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AELUROSTRONGYLUS ABSTRUSUS IN CATS – DIAGNOSIS AND TREATMENT

Boris Borisov[1], Radoslav Rafailov[2], Dimitar Hadzhimitev[1], Georgi Marinov[1], Nadya Zlateva[2], Evdoxia Magkrioti[3]

[1]Veterinary clinic Saint George, Sofia, Bulgaria
[2]University of Forestry, Faculty of Veterinary Medicine, Sofia, Bulgaria
[3]University of Forestry, Faculty of Veterinary Medicine, Sofia, Bulgaria, Student 6th year
E-mail: nzlateva@ltu.bg

ABSTRACT

There are a significant number of parasites in which part of their life cycle passes through the lung or adult forms can be found there.

Aelurostrongylus abstrusus (*Strongylida, Angiostrongylidae*) is one of the so-called lungworm parasites, and in recent years has gained considerable prevalence in our country. Its location is usually in bronchioles and alveoli and the disease may occur asymptomatically or with cough, breathing disturbances and worsening of the general condition.

For a period of 1 year, 60 coprological samples were made in the clinic, six of which were positive for Aelurostrongylus abstrusus as a single invasion or as a co-invasion with other parasites.

The specific treatment performed has led to animal healing.

Key words: cats, *Aelurostrongylus abstrusus*, lung parasites.

Introduction

Aelurostrongylosis is helminthosis in cats, characterized by a variety of clinical signs - from asymptomatic to severe respiratory distress with weight loss.

Aelurostrongylus abstrusus (Aeluro-cat, strongylus-round, abstrusus-hidden from view) is a nematode of the category *Strongylida*, superfamily *Metastrongyloidea*, family *Angiostrongylidae*. originally described by Mueller (1890) as *Strongylus pusillus*. Cameron (1927) describes the genus *Aelustrongylus*, including this nematode, and concludes that the larva passes into the stools and is capable of infecting mice.

Metastrongylids are nematodes whose life cycle requires the mediation of shellfish or naked snails as intermediate hosts for the development of third-degree larvae that are invasive. Cats are usually invaded after eating additional hosts (small birds or rodents) who have ingested the intermediate ones. The localization of most metastrongylids is in the lung tissue, although adult forms can also be found in the blood vessels.

In the literature, four types of metastrongylids are reported in the domestic cat – most often *Aelurostrongylus abstrusus*, and the other three species *Troglostrongylus subcreanatus*, *Oslerus rostratus* and *Gurltia paralysans* are less common met and mainly in wild felids (4).

Adult parasites localize in lung tissue and they form small gray-white subpleural nodules as a result of their specific winding (2). The females are 9 to 10 mm long together with the vulva which opens near the anus. Males are 4 to 6 mm. Eggs have a thin shell with dimensions from 50 to 75 microns (17). 25 days after the cat is invaded with the larva L3, the female parasites begin to lay eggs (18) and larvae L1 along with the tracheal secretion are swallowed and so they pass into the digestive tract. They are short and thick with a conical front end while the back is with a dorsal spike

and a S-shaped curved tail. Their length is about 360-400 microns with a grainy structure and very mobile. Larvae can be found in the stool 39 days after infection (11).

After the larvae go with the stools in the environment, the following development is only possible if they are encountered with intermediate hosts (snails). After two molts of the unwrapped larvae in the mollusc foot, the invasive larvae develop from 2 to 5 weeks and are wrapped in two shells (16).

Experimentally cats can be infected by being fed with snails containing L3 larvae. Natural way of invasion is possible through the predation of additional hosts who usually eat snails (small birds and rodents) (3).

Materials and methods

Examined animals

At St. George's Clinic for the period 10.08.2015–20.11.2016, 60 coprological samples were made in cats. The age of the examined animals was between 7 months and 6 years of age, of both sexes, mix-breed. Twenty seven of them are yard cats that have contact with the outside environment throughout the year, and 33 lived outdoors and were taken home without contact with an outside environment at least one month before the study.

Methods of examination

Method 1. **Fülleborn's flotation method** – this method is used for flotation of lighter helminthic eggs (1) (eggs of nematodes, some cestodes and coccidias) (picture 1).

Method 2. **Baermann simplified method (helminth and larvascopy method)** - it is based on the hydrophilicity and thermophilicity of the larvae and serves for detection and differentiation of helminthic larvae (1) (picture 2).

Picture 1:

Picture 2:

Results

In six of the animals tested using *Baermann simplified method*, live movable larvae of *Aelurostrongylus abstrusus* with conical front, dorsal spike at the rear end, S-shaped curved tail and

grainy body structure (picture 3 and picture 4) were found in their faeces. One cat was co-infected with *Toxocara mystax.*

Picture 3:

Picture 4:

Clinical cases:

Clinical case 1

Cat Emma, age 7 months, weight 2.100 kg, female, breed-mix, from Petarch village. The animal is dewormed once against external parasites, not vaccinated. It was taken in an apartment a month ago. It came with an anamnesis of coughing intermittently without being associated with tiredness. In the last days, these seizures have increased as frequency and duration.

The clinical examination revealed: internal body temperature (BT) – 39 °C, tachypnea, enlarged mandibular lymph nodes and slightly cyanotic mucous membranes. Aspiration dyspnea was detected in the auscultation procedure. In x-ray examination, we found a decrease in radiological translucency of lung fields, perivascular edema and diffuse radiopacity. The lungs seem to look stained (picture 5).

