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Prevalence of feline panleukopenia in domestic cats and current therapeutic methods

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ABSTRACT

Introduction. The causative agent of feline panleukopenia belongs to the *Parvoviridae* family; it is species-specific to felines and is not transmissible to humans. The particular danger of the disease lies in its rapid course and high mortality rate, especially among kittens, as animals under six months of age exhibit weakened immunity. The virus targets bone marrow and intestinal cells, causing severe inflammatory processes, dehydration, and sepsis.

Objective. To study the prevalence of feline panleukopenia in domestic cats in the city of Kislovodsk and to review current therapeutic methods for managing this infection

Materials and methods. The study focused on data from primary veterinary outpatient record of sick animals admitted to the veterinary clinic "Chip and Dale" in Kislovodsk during the period from 2020 to 2024. Clinical and therapeutic studies using polymerase chain reaction, veterinary rapid tests, and combined rapid tests were conducted in September 2025.

Results. Analysis of the nosological profile of infectious diseases in cats in Kislovodsk from 2020 to 2024 revealed that for five consecutive years, the most common disease was feline viral rhinotracheitis (357 recorded cases), followed by feline panleukopenia (226 cases). This paper examines several clinical cases of feline panleukopenia in detail, where the final clinical diagnosis was established based on a combination of clinical and laboratory data. Laboratory blood tests revealed decreased levels of leukocytes, erythrocytes, and platelets (pancytopenia). Due to the timely visits of the owners to the veterinarian and the subsequent comprehensive treatment of the kittens (infusion therapy, immunostimulants, antiviral therapy, antibiotic therapy, vitamins, antiemetics, antipyretics, analgesics, and probiotics), positive clinical dynamics were successfully achieved. Two weeks post-recovery, the animals were vaccinated, followed by treatment against ecto- and endoparasites a few days later. Booster vaccination (revaccination) was performed after 21 days.

Conclusion. When the first signs of disease appear in cats, immediate consultation with a veterinarian is necessary, and therapeutic measures should be comprehensive and prompt.

Keywords: panleukopenia, cats, retrospective analysis, nosological profile

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Распространенность панлейкопении у домашних кошек и современные методы лечения

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РЕЗЮМЕ

Введение. Возбудитель панлейкопении относится к семейству парвовирусов и специфичен для кошек, человеку не передается. Особая опасность болезни заключается в ее стремительном течении и высокой смертности, особенно среди котят, так как у животных в возрасте до 6 мес. ослаблен иммунитет. Вирус поражает клетки костного мозга и кишечника, вызывая тяжелые воспалительные процессы, обезвоживание и сепсис.

Цель исследования. Изучение распространения панлейкопении среди домашних кошек в г. Кисловодске и обзор современных методов лечения данной инфекции.

Материалы и методы. Предметом исследования явились сведения журналов первичного ветеринарного амбулаторного приема больных животных в ветеринарной клинике «Чип и Дейл» г. Кисловодска за период с 2020 по 2024 г. Клинико-терапевтические исследования с применением полимеразной цепной реакции, ветеринарных экспресс-тестов и комбинированных экспресс-тестов проводились в сентябре 2025 г.

Результаты. Анализируя нозологический профиль инфекционных заболеваний кошек в г. Кисловодске в 2020–2024 гг., пришли к выводу, что на первом месте на протяжении 5 лет самым распространенным заболеванием был вирусный ринотрахеит (357 зарегистрированных случаев), на втором – панлейкопении кошек (226 случаев). В данной работе подробно рассмотрены несколько клинических случаев панлейкопении кошек, которым окончательный клинический диагноз устанавливали на основании совокупности клинических и лабораторных данных. При проведении лабораторных исследований крови животных выявлено снижение количества лейкоцитов, эритроцитов и тромбоцитов (панцитопения). Обращение владельцев к ветеринарному

врачу было своевременным, по результатам комплексного лечения котят (инфузионная терапия, иммуностимуляторы, противовирусная терапия, антибиотикотерапия, витамины, противорвотные препараты, жаропонижающие, обезболивающие, пробиотики) удалось достигнуть положительной динамики. После выздоровления, через 2 нед., животные были вакцинированы, а затем через несколько дней обработаны от экто- и эндопаразитов. Через 21 день была проведена ревакцинация.

