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Studies of clinical symptoms of panleukopenia in cats in the Donetsk People's Republic

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SUMMARY

Feline panleukopenia is a highly contagious viral disease of the members of the family *Felidae* caused by a DNA-virus of the family *Parvoviridae*. After infection, the virus is detected in saliva, nasal discharge, urine and feces; it is transmitted through excrements, water, food, and, according to some reports, by blood-sucking insects. The disease is characterized by gastrointestinal tract, central nervous system, hematopoietic tissue lesions. The paper describes the clinical signs of panleukopenia in cats in the territory of the Donetsk People's Republic. Based on the records of a state-financed veterinary hospital and a charitable animal shelter located in the town of Yasinovataya, as well as those of private veterinary clinics and a veterinary office located in Donetsk, a classification of the clinical signs of the disease in pet and stray cats is suggested with the signs grouped according to their occurrence rate and by age groups. The paper provides evidence of feline panleukopenia occurrence in the territory of the Donetsk People's Republic. In particular, the period from 2015 to 2018 was characterized by an increase in panleukopenia morbidity in stray animals; pet cats were also involved in the epidemic process. It was found that most of the clinical symptoms of panleukopenia were reported in cats of all age categories irrespective of their sex. Specific symptoms characteristic for different age groups were reported. It was found that panleukopenia morbidity rates for stray kittens aged 0–12 months were 1.8 times higher than those for pet kittens of the same age group. The disease was reported in adult pet cats 2.4 times less frequently than in stray cats. It is shown that the number of the disease cases in female cats is 1.5 times higher than in male ones. It is concluded that the violation of quarantine rules and insufficient vaccination coverage in cats are risk factors for the disease outbreak occurrence precipitating the multiple recurrent outbreaks of the disease.

Key words: panleukopenia, cats, clinical symptoms, morbidity.

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Изучение клинических симптомов при панлейкопении у кошек на территории Донецкой Народной Республики

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РЕЗЮМЕ

Панлейкопения кошек – высококонтагиозное вирусное заболевание представителей семейства кошачьих, возбудителем которого является ДНК-содержащий вирус из семейства *Parvoviridae*. После заражения вирус обнаруживается в слюне, в отделяемом из носа, моче и фекалиях, распространяется через экскременты, с водой и пищей, а также, по некоторым данным, через кровососущих насекомых. Болезнь сопровождается поражениями органов желудочно-кишечного тракта, центральной нервной системы, кроветворной ткани. В статье рассмотрены клинические признаки у кошек при заболевании панлейкопенией на территории Донецкой Народной Республики. На основании отчетных документов государственной больницы ветеринарной медицины и благотворительного питомника города Ясиноватая, а также частных ветеринарных клиник и ветеринарного кабинета города Донецка предложена классификация клинических признаков заболевания среди домашних и бродячих кошек, сгруппированных по частоте встречаемости и возрастным группам. Показано, что территория Донецкой Народной Республики является неблагополучной по заболеваемости панлейкопенией среди кошек. Так, за период с 2015 по 2018 г. ситуация характеризовалась ростом заболеваемости бродячих животных с вовлечением в эпизоотический про-

цесс домашних кошек. Установлено, что большинство клинических симптомов панлейкопении регистрируются у всех возрастных категорий кошачьих вне зависимости от половой принадлежности. Отмечены специфические симптомы, характерные для разных возрастных категорий. Установлено, что показатели заболеваемости панлейкопенией бродячих котят возрастной группы 0–12 месяцев в 1,8 раза выше по отношению к домашним котятам той же возрастной категории. У взрослых домашних кошек заболевание регистрировали в 2,4 раза реже по сравнению с бездомными кошками. Показано, что количество случаев заболевания среди самок в 1,5 раза выше по сравнению с заболеванием среди самцов. Сделан вывод, что нарушение правил карантина и недостаточный охват кошек вакцинацией являются факторами риска возникновения очагов заболевания и приводят к многократным повторным вспышкам болезни.

Ключевые слова: ветеринария, панлейкопения, кошки, клинические симптомы, заболеваемость.

