European Veterinary Parasitology College (EVPC)

Examination

Sample questions

INSTRUCTIONS for candidates

Before starting answering the questions, please read the following information

The examination is divided into three parts:

A. General Parasitology
B. Clinical Parasitology
C. Diagnostic Parasitology

A. <u>General Parasitology</u> consists of
40 MCQs with four distractors and **one** correct answer. No negative marking.
Duration: 1 h [40]
Two Essay questions (to be chosen from a list of 4). [40] *Duration: 1 h 30'* [40]
Two Short Answer questions (to be chosen from a list of 4). *Duration: 40'* [20]
[40% of final marks]

B. <u>Clinical Parasitology</u> consists of
Oral presentation of 2 case reports selected by the ExCom. Board from a total of 10. *Duration: 2 x 30'* (20 min presentation, 10 min questions from the ExCom).
[50% presentations; 50% written reports]
[40% of final marks]

C. <u>Diagnostic Parasitology</u> consists of
10 clinical scenarios with 4 associated MCQs for each of them. Four distractors and one correct answer. No negative marking. *Duration: 1 h* [40]
Note: feel free to give any comments dealing with each clinical scenario, particularly with regard to differential diagnosis.
• 15 pictures (gross parasite specimens or slides or tissues sections or pictures from parasitized animals) to be identified. Note that the host species and some relevant clinical information are provided for each specimen. *Duration: 45'* [40]
Diagnostic practicum: Instructions will be provided before the start of the practicum
Duration: 1h 15' [20]
[20% of final marks]

To pass successfully the exam a score of <u>70%</u> is required in <u>each</u> section.

Note: all candidates are allowed to use an English dictionary.

Contact: evpcsecretary@gmail.com

PART A. General Parasitology

Section 1: Multiple choice Questions

1.	Sweet itch in horses results from bites by:	
	A	*Hydrotea irritans*
x	**B**	*Culicoides* spp
	C	*Stomoxys calcitrans*
	D	*Gasterophilus* spp
	E	*Oxyuris equi*
2.	*Demodex* mites are usually transferred from the dam to the offspring early after birth. Which of the following species can also be transmitted between adult animals?	
	A	*Demodex criceti*
	B	*Demodex injai*
	C	*Demodex canis*
	D	*Demodex cati*
X	**E**	*Demodex gatoi*

PART A. General Parasitology

Section 2: Essay Questions

Title of article: Pennisi M. G. et al. , 2015. Lungworm disease in cats. ABCD guidelines on prevention and management. *J. Feline Equine Medicine and Surgery*, 17, 626-636.

Cardiopulmonary helminths are emerging parasites of cats and dogs in Europe and have received growing attention in recent years. Significant progress has been made, mainly in the diagnosis and treatment of these conditions.

Questions

1) List the parasites species which can affect the respiratory tract of the cat and give for each species its approximate length and location (as adults) in the respiratory tract. (20% of marks)

Answer should include:
Aelurostrongylus abstrusus: the most prevalent; very small (5-10 mm); colonize the bronchioles and alveolar ducts in cats and other wild felids.
Oslerus rostratus: rare in domestic cat; 30-40 mm. Infects the bronchial submucosa.
Troglostrongylus spp.: rare in domestic cat; about 10-25 mm according to species. Located in the trachea and bronchi or even the bronchioles for the smallest species (*T brevior*).
Capillaria aerophila (syn. *Eucoleus aerophilus*) has a low host specificity and can be found in cats (domestic and wild) and dogs. It is also zoonotic. Located in the submucosa of the trachea, bronchi and bronchioles. 15-30 mm.
Paragonimus spp are lung flukes with low host specificity (reported in cats and humans). 8-18 mm; located in subpleural cyst or bullae.

2) Describe the life cycle and transmission biology of these helminths (30% of marks)

Answer should include:
A. abstrusus, *O. rostratus*, *Troglostrongylus spp* and *Paragonimus spp* all have indirect life cycle whereas *C. aerophila* has a direct life cycle.
A. abstrusus: eggs of this species are laid by female worms and hatch in the respiratory tract. L1 are coughed up, swallowed and passed with faeces in the environment. L1 can actively enter slugs or snails feeding on faeces. L3 stage is reached inside the mollusc. Development rate in the intermediate host is under the control of temperature. L3 can use a wide range of paratenic hosts (rodents, lizard, birds, frogs). Life cycle then completed by predation. Ingestion of L3 is the usual way of contamination but vertical transmission from the queen to her offspring is suspected. Environmental contamination has been suggested recently (live larvae were found in the pedal mucus excreted by the snail *Helix aspersa*, a common intermediate host. Prepatent period is 4 to 6 weeks and egg production may last for months although it can be irregular.
O. rostratus and *Troglostrongylus* spp: intermediate hosts are also terrestrial slugs and snails. Life cycle not so well known. Mixed infection between *A. abstrusus* and