Заключение. При появлении у кошек первых симптомов заболевания необходимо срочное обращение к ветеринарному врачу, терапевтические мероприятия должны проводиться комплексно и безотлагательно.

Ключевые слова: панлейкопения, кошки, ретроспективный анализ, нозологический профиль

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INTRODUCTION

Feline panleukopenia virus belongs to the viral species *Protoparvovirus carnivoran 1* (Feline panleukopenia virus, FPV) and is specific to felines. It poses no threat to humans, as its structure and infection mechanism are exclusively adapted to animals [1, 2].

Feline panleukopenia is one of the most serious viral infections in veterinary medicine. This disease is ubiquitous and is particularly dangerous for kittens under 6 months of age, whose immune system is not yet fully developed. Feline panleukopenia is characterized by the rapid progression of pathological processes in the bone marrow and intestinal mucosa, leading to a significant decrease in leukocyte count, severe weight loss, and serious gastrointestinal disorders; the immune system is compromised, which facilitates the rapid onset of secondary infections. In severe and advanced cases, sepsis develops, which can be fatal. Clinical signs of the disease include high fever, loss of appetite, vomiting, diarrhoea (often with blood), dehydration, weakness, and depression [3, 4, 5, 6, 7].

Kittens may also exhibit neurological signs (tremors, seizures) associated with central nervous system involvement. The combination of these symptoms requires immediate professional veterinary care, as without treatment the disease progresses rapidly and can be fatal [8, 9].

Feline panleukopenia virus exhibits high stability in the environment, which significantly complicates infection control. It can remain viable outside the host for several months under favourable conditions, such as low temperature and high humidity. The virus is resistant to most household disinfectants, high and low temperatures, and dehydration. For effective disinfection of contaminated facilities, chlorine-based agents (e.g., sodium hypochlorite at a 1:32 dilution) and formaldehyde-based agents are recommended. Thorough cleaning, decontamination of animal care items, and preventing contact of healthy animals with the excretions of infected animals are key measures to prevent the spread of infection. Underestimating the virus's environmental stability largely leads to outbreaks in animal shelters and rescues [10, 11, 12].

Although the feline panleukopenia virus poses no risk to humans, a person who has been in contact with an infected animal can transmit this virus to healthy, but

unvaccinated cats with weakened immune systems via clothing, hair, or household items.

Despite modern advances in veterinary medicine, the disease remains an unresolved issue where prevention and timely treatment are absent. Therefore, feline panleukopenia is widespread globally and poses a serious threat to both domestic cats and wild felines [13, 14, 15].

The purpose of the study is to investigate the prevalence of feline panleukopenia in domestic cats in the city of Kislovodsk and to review modern methods of its treatment.

MATERIALS AND METHODS

The study focused on data from primary veterinary outpatient record of sick animals admitted to the veterinary clinic "Chip and Dale" in Kislovodsk from 2020 to 2024. Clinical and therapeutic studies were conducted in 2025 in accordance with Directive 2010/63/EU of September 22, 2010, on the protection of animals used for scientific purposes.

A comprehensive approach was used for diagnosis, including history taking, rapid tests, polymerase chain reaction (PCR) diagnosis (samples were sent to the "Vet Union" laboratory), and other examinations.

For the diagnosis of feline infectious diseases, rapid test kits manufactured by EDbio (Russia) were used, including: "Feline calicivirus infection Ag (FCV Ag)", "Feline infectious peritonitis Ab (FIP Ab)", "Feline rhinotracheitis Ag (FHV Ag)", and a combined test for "Feline immunodeficiency Ab + Feline leukemia Ag (FIV Ab + FeLV Ag)".