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INTRODUCTION

Feline panleukopenia continues to be a topical issue in feline infectious disease pathology in spite of the fact that it can be relatively effectively prevented by vaccination [1–5]. Feline panleukopenia (FPL) is a highly contagious infectious disease of the members of the family *Felidae* caused by a DNA-virus of the family *Parvoviridae*.

Just a few decades have passed since the disease was first reported; the results of the studies published with regard to this topic indicate that panleukopenia morbidity and mortality show persistent upward trends [1, 6–8]. In particular, K. Van Brussel et al. [8] described the outbreaks of feline panleukopenia between 2014 and 2018 in Australia, New Zealand and the United Arab Emirates (UAE) where the disease had not been reported for several decades. The authors hold the view that each of these outbreaks was caused by a distinct feline panleukopenia virus (*Felis parvovirus*, FPV) with two viral lineages present in eastern Australia. The viruses from the UAE outbreak formed a lineage of unknown origin. The authors explain the new reported cases of the disease by the fact that feline panleukopenia viruses circulating in the feral cat population may occasionally infect pet cats [6, 8, 9].

The examples found and analyzed by the authors allow to identify the following pattern: the violation of quarantine rules and insufficient vaccination coverage in cats are common factors in all the disease outbreaks precipitating the multiple recurrent outbreaks of the disease [6, 8, 10].

According to the literature data, animal shelters are conducive environments for the disease outbreak occurrence or recurrence because of a large number of susceptible animals living together in a confined area [1, 4]. It should be emphasized that such factors as young age, immunological naivety or immunosuppression, close contact and co-morbidities (the presence of endo- and ectoparasites) exarcebate the disease progression [2, 7]. Issues related to the spread, prevention and treatment of panleukopenia [1, 2, 4, 5, 9, 11, 12], as well as the studies and detailing of the clinical signs that can most accurately characterize this pathology [7, 11, 13–15] still remain relevant for veterinary practitioners.

In view of the above, the aim of this paper was the detailed analysis of the clinical signs of panleukopenia in pet and stray cats in the territory of the Donetsk People's Republic.

MATERIALS AND METHODS

To achieve the aim of the paper, commonly available research methods were applied when studying the documentary records of veterinary clinics and analyzing the findings. The following types of veterinary records were used: a veterinary case log, an infectious disease registration log, animal patients' records.

The monitoring studies were conducted at the facilities of the Yasinovataya municipal state-financed veterinary hospital, the charitable animal shelter of the LLC "RPA "Yasinovataya machine-building plant", the private veterinary office "Invet", as well as of the veterinary clinics ("Bagira", "Aybolit", "Dingo") of the city of Donetsk.

The cases covered by the study included the diseased cats that had received ambulatory care in the period from 2015 to 2018.

The findings were statistically processed and presented in the form of a diagram and tables.

RESULTS AND DISCUSSION

During the reporting period, 1,216 cats with the signs of panleukopenia were reported. The diagnosis was made based on the case history, clinical signs and confirmed by laboratory tests of blood (a complete blood count and a biochemical analysis). For blood tests, commercial immunochromatography assay (ICA) test kits were used in 60% of cases.

The reported clinical signs of panleukopenia in cats were analyzed and grouped according to their occurrence rate and by the age of animals. The obtained results are presented in Table 1.

Data in Table 1 show that cats of all ages can be infected by panleukopenia virus, but young kittens (the 1–6 month age group) are the most susceptible: the body stops resisting when colostral antibody levels decline to the threshold value, and the kittens develop the pronounced clinical signs of the disease.

Primary symptoms in this category of animals include the following: apathy, hyperthermia, ataxy, crouched posture, exicosis, thirst (however, animals refuse to drink); dry, cyanotic oral mucosa; edematous laryngeal mucosa; cachexia; dull dishevelled coat; dry and atonic skin.