T. brevior des cribbed in the same intermediate host (*H. aspersa*).Vertical transmission of *T. brevior* reported (case report).
C. aerophila: Eggs laid by female worms in the respiratory tract. They are swallowed and passed in the environment with the faeces. After 30-45 days they are embryonated and infective. Earthworms are facultative paratenic hosts. Infection is through the ingestion of embryonated eggs or paratenic hosts. After migration to the lungs the first eggs appear in the faeces 3 to 6 weeks later.
Paragonimus spp: complex life cycle associated with freshwater environment. Two intermediate hosts are involved. Eggs of the parasite are swallowed and passed in the environment with faeces. Miracidia penetrate aquatic snails; cercarial stages develop in snails and move from them actively to enter a second intermediate host (crab or crayfish) in which metacercaria are produced. Cats are infected after eating the second intermediate host. Juvenile flukes penetrate the intestinal wall and then the diaphragm and pulmonary parenchyma. The adult stage is reached in about 6 weeks.

3) For each species outline the pathogenesis (30% of marks)

Answer should include:
The severity of lesions depends on the worm species and burden. Kittens seem to be more susceptible and there is indication that the immaturity of the immune system is also involved.
A.abstrusus: <100 L3 does not induce clinical signs. 800-3200 larvae severely affect clinical condition and may be fatal. Small repeated infective doses and passive immunity are protective against a heavy challenge. Infection is characterized by a marked eosinophilia and immune-mediated types I, III and IV associated with alveolar, interstitial, peribronchial and vascular lesions. Associated clinical signs are: moderate fever, lethargy, weight loss, lymph node enlargement, cough, dyspnoea, respiratory sounds. Low fibrinogen values are frequently observed suggesting an increased consumption of coagulation factors. A bronchial pattern and lymphadenopathy are observed on X-ray pictures. *A. abstrusus* eggs are trapped in alveoli and bronchioles ➔inflammatory reactions with granulomatous reactions, emphysema, peribronchial lymphoid hyperplasia, hypertrophy of small muscle layers of the air ways but also of arteries. A consequence may be pulmonary hypertension. Differential diagnosis includes asthma. Bacterial complications are frequent.
T. brevior: less documented. Case reports indicate catarrhal bronchitis, pulmonary haemorrhages and emphysema. *O. rostratus*: not associated usually with clinical signs. *C. aerophila*: chronic bronchitis

4) List the available treatments (20% of marks)

Answer should include:
Oral administration of fenbendazole (different dosages and durations)
Advocate, Bayer imidacloprid and moxidectin
Profender, Bayer emodepside and praziquantel
Broadline, Merial S-methoprene, eprinomectin, praziquantel
Milbemax, Novartis milbemycin oxime and praziquantel
Stronghold, Zoetis Selamectin
EBM grades vary according to studies. In some cases very limited data (case reports).This is particularly the case for *T. brevior*.
Antibiotics and corticosteroids sometimes necessary; thoracocentesis and supportive therapy

European Veterinary Parasitology College (EVPC)

Examination

Sample questions

PART A. General Parasitology

Section 3: Short Answer Questions

Short Questions: *Dermanyssus gallinae* the poultry red mite (PRM) is an increasingly important pathogen in egg layers and is responsible for substantial economic losses to the poultry industry worldwide.

Questions

1) Outline the life cycle of this mite (50% of marks) and the related pathology (30 % of marks)

Answer should include:
PRM is a haematophagous ectoparasite of poultry and wild birds. Blood is required to allow development into the last three stages but also for egg development and oviposition. Females feed several times on blood during their live whereas males feed intermittently.
This is a cosmopolitan parasite of birds but it is able to feed on alternative hosts such as rodents and humans.
The life cycle may be completed in 7 days but takes usually 14 days.
Female adults typically lay clutches of 4-8 eggs with a maximum of 30 eggs total in their life time.
Larvae are six-legged and do not feed on blood. All stages live off the host in hidden places, feeding intermittently for short periods of time.
Pathology due to PRM is variable depending on parasite burdens. Most often there is a decline in the general condition of the birds (self-picking, lack of sleep) but also cannibalism, anaemia and sometime death.