Picture 5:

Clinical case 2

Cat Snejka, age 6 years, weight 3,200 kg, female, breed – European cat, nbh Hadzhi Dimitar (Sofia).

The cat lives in the blockade space. The last deworming against internal parasites was made two years ago. The people who take care of it have noticed that the animal is not playful and has yellowish secretions from the nose.

During the clinical examination, we found: IBT – 39.9 °C, bristling hair coat, enlarged mandibular lymph nodes. The cat was breathing with its mouth open, including the abdominal muscles. Nasal holes were stained with yellow sticky secretions.

After the blood test, leukocytosis (30.3x10^9/L) with granulocytosis (28.7x10^9/L) was detected.

Clinical case 3

Cat Topcho, age 2.5 years, weight 4 kg, male, mixed breed, from Sofia (nbh Levski).

The animal lives both at home and in the yard. It is vaccinated regularly and is protected against external parasites with an anti-parasite strap. Over the past 7 months, it has not been dewormed against internal parasites. It was brought for a prophylactic examination and an annual vaccination.

The clinical examination revealed: normal IBT (38.9 °C), lymph nodes unchanged, skin and hair coat without pathological changes. During pulmonary auscultation we detected stridors in the cranial pulmonary lobes.

After a coprological examination using **Baermann simplified method**, larvae of ***Aelurostrongylus abstrusus*** were found in the three animals. With the **Fülleborn's flotation method *Toxocara mystax*** eggs were found in one of the animals surveyed.

Treatment:

All animals positive for *Aelurostrongylus Abstrusus* were given the following treatment:

- 1–5 day Fenbendazole 4.8g (Panacure®PetPaste 187.5mg in 1g) – at a dose of 20mg/kg, p.o. once every 24 hours.
- On 6th and 20th day – treatment with Ivermectin (Kepromec®10mg/ml) at a dose of 0.4 mg/kg s.c.
- On the 30th day –- Advocate cat spot on, and it is recommended this treatment to be monthly.

In order to improve the overall condition, we made the additional non-specific therapy – Dexamethasone 0.2 % (Alfasan®) at a dose of 0.3 mg/kg i.m. 3 times per 48 hours, Amoxicillin 20 % (Alfasan®) at a dose of 7 mg/kg s.c. per 24 hours for 7 days.

One month after the last treatment with Ivermectin (Kepromec®, Holland) a control coprological examination was performed using both methods and the results were negative.

Discussion

The severity of the disease depends on the general condition of the animal before infection, the presence of co-infection, immune status, age, etc. Young cats up to 1 year of age suffer more than adults (5, 6, 12, 14). This can be explained by the smaller lung volume and the smaller diameter

of the trachea and the bronchi. It is believed that the immature immune system facilitates infection. More severe clinical and radiological signs have been observed in young animals (11).

The scheme we used was designed to combine the benefits of different antiparasitic agents in order to get the most rapid and secure effect.

The information on the efficacy of different antiparasitic agents is contradictory. In the literature have been described fenbendazole therapies at 20 mg/kg for 5 days up to 50 mg/kg for 15 days (17). Fenbendazole has a broad antiparasitic spectrum. The benzimidazole mechanism of action is by disrupting the intracellular microtubule transport systems by selectively binding and damaging the tubulin, preventing tubulin polymerization, and suppressing the microtubule formation. Benzimidazoles act at a higher concentration by destroying the metabolic pathways and inhibiting enzymes, including malate dehydrogenase and fumarate reductase. Benzimidazoles may be considered time-dependent antiparasitic agents. They are absorbed only after oral administration (7).

The use of spot-on products (Advocate®, Bayer, Profender®, Bayer) also showed efficacy in the treatment of aelurostrongylosis, but better efficacy have when combined with moxidectin (18). Moxidectin influences the activity of chloride ion channels in the nervous system of nematodes and arthropods, increasing the permeability of the chlorine ion membrane, resulting in paralysis and death in the arthropods. Ivermectins in which group is also moxidectin also stimulate the release of GABA. Moxidectin is highly lipophilic and therefore very low body fat animals may have higher serum levels than those with normal body fat (9). Ivermectin increases the release of gamma-aminobutyric acid (GABA) through the presynaptic membranes, inhibiting neurotransmission and blocking post-synaptic stimulation of neurons in nematodes or in the muscle fibers of the arthropods. As a result of stimulating the release of GABA, ivermectin causes paralysis of parasites and death. In animals with simple stomach ivermectin is absorbed to 95% after oral administration (8).

In experimental conditions, the combination of fipronil 8.3%, (9) S-methoprene 10 %, eprinomectin 0.4 % and praziquantel 8.3 % (Broadline®, Merial) was evaluated as highly effective for both prophylaxis and treatment (13).

Conclusions

The infection of cats with *Aelurostrongylus abstrusus* takes place in an external environment, ie they must be able to contact the intermediate or additional hosts.

The period of clinical signs and/or asymptomatic illness may be long.

Treating with fenbendazole preparates and spot-on products containing moxidectin is efficient and can be used for both treatment and prophylaxis of cats.

Periodic coprological examinations of animals that are in contact with the external environment are recommended.

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