For the qualitative detection of the panleukopenia pathogen in feline feces, Global Lab (China) veterinary rapid tests based on the lateral flow immunochromatographic method were used. For the differential detection of panleukopenia virus and feline coronavirus antigens in feces (rectal swabs) or vomitus, a combined rapid test by EDbio (Russia) was used "Feline panleukopenia Ag + Feline coronavirus Ag (FPV Ag + FCoV Ag)".

Hematological parameters in cats infected with feline panleukopenia virus were determined using the Human GmbH automatic hematology analyzer (Germany); manual blood smears were also taken, and cellular elements were counted using a microscope (Micromed, Russia).

RESULTS

In 2020, the veterinary clinic “Chip and Dale” reported 182 cases of infectious diseases in cats, including: 80 (44.0%) – feline viral rhinotracheitis (herpesvirus infection), 36 (19.8%) – feline panleukopenia, 23 (12.6%) – feline calicivirus infection, 18 (9.9%) – feline immunodeficiency virus infection, 10 (5.5%) – feline leukemia, 10 (5.5%) – feline enteric coronavirus infection, and 5 (2.7%) – feline infectious peritonitis.

In 2021, out of 197 reported cases, the distribution was as follows: 78 (39.6%) – feline viral rhinotracheitis, 55 (27.9%) – feline panleukopenia, 19 (9.6%) – feline enteric coronavirus infection, 17 (8.6%) – feline calicivirus infection, 11 (5.6%) – feline leukemia, 10 (5.1%) – feline immunodeficiency virus infection, and 7 (3.6%) – chlamydiosis.

In 2022, out of 161 reported cases, the distribution was as follows: 69 (42.9%) – feline viral rhinotracheitis, 39 (24.2%) – feline panleukopenia, 17 (10.6%) – feline calicivirus infection, 13 (8.1%) – feline immunodeficiency virus infection, 12 (7.4%) – feline enteric coronavirus infection, and 11 (6.8%) – feline leukemia.

In 2023, out of 160 reported cases, the distribution was as follows: 56 (35.0%) – feline viral rhinotracheitis, 41 (25.6%) – feline panleukopenia, 22 (13.8%) – feline calicivirus infection, 22 (13.8%) – feline immunodeficiency virus infection, 11 (6.8%) – feline enteric coronavirus infection, and 8 (5.0%) – feline leukemia.

In 2024, out of 203 reported cases, the distribution was as follows: 74 (36.4%) – feline viral rhinotracheitis, 55 (27.1%) – feline panleukopenia, 31 (15.3%) – feline immunodeficiency virus infection, 24 (11.8%) – feline calicivirus infection, 11 (5.4%) – feline enteric coronavirus infection, 6 (3.0%) – feline leukemia, and 2 (1.0%) – chlamydiosis.

Thus, analysis of the nosological profile of feline infectious diseases in Kislovodsk from 2020 to 2024 reveals that viral rhinotracheitis ranked first as the most common

disease throughout the five-year period, followed by feline panleukopenia in second place (Fig.).

This paper presents the results of a study of several clinical cases of feline panleukopenia.

In 2025, the owners of 8 grey Scottish breed cats visited the clinic with complaints of a sudden deterioration in their animals' condition, including high fever, diarrhea, and apathy. The cats were between 8 and 10 months of age and had not been vaccinated or treated for ecto- or endoparasites.

Upon auscultation, clear breathing with no wheezing was reported. The first clinical manifestations were observed from 2 to 10 days after infection; the incubation period depended on the immune status of the animals. The main symptoms included: high fever (up to 40–41 °C) that persisted for several days; lethargy; apathy; refusal to eat and drink; vomiting, often repeated, which exacerbated dehydration; diarrhea, sometimes with blood, or foul-smelling. Dehydration developed very rapidly, manifesting as dry mucous membranes and loss of skin turgor.