2) What do you know about the vectorial capacity of the PRM? (20% of marks)

Answer should include:

- Borrelia anserine
- Fowl Pox Virus
- Eastern Equine Encephalitis virus
- Salmonella (even vertical transmission in the mite)

Pritchard et al. Understanding the biology and control of the poultry red mite *Dermanyssus gallinae:* a review. Avian Pathology, 2015, 44, 143-153.

PART B. Clinical Parasitology

Section 1: Clinical case

***Angiostrongylus vasorum* infection in a four-month-old puppy**

Clinical case

EVPC resident: [redacted]

I assisted in clinical examination, care and treatment of the puppy together with clinicians while it was at the Clinic for Small Animals at the [redacted]. I did the faecal examination and morphological identification of the larvae. I was present and assisted during two follow-up examinations together with a clinician from the Animal Hospital. I advised on treatment and control.

Abstract

Summary: This case describes a clinical angiostrongylosis in a puppy. **Introduction:** The cardiopulmonary nematode *Angiostrongylus vasorum* is endemic in Europe and can cause severe disease in infected dogs. Clinical signs range from respiratory distress and coughing to bleeding and neurological signs. **Case presentation:** A four-month-old male Yorkshire Terrier was presented with syncope, lethargy, dyspnoea and progressive coughing. **Clinical findings and investigations:** The puppy had pale mucous membranes, was dehydrated, showed increased breathing rate, increased lung sounds and heart arrhythmia. The puppy had a mild anaemia, eosinophilia and lymphocytosis. Radiographs revealed a moderate to severe diffuse, heterogenic interstitial and alveolar lung pattern in line with verminous pneumonia. The heart ultrasonography was normal. **Diagnosis:** Blood was tested using the IDEXX Angio Detect™ antigen test with a positive result, confirmed coproscopically by the Baermann- Wetzel technique: *A. vasorum* first stage larvae were morphologically identified in the faeces. **Treatment outcome and follow-up:** The dog was treated with oxygen, intravenous fluids, prednisolone 1 mg/kg iv for 2 days and fenbendazole 50 mg/kg po was started. During initial treatment, the puppy showed mild bloody diarrhoea, but no other signs of bleeding. The puppy was released 2 days after hospitalisation with continued fenbendazole treatment (total 21 days) and prednisolone treatment (total 10 days). Seven days after diagnosis the puppy was in good health but still coughing. Three weeks after diagnosis it was not coughing anymore, and the radiographic lung changes had moderately regressed. The puppy was additionally treated with imidacloprid 40 mg/moxidectin 10 mg (Advocate® 40). Four and 7 months after admission, the dog was healthy and radiographic lung changes had further regressed and were mild. **Control:** Monthly

treatment with milbemycinoxime was recommended to prevent reinfection. **Clinical relevance and discussion:** *Angiostrongylus vasorum* is an emerging parasite due to its spread and increasing incidence rates in dog. Even though disease awareness has increased in the last two decades, cases of canine angiostrongylosis often remain undetected. Veterinarians need to be aware of the various clinical signs upon infection and educated in the state-of-art prevention and treatment.

Keywords

Angiostrongylus vasorum, angiostrongylosis, dog, verminous pneumonia, coughing

Introduction

Angiostrongylus vasorum, a cardiopulmonary nematode of canids, mainly infects dogs and foxes. Definitive hosts become infected by ingestion of intermediate hosts (slugs and snails) containing infectious third stage larvae (L3) (Guilhon and Cens, 1973). *Angiostrongylus vasorum* is endemic in Europe (Koch and Willesen, 2009) and has been increasingly diagnosed in dogs in the last two decades (Maksimov et al., 2017). Upon infection dogs can suffer severe disease. The most common clinical signs are coughing, increased respiration rate, respiratory sounds and dyspnoea (Schnyder et al., 2010). Some dogs may also show bleeding, neurological or unspecific signs (Sigrist et al., 2017, Koch and Willesen, 2009). Around 10-15% of severe infections are fatal (Chapman et al., 2004). Angiostrongylosis is usually diagnosed by the Baermann-Wetzel technique (Deplazes et al., 2016), which allows the detection of first stage larvae (L1) from faeces. However, intermittent shedding of L1 may lead to false negative results. Therefore, other methods such as serological detection of circulating antigens or specific

antibodies, PCR detection and a rapid lateral flow assay have been developed (Schnyder et al., 2015, Schnyder et al., 2014).

