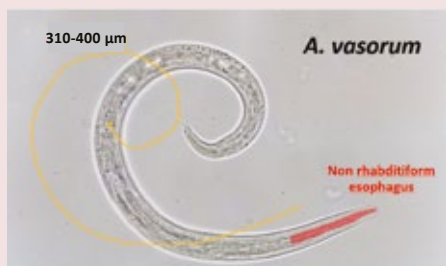
The Baermann technique

- Equipment: funnel (on an appropriate stand) with rubber or plastic tube with a clamp
- Procedure:
 - Use 5-10 g of fresh faeces, not contaminated with soil or grass.
 - Place it on a double layer of gauze, large enough to wrap the gauze around the sample to make a pouch.
 - Suspend the gauze with faeces on a glass stick or wooden tongue depressor using a clamp or rubber band.
 - Place the sample in the funnel.
 - Fill the funnel with lukewarm water, covering the faecal material.
 - Allow the sample to sit overnight (at least 12 hours).
 - Release the clamp of the funnel and collect the first 10 ml of the fluid into a centrifuge tube.
 - Centrifuge the collected fluid for 3 minutes (1500 rpm).
 - Discard the supernatant and place a few drops of the sediment on a glass slide; examine with 4x or 10x objective lens.
- If moving larvae are spotted, add two drops of Lugol solution (which will kill and stain larvae) and add a cover glass; examine larval morphology with 10x and 40x magnification.



The Baermann technique is based on the active migration of the larvae (L1). Faeces are suspended in water: the larvae move into the water and sink to the bottom, where they can be collected for identification.

Characteristics of the *A. vasorum* larva (L1)



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