Diagnostic tests detected the feline panleukopenia virus antigen in the biological samples tested. The final clinical diagnosis was established based on a combination of clinical and laboratory data.

On day 3 of the disease, haematological testing revealed that the leukocyte count, including segmented neutrophils and monocytes, was below the reference range. A decrease in erythrocyte count, hemoglobin, hematocrit, and platelet levels was also observed.

Following intensive treatment, by day 5 of the disease, the leukocyte count increased by 31%, segmented neutrophils by 12%, the erythrocyte count by 22%, the hemoglobin level rose by 18%, hematocrit by 27%, and platelets by 8%.

On day 9 of the disease, stabilization of the aforementioned parameters within the reference range was recorded (Table).

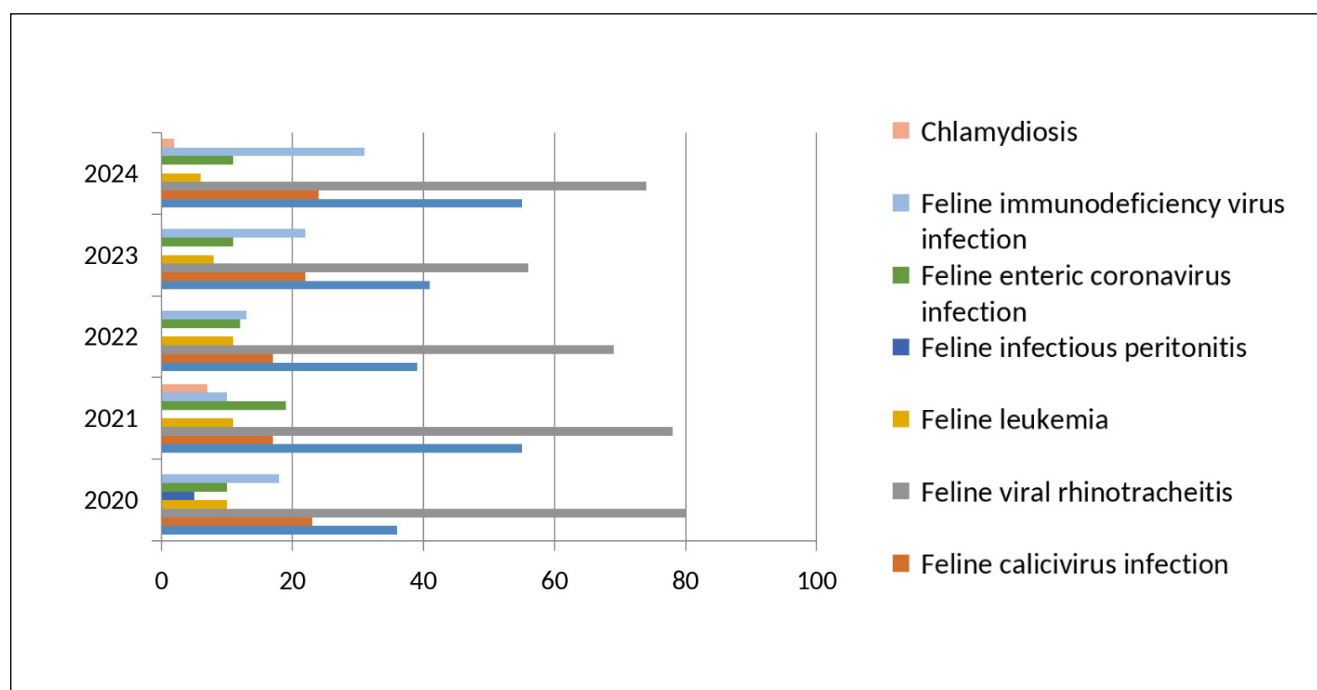


Fig. Nosological profile of feline infectious diseases in Kislovodsk, 2020–2024

Table
Hematological parameters of cats affected by feline panleukopenia

Parameter	Unit	Reference range	Day 3 of disease	Day 5 of disease	Day 9 of disease
Leukocytes	$\times 10^9/L$	5.5–18.5	5.0 ± 0.2	$7.2 \pm 0.43^*$	8.0 ± 0.48
Erythrocytes	$\times 10^{12}/L$	5.3–10.0	4.38 ± 0.3	$5.6 \pm 0.34^*$	7.1 ± 0.43
Hemoglobin	g/L	80.0–150.0	68.0 ± 4.1	$82.8 \pm 5.0^*$	101.5 ± 6.1
Hematocrit	%	26.0–48.0	20.9 ± 1.3	$28.5 \pm 1.7^*$	33.6 ± 2.0
Mean corpuscular volume	fL	43.0–53.0	46.0 ± 2.8	48.7 ± 3.0	49.0 ± 2.5
Mean corpuscular hemoglobin	pg	14.0–19.0	15.0 ± 0.9	16.3 ± 1.0	16.3 ± 0.8
Mean corpuscular hemoglobin concentration	g/L	310.0–360.0	315.0 ± 4.9	316.1 ± 5.3	320.0 ± 6.0
Erythrocyte distribution width	%	14.0–19.0	16.6 ± 1.0	16.2 ± 0.9	16.3 ± 1.1
Platelets	$\times 10^3/L$	200.0–630.0	187.0 ± 5.2	$204.0 \pm 4.5^*$	255.5 ± 6.7
Plateletcrit	%	0.2–0.5	0.2 ± 0.01	0.2 ± 0.01	0.3 ± 0.02
Mean platelet volume	fL	8.2–12.0	8.4 ± 0.5	8.5 ± 0.6	9.9 ± 0.5
Platelet distribution width	%	0.0–55.0	21.0 ± 1.3	23.3 ± 1.1	30.2 ± 1.8