Case presentation

A four-month-old male Yorkshire Terrier puppy (2.3 kg), was presented to the Emergency Unit of the Small Animal Clinic due to a syncope. The dog had been showing tachypnoea, dyspnoea, and progressive coughing for 2 months, since it had been adopted by the owners. It had been lethargic for two days prior to presentation. It was fully vaccinated and was dewormed one month prior (unknown product). The puppy had been presented to a veterinarian three times during the past 2 months due to progressive coughing, but was neither diagnosed nor treated. The puppy had pale mucus membranes, increased breathing rate (56/min), was dehydrated (5%), had increased lung sounds and heart arrhythmia. Differential diagnoses at this point included, among others, verminous pneumonia (*A. vasorum*), bacterial, viral or fungal pneumonia, lung oedema, and cardiac anomaly. Blood was taken for haematology, blood chemistry and the IDEXX Angio Detect™ quick test. Thorax x-rays were taken, and the heart examined sonographically. Radiographs revealed diffuse, heterogenic lung parenchyma and condensed lung lobes, associated with a moderate to severe diffuse, heterogenic mixed (interstitial and alveolar) lung pattern with suspicion of consolidated lung lobes (Fig. 1A). This was in line with verminous pneumonia due to *A. vasorum* infection. The heart ultrasound showed a normal heart. The puppy had a mild anaemia, mild eosinophilia, mild lymphocytosis, mild increase of creatine kinase, and slightly elevated phosphate levels. The IDEXX Angio Detect™ test was positive (Fig. 2). Faeces was collected for confirmation of the result by Baermann funnel technique: *A. vasorum* L1 were morphologically identified (Fig. 3). The puppy stayed in the Intensive Care Unit,

received oxygen for 24 hours and was monitored for another day before release. During the stay at the Small Animal Clinic, the puppy showed mild bloody diarrhoea. The puppy was treated with intravenous fluids for 2 days and fenbendazole (50 mg/kg po) and prednisolone (1 mg/kg iv). After release, fenbendazole treatment was continued for 19 days and prednisolone (po) for 3 days at the same concentrations followed by 0.5 mg/kg po for another 5 days. At the first follow up 7 days after diagnosis, the puppy was still coughing but in an overall good condition without bloody diarrhoea. At the 3-week follow up, the puppy was in good health, coughing had ceased, and lung radiographs showed a regressive interstitial and alveolar lung pattern (Fig. 1B). Six weeks after diagnosis the puppy was treated with imidacloprid 40 mg/moxidectin 10 mg (Advocate® 40). Prophylactic treatment with milbemycin oxime 2.5 mg/ praziquantel 25 mg once a month was recommended to prevent reinfection. Radiographic follow-ups 4 and 7 months after diagnosis revealed regression with mild interstitial lung changes (Fig. 1C and 1D). The dog was in good health at both follow-up appointments.

Discussion

The presented case describes a clinical angiostrongylosis in a four-month-old puppy. The dog was showing severe respiratory disease, which was reflected in its thorax radiographs. The severe lung changes were cause by *A. vasorum* L1, which migrate from the blood vessels to the lung alveoli and cause damage to the tissue (Schnyder et al., 2010). This further induces severe inflammation, which could lead to complications and progression of the disease and may induce bleeding (Adamantos et al., 2015). Even though the puppy developed mild bloody diarrhoea, it did not develop further clinical signs of bleeding. Generally, progression of the disease may result in fatal complications, particularly when dogs develop bleeding or neurological disorders

(Chapman et al., 2004, Wessmann et al., 2006). In this case, because of the severe respiratory and cardiac signs of the puppy, clinicians from the Small Animal Clinic opted for a fenbendazole treatment over 21 days in combination with prednisolone with the assumption and intention of a 'slow kill' of adult specimens in analogy to *Dirofilaria immitis* treatment, to decrease possible complications by dying worms. However, at the [redacted] we usually recommend treatment with moxidectin/imidacloprid, which in this case was done additionally after initial treatment with fenbendazole. Angio Detect™, a lateral flow assay, was used for quick diagnosis of the dog. This rapid test is based on an *A. vasorum* antigen detection ELISA, which however has a higher sensitivity than the rapid test (Schnyder et al., 2014, Schnyder et al., 2011). *Angiostrongylus vasorum* is highly endemic in [redacted] and other European countries (Gillis-Germitsch et al., 2020, Taylor et al., 2015). Incidence rates of canine angiostrongylosis in dogs have increased in the last two decades (Maksimov et al., 2017) and the parasite is spreading to areas where it has not been detected before (Morgan and Shaw, 2010), and is therefore considered an emerging parasite. Nevertheless, there are still clinician who do not include this parasite as a differential diagnosis when encountering dogs with respiratory signs or bleeding. Exemplary, in the presented case a clinical angiostrongylosis remained undetected for several weeks. Even though disease awareness has increased recently, it is important that veterinarians are aware of the various clinical signs of angiostrongylosis to prevent infections remaining undetected. Veterinarians and pet owners also need to be aware that not all anthelmintics are effective in preventing or eliminating the parasite. For prophylactic intervention against angiostrongylosis in highly endemic areas monthly treatment with moxidectin or milbemycinoxime is recommended (Schnyder et al., 2009).

References

ADAMANTOS, S., WATERS, S. & BOAG, A. 2015. Coagulation status in dogs with naturally occurring *Angiostrongylus vasorum* infection. *Journal of Small Animal Practice*, 56, 485-490.

CHAPMAN, P. S., BOAG, A. K., GUITIAN, J. & BOSWOOD, A. 2004. *Angiostrongylus vasorum* infection in 23 dogs (1999–2002). *Journal of Small Animal Practice*, 45, 435-440.

DEPLAZES, P., ECKERT, J., MATHIS, A., VON SAMSON-HIMMELSTJERNA, G. & ZAHNER, H. 2016. *Parasitology in veterinary medicine*, Wageningen, Netherlands, Wageningen Academic Publishers.

GILLIS-GERMITSCH, N., TRITTEN, L., HEGGLIN, D., DEPLAZES, P. & SCHNYDER, M. 2020. Conquering Switzerland: the emergence of *Angiostrongylus vasorum* in foxes over three decades and its rapid regional increase in prevalence contrast with the stable occurrence of lungworms. *Parasitology*, 147, 1071-1079.

GUILHON, J. & CENS, B. 1973. *Angiostrongylus vasorum* (Baillet, 1866): Étude biologique et morphologique. *Annales de Parasitologie Humaine et Compareé*, 48.

KOCH, J. & WILLESEN, J. L. 2009. Canine pulmonary angiostrongylosis: an update. *The Veterinary Journal*, 179.

MAKSIMOV, P., HERMOSILLA, C., TAUBERT, A., STAUBACH, C., SAUTER-LOUIS, C., CONRATHS, F. J., VRHOVEC, M. G. & PANTCHEV, N. 2017. GIS-supported epidemiological analysis on canine *Angiostrongylus vasorum* and *Crenosoma vulpis* infections in Germany. *Parasites & Vectors*, 10, 108.

MORGAN, E. & SHAW, S. 2010. *Angiostrongylus vasorum* infection in dogs: continuing spread and developments in diagnosis and treatment. *Journal of Small Animal Practice*, 51, 616-621.

SCHNYDER, M., FAHRION, A., OSSENT, P., KOHLER, L., WEBSTER, P., HEINE, J. & DEPLAZES, P. 2009. Larvicidal effect of imidacloprid/moxidectin spot-on solution in dogs experimentally inoculated with *Angiostrongylus vasorum*. *Veterinary Parasitology*, 166, 326-332.

SCHNYDER, M., FAHRION, A., RIOND, B., OSSENT, P., WEBSTER, P., KRANJC, A., GLAUS, T. & DEPLAZES, P. 2010. Clinical, laboratory and pathological findings in dogs experimentally infected with *Angiostrongylus vasorum*. *Parasitology Research*, 107, 1471-1480.

SCHNYDER, M., JEFFERIES, R., SCHUCAN, A., MORGAN, E. R. & DEPLAZES, P. 2015. Comparison of coprological, immunological and molecular methods for the detection of dogs infected with *Angiostrongylus vasorum* before and after anthelmintic treatment. *Parasitology*, 142.

SCHNYDER, M., STEBLER, K., NAUCKE, T. J., LORENTZ, S. & DEPLAZES, P. 2014. Evaluation of a rapid device for serological in-clinic diagnosis of canine angiostrongylosis. *Parasites & Vectors*, 7.

SCHNYDER, M., TANNER, I., WEBSTER, P., BARUTZKI, D. & DEPLAZES, P. 2011. An ELISA for sensitive and specific detection of circulating antigen of *Angiostrongylus vasorum* in serum samples of naturally and experimentally infected dogs. *Veterinary Parasitology*, 179.

SIGRIST, N. E., HOFER-INTEEWORN, N., JUD SCHEFER, R., KUEMMERLE-FRAUNE, C., SCHNYDER, M. & KUTTER, A. P. N. 2017. Hyperfibrinolysis and hypofibrinogenemia diagnosed with rotational thromboelastometry in dogs naturally infected with *Angiostrongylus vasorum*. *Journal of Veterinary Internal Medicine*, 31, 1091-1099.