Besides, non-specific symptoms (48.8%) were reported in most kittens. The following gastrointestinal symptoms (11.8%) were recorded: vomiting (foamy vomit with

Table 1
Clinical signs of panleukopenia in cats

Таблица 1
Клинические признаки при заболевании панлейкопенией кошек

Symptoms	Age group				
	1–6 months	6–12 months	1–6 years	6–12 years	over 12 years
Primary	142	93	72	28	21
%	35.0	38.0	23.7	15.2	27.3
GIT	48	54	37	51	16
%	11.8	22.0	12.2	27.7	20.8
CNS	18	3	–	1	8
%	4.4	1.2	0.0	0.5	10.4
Reproductive system	–	–	38	17	4
%	0.0	0.0	12.5	9.2	5.2
Non-specific	198	95	157	87	28
%	48.8	38.8	51.6	47.4	36.3
Total number of animals (100%)	406	245	304	184	77

GIT – gastrointestinal tract (желудочно-кишечный тракт);
CNS – central nervous system (центральная нервная система).

admixed bile and blood), after abdominal palpation – pain and vomiting, diarrhea (voluminous, watery, often with admixed blood and fibrin, foamy). Palpation revealed non-mobile, thickened, painful (resembling a rubber tube), fluid- and gas-dilated intestinal loops; a succussion splash was heard on auscultation. The disease was also characterized by other symptoms such as rhinitis, optic nerve atrophy, retinal dysplasia, seizures, paresis, paralysis of limbs and internal organ sphincters, head tremor (cerebellar hypoplasia), often followed by death, and these may be indicative of intrauterine infection of kittens from the cats that had not been vaccinated against panleukopenia or from the virus carrier cats.

In animals aged between 6 and 12 months primary and non-specific symptoms were mainly reported (38.0 and 38.8% respectively), whereas central nervous system symptoms were reported only in 3 cases (1.2%), and this may be indicative of the fact that the animals had not been intrauterinally infected, but had contracted the disease independently. The signs of central nervous system disorders can also be regarded not as stand-alone ones, but as the symptoms of intoxication.

The following symptoms were reported in pregnant queens (the 1–12 year age group): during the first stage of gestation – fetal death and resorption, return to estrus; during the second stage – abortion or passage of mummified fetuses; during the third stage – congenital malformations (the replication and spread of the virus in the lymphoid tissues, eyes and nervous system of the fetus resulting in hydrocephalus, ophthalmic abnormalities and, first and foremost, in cerebellar hypoplasia). As for the male cats of this age group, unproductive copulations were reported.

Along with primary and non-specific symptoms of panleukopenia, such symptoms as moist rales (pulmonary edema), optic nerve atrophy were often reported in cats aged over 12 years. The last-mentioned symptom is ambiguous, since it is associated with age-related changes rather than with the disease. Gastrointestinal symptoms (20.8%) also require further differential diagnosis taking into account age-related changes. The symptoms of reproductive disorders (5.2%) mostly manifest themselves in the form of spontaneous abortions and return to estrus.

The figure shows the percentages of reported clinical symptoms of feline panleukopenia by age groups.

Panleukopenia morbidity in pet and stray cats was also analyzed in terms of age and sex. The results are presented in Table 2.

According to the data presented in Table 2, the number of panleukopenia cases in stray kittens aged 0–12 months is 1.8 times higher than in pet kittens of the same age group. Panleukopenia cases in adult stray cats of the 1–12 year age group were reported 2.4 times more frequently than in pet cats of the same age group. This is due to the fact that pet cats, unlike stray ones, are kept under supervision and any changes in the animal's behavior can prompt the owner to contact the veterinarian. The number of diseased kittens is 2.1 times higher than that of adult cats, and the number of diseased stray cats is 1.9 times higher than that of pet cats. Morbidity rates for female cats are 1.5 times higher than for male cats.

As a result of the study, it was found that most of the clinical symptoms of panleukopenia were reported in cats of all age groups irrespective of their sex. However, attention should be paid to the fact that specific symptoms characteristic for certain age groups were reported.