Erythrocyte sedimentation rate	mm/h	0.0–13.0	8.0 ± 0.5	7.6 ± 0.38	7.8 ± 0.5
Segmented neutrophils	%	35.0–75.0	34.0 ± 2.0	$38.8 \pm 2.3^*$	42.5 ± 2.6
Band neutrophils	%	0.0–3.0	2.0 ± 0.12	1.5 ± 0.09	1.7 ± 0.1
Lymphocytes	%	20.0–55.0	47.7 ± 3.2	46.2 ± 2.1	49.7 ± 3.0
Monocytes	%	1.0–4.0	1.0 ± 0.5	$3.6 \pm 0.22^*$	3.4 ± 0.2
Eosinophils	%	0.0–4.0	2.3 ± 0.14	2.0 ± 0.12	2.2 ± 0.11
Basophils	%	0.0–1.0	0.6 ± 0.04	0.4 ± 0.02	0.3 ± 0.01
Plasma cells	%	0	0	0	0
Metamyelocytes	%	0	0	0	0
Myelocytes	$\times 10^3/L$	0	0	0	0

* $p \leq 0.05$ – the difference is statistically significant compared to the values on day 3 of the disease.

The animals were prescribed comprehensive treatment. First, infusion therapy: as feline panleukopenia is accompanied by severe dehydration due to vomiting and diarrhea, the primary goal was to restore fluid and electrolyte balance. Intravenous infusions of 0.9% sodium chloride, Ringer – Locke's solution, and 5% glucose were administered until full rehydration (a 10day course), which helped maintain heart and kidney function. Vitamin B₁₂ was given to stimulate regeneration of the intestinal mucosa, support leukocyte production, hemoglobin synthesis and erythrocyte formation, as well as to improve appetite and digestion. Second, the following was prescribed: the antivirals "Favirox" (90 mg/kg twice daily for 10 days) and the immunostimulant "Maxidin" (0.5 mL subcutaneously twice daily for 5 days). Because a weakened immune system increases the risk of secondary bacterial infections, the broad-spectrum antibiotic ceftriaxone (40 mg/kg for 10 days) was administered intramuscularly to prevent complications. Antiemetics – maropitant (1 mg/kg) and ondansetron (0.5 mg/kg) – were given for 3–5 days if clinically indicated. Antipyretics and analgesics were used

when fever and significant distress were present: analgin (50 mg/kg) or ketoprofen (1 mg/kg). Medications to normalise digestion (probiotics) were prescribed for 7 days.