TAYLOR, C. S., GARCIA GATO, R., LEARMOUNT, J., AZIZ, N. A., MONTGOMERY, C., ROSE, H., COULTHWAITE, C. L., MCGARRY, J. W., FORMAN, D. W., ALLEN, S., WALL, R. & MORGAN, E. R. 2015. Increased prevalence and geographic spread of the cardiopulmonary nematode *Angiostrongylus vasorum* in fox populations in Great Britain. *Parasitology*, FirstView, 1-6.

WESSMANN, A., LU, D., LAMB, C. R., SMYTH, B., MANTIS, P., CHANDLER, K., BOAG, A., CHERUBINI, G. B. & CAPPELLO, R. 2006. Brain and spinal cord haemorrhages associated with *Angiostrongylus vasorum* infection in four dogs. *Veterinary Record*, 158, 858-863.

Figure legends

Figure 1:

Thorax radiographs of the puppy. An alveolar and interstitial lung pattern is visible upon first presentation (A). Follow up radiographs 3 weeks after diagnosis (B), 4 months after diagnosis (C) and 7 months after diagnosis (D) show regression of lung changes.

Figure 2:

Photograph of the puppy at the Small Animal Clinic with the positive outcome of the IDEXX Angio Detect™ antigen quick test.

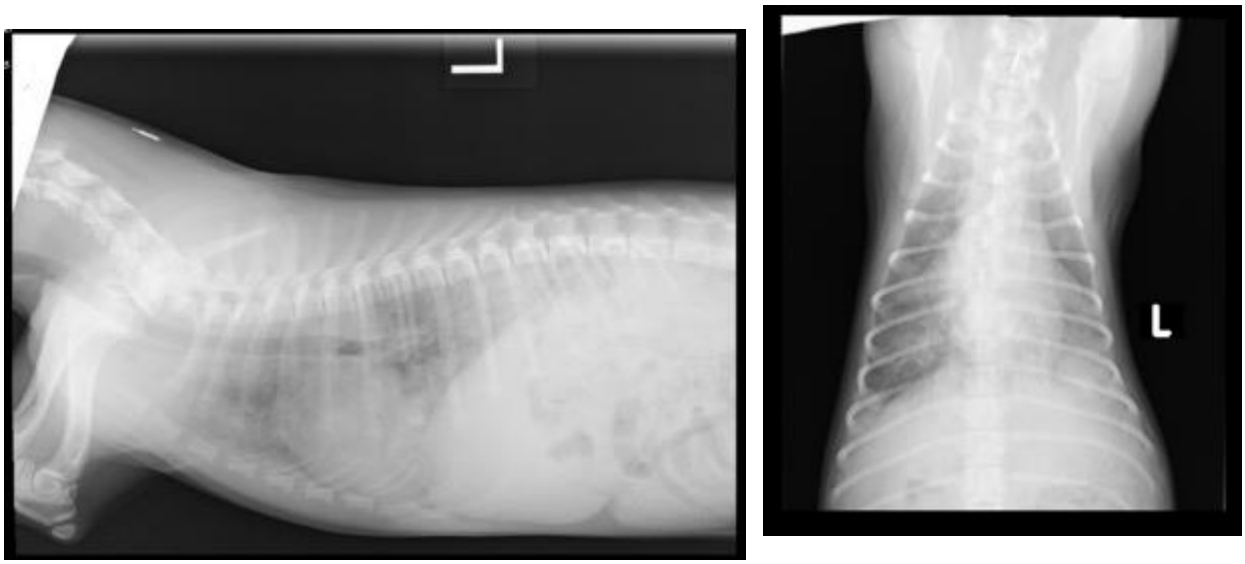
Figure 3:

Angiostrongylus vasorum first stage larvae identified from the faeces of the puppy. The larvae were approximately 350 µm in length, had characteristic dorsal and ventral

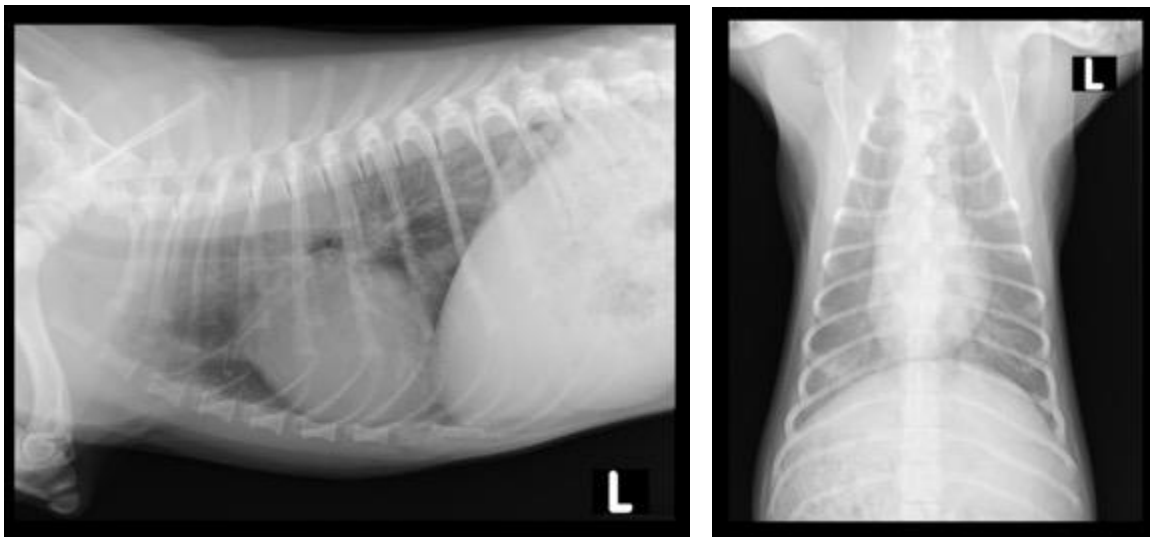
indentations at the tail as well as a cephalic button at the anterior end. This specimen was immobilized and stained with lugol.

Figure 1

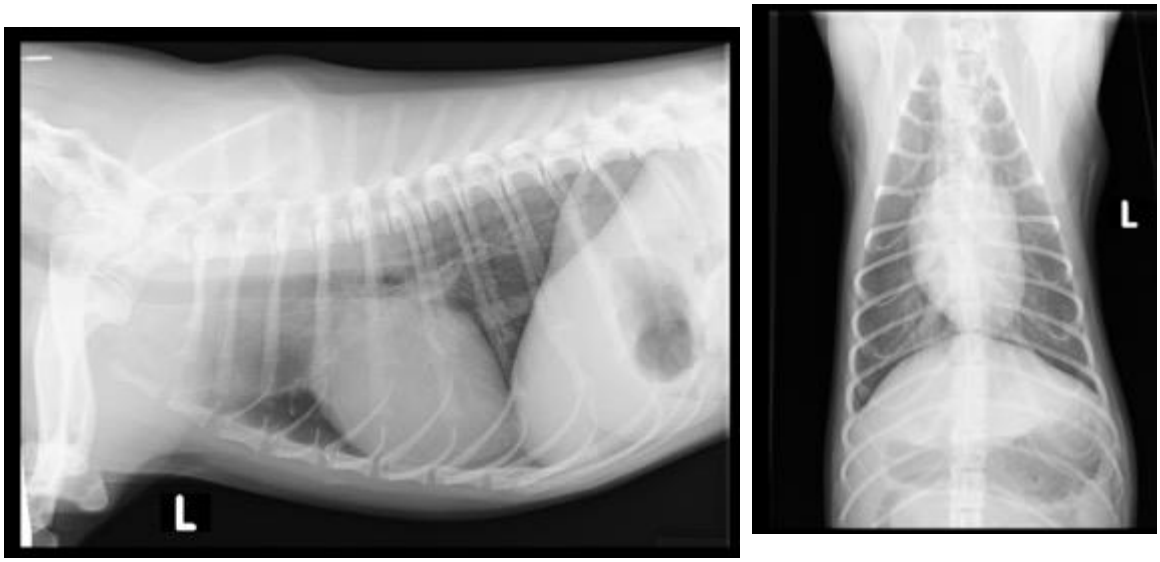
A



B



C



D

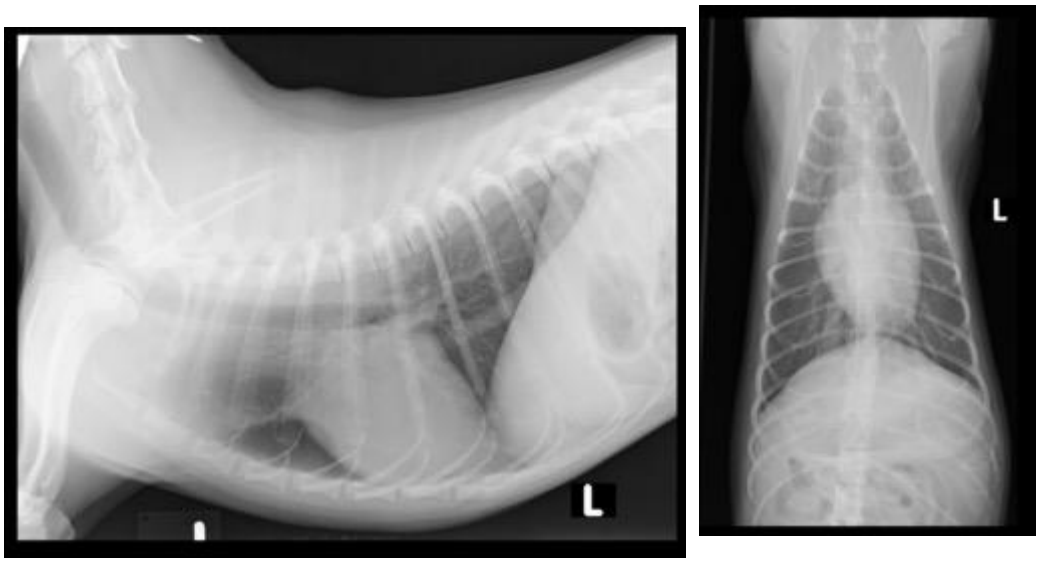


Figure 2

[redacted]

Figure 3

Contact: evpcsecretary@gmail.com

PART C. Diagnostic Parasitology

Section 1: Clinical scenario

An adult cross-breed dog from a shelter, presented with a history of intense itching, showed localized, crusty alopecia of the face, ears, lateral trunk and limbs. (Fig 1). The pinnal-pedal reflex test was positive and a skin scraping revealed the presence of adult mites and eggs.

Figure 1 Dog with history of intense itching

1.	Which of the following ectoparasites is likely responsible for the above infection?	
	A	*Demodex canis*
	B	*Ctenocephalides canis*
X	C	*Sarcoptes scabiei*
	D	*Neorombicula autumnalis*
	E	*Trichodectes canis*
2.	What is the site of the infection in the host?	
	A	Hair
	B	Hair follicles
X	C	Epidermis
	D	Derma
	E	Lymph nodes
3.	Transmission of the parasite is?	
	A	Direct
	B	Indirect
X	C	Direct and indirect
	D	Not known
	E	Venereal

4.	Which of the following drugs could be considered the best choice for treatment of the infection?	
	A	Metaflumizone
	B	Imidacloprid
	C	Fipronil
X	D	Selamectin
	E	Nitenpyram

PART C. Diagnostic Parasitology ***Section 2: Slides***	
Picture #1 ***Relevant information:*** Collected from the hair of a farm cat after a night-out hunting mice; UK ***Clinical signs:*** Pruritus	
GENUS: Nosopsyllus	*SPECIES: fasciatus*

PART C. Diagnostic Parasitology

Section 3: Practicum

History will be provided during the practicum.

Clinical scenario:
A 5-year-old 15-kg female Beagle with a 4-week history of diarrhoea has been brought to your clinic. The dog had been treated with tylosin antibiotic and budesonide (a systemic glucocorticoid (steroid) used to treat intestinal inflammation). However, the dog continued to have diarrhoea. The owner's neighbour suggests the feeding of a probiotic as a supplement to improve the gut health and help manage the diarrhoea, based on their findings on the Internet. The dog has been routinely vaccinated, but the owner does not recall when the last time he used a dewormer.

The resident must ask to get this information:
The dog owner is very worried because the dog is pregnant, and his family is already under pressure due to the ocular dysfunction that has been recently diagnosed in his 7-year-old daughter.

Part A:
Perform a general clinical examination, ask to the "owner" all the questions you want on the animal and collect whatever sample you think is appropriate to make a diagnosis of the condition.

Samples collected:
- *Toxocara canis* infection (feces)

Part B:
Perform a basic parasitological examination on the sample(s) collected and record your result(s).

Results
- *Toxocara canis* eggs with floatation (feces is provided)

Part C:
Based on the results of your investigation, what is your clinical diagnosis and interpretation of the case? What will be your recommendation be to the farmer (or owner)?

European Veterinary Parasitology College (EVPC)

Examination

Sample questions

Policy document Title	Examination, sample questions 2022
Responsible committee	Examination Committee
Version number	I
Date Approved	
Date Effective From	

Contact: evpcsecretary@gmail.com