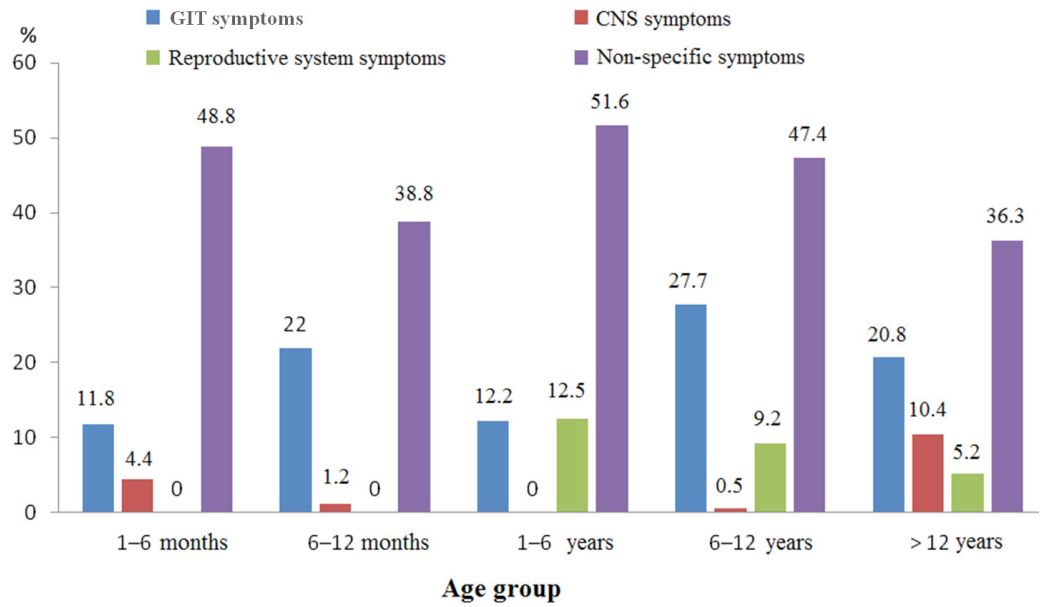

Fig. Reported symptoms of feline panleukopenia by age groups, %

Рис. Регистрируемые симптомы при панлейкопении кошек по возрастным категориям в процентах

Besides, it should be noted that the period from 2015 to 2018 was characterized by an increase in panleukopenia morbidity in stray animals; pet cats were also involved in the epidemic process.

The analysis of data from the studies reveals the following pattern: an increase in morbidity occurs early in the year because of the feline mating season; the next peak occurs in spring and is associated with the loss of colostral immunity in young animals; another one that occurs in autumn and winter period results from the dispersal of young animals seizing new territories and related conflicts. The reduction of the rates is observed during the offspring raising period when adult cat movements are limited and young animals have not yet become independent.

Summing up the intermediate results, it can be stated that the following measures still remain relevant: activities to raise awareness with regard to observance of veterinary and sanitary, as well as animal hygiene measures; balanced feeding, appropriate care and maintenance of cats in homes and in animal shelters; mandatory quarantine of all the animals entering catteries and shelters; obligatory disinfection (of animal facilities, tools, equipment and supplies), disinsection and deratization activities. Spaying and neutering of stray and pet cats contribute to the improvement of the epidemic situation.

We see the prospects for further research on this issue in more detailed studies and improvement of diagnostic methods, as well as in refinement of existing treatment regimens for this pathology. In our view, systemic disease prevention measures help reduce morbidity in pet and stray cats, and this is directly related to the annual vaccination of the entire animal population.

CONCLUSION

Feline panleukopenia persists in the territory of the Donetsk People's Republic. The period from 2015 to 2018 was characterized by an increase in panleukopenia morbidity in stray animals; pet cats were also involved in the

Table 2
Panleukopenia morbidity rates in cats by age and sex

Таблица 2
Характеристика заболеваемости кошек панлейкопенией по возрастным и половым признакам

Cat age/sex	Stray cats		Pet cats		Total number of cases
	animals	%	animals	%	animals
Kittens aged 0–12 months	526	64.3	292	35.7	818
Adult cats aged 1–12 years	282	70.9	116	29.1	398
of which – female	144	60.5	94	39.5	238
– male	51	31.9	109	68.1	160
Total	808	–	408	–	1,216

epidemic process. Notably, most of the clinical symptoms of panleukopenia were reported in cats of all age groups irrespective of their sex. Specific symptoms characteristic for different age groups were also reported.

Panleukopenia morbidity rates for stray kittens aged 0–12 months were 1.8 times higher than those for pet kittens of the same age group. The disease was reported 2.4 times less frequently in adult pet cats than in stray cats. The number of the disease cases in female cats is 1.5 times higher than in male ones.

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