Veterinary medical care was sought in a timely manner. As a result of the interventions, positive outcomes were achieved in all 8 cats diagnosed with feline panleukopenia.

The criteria for clinical recovery on days 9–10 included: negative diagnostic tests for the pathogen antigen; normalization of appetite and behavior; absence of vomiting and diarrhea; restoration of hydration; absence of fever; maintenance of body weight; hemoglobin, leukocyte, erythrocyte, and platelet levels within the reference range. After recovery, two weeks later, the animals were vaccinated and then, a few days later, treated for ecto- and endoparasites. Booster vaccination (revaccination) was performed after 21 days.

DISCUSSION

Feline panleukopenia is a highly severe, rapidly progressing viral disease in felines, which is particularly dangerous for kittens and non-immunized animals [16, 17].

In urban environments, feline panleukopenia is characterized by seasonal outbreaks that are more frequently reported in spring and autumn, which is driven by climatic features, the animals' reproductive cycle, and conditions favorable to the spread of infection [18].

Several authors have reported an increase in the number of feline panleukopenia cases. For example, in the city of Tyumen, 19 infected cats were identified in 2012, 69 cats – in 2013, and in 2014 the number of affected cats increased to 94. A similar trend persisted in subsequent years: in 2015, feline panleukopenia was diagnosed in 145 animals, and in 2016 – in 208 animals [19]. This increase in cases may be associated with the growing popularity of purebred cats, the lack of specific prophylaxis, and weakening of the organism resulting from non-compliance with zoohygiene standards, as well as helminth and ectoparasite infestations.

In the city of Ivanovo, 425 cases of feline panleukopenia were detected between December 2020 and December 2022, while in the city of Vladimir, 126 cases were identified [15].

The high contagiousness and environmental stability of the virus necessitate early diagnosis, intensive treatment, and preventive measures, the most important of which is vaccination [16, 17].

According to the 2024 Guidelines for the Vaccination of Dogs and Cats, compiled by the Vaccination Guidelines Group (VGG) and the World Small Animal Veterinary Association (WSAVA), the core vaccines for feline immunization relevant across all parts of the world are those against feline panleukopenia, viral rhinotracheitis, and calicivirus infection. WSAVA recommends vaccinating kittens with the first dose of the trivalent core vaccine at 6 to 8 weeks of age, then every 2–4 weeks until they reach 16 weeks of age or older, followed by a booster vaccination at 26 weeks of age or older – by that time the level of maternal antibodies decreases sufficiently. These recommendations are based on evidence that maternal antibody interference is significant and prolonged in some kittens, rendering vaccination ineffective [20].

The outcome of feline panleukopenia largely depends on the animal's age, the timeliness of treatment initiation, and the severity of systematic damage. Early consultation with a veterinarian and adherence to all prescribed measures or treatment protocol lead to positive progression of the disease and eventually to recovery. In adult animals, recovery tends to be faster, and the prognosis is more favorable – up to 80% of affected animals make a full recovery. In kittens younger than 3 months, the risk of death is significantly higher, especially when veterinary care is sought late [21, 22].

To prevent the spread of the disease, it is necessary to:

- isolate felines that are sick or suspected of having feline panleukopenia;
- prevent contact with other animals and with felines that have outdoor access;
- avoid transporting the animal except for visits to veterinary clinics.

Preventive measures: avoid visiting places with high animal density (e.g., shelters, exhibitions) if the animals are not vaccinated; control the entry and exit of people

into the facilities (change of footwear and clothing, hand disinfection); provide optimal housing and feeding for cats (balanced nutrition and vitamin therapy); regularly vaccinate animals with combination vaccines; monitor immune status, especially in kittens and immunocompromised animals [23].

Disinfection of facilities and items is carried out using chlorine-containing solutions in working concentrations; formaldehyde is also effective, but requires caution in application and compliance with airing periods. It is critical to thoroughly disinfect cages, bowls, toys, clothing, and instruments; it is preferable to dispose of the animal's toys, clothing, and soft pet accessories (soft bedding and fabric items). These disinfection methods significantly reduce the risk of virus spread and the severity of the disease [23].

For the treatment of feline panleukopenia, J. K. Rice developed a protocol that included: the administration of neupogen (for the first 3 days, followed by a 1-day break, and resuming intake for the next 2 days); the prescription of baytril and penicillin – two broad-spectrum antibiotics; infusion therapy; the use of an antiemetic drug; the administration of vitamin B₁₂ or a vitamin complex; and a transition to A/D Hills dietary food [24].

Experimental studies, performed by I. O. Pereslegina et al., evaluated the efficacy of two treatment protocols for feline panleukopenia. The study included 10 animals (5 male and 5 female felines) aged 4 to 8 months diagnosed with feline panleukopenia, which were divided into 2 groups. The first group was prescribed a treatment course consisting of: fosprenil (0.5 mL/kg subcutaneously for the first 5 days, followed by 0.2 mL/kg twice daily for up to 10 days); gamavit (0.5 mL/kg twice daily intravenously or subcutaneously for the first 5 days, followed by the same dose once every 3 days for up to 2 weeks); maxidin (0.5 mL subcutaneously twice daily for 5 days); Ringer's solution and 5% glucose (infusion therapy was divided into 2 administrations: morning and evening); amoxicillin (3 subcutaneous injections every other day); barium sulfate as a sorbent (once daily orally), tailored individually until diarrhea symptoms resolved; and cerucal (0.3 mL intramuscularly 2 daily) for the relief of vomiting symptoms. The animals in the second group were prescribed a treatment course, consisting of: "Vitafel" serum (1 dose subcutaneously, repeated after 24 hours), concurrently with tavegil (0.3 mL intramuscularly); feliferon (400,000 IU intramuscularly once daily for 5 consecutive days); "Vitam" vitamin-amino acid complex (2 mL subcutaneously twice daily for 5 consecutive days); Ringer's solution and 5% glucose (infusion therapy divided into two administrations: morning/evening); amoxicillin (3 subcutaneous injections every other day); barium sulfate (orally once daily) until diarrhea symptoms resolved; and cerucal (0.3 mL intramuscularly twice daily). In the first group, the leukocyte count after 10 days of treatment was within the reference range, whereas in the second group, leukopenia persisted even after 10 days. By the 10th day, the erythrocyte sedimentation rate in the first group decreased to the upper limit of the reference range, while in the second group, it remained above normal values [25].

Akmatova E. K. et al. used a treatment protocol

for feline panleukopenia that also included fosprenil, gamavit, maxidin, amoxicillin, infusion therapy, and cerucal. Additionally, symptomatic therapy was performed: 2% papaverine hydrochloride and No-spa® (drotaverine) were used to relieve intestinal spasms; the antihistamine diphenhydramine was given to reduce the risk of allergic reactions; and nikethamide was used to support cardiac function. Recovery of the cats occurred on days 10–12 of intensive treatment [18].

Thus, the results of the study showed that the proposed treatment protocol for feline panleukopenia is effective, as 100% of the animals recovered by days 9–10. The authors would therefore recommend it for use in veterinary practice.

CONCLUSION

The analysis of the disease situation in the city of Kislovodsk, Stavropol Krai, as well as the review of scientific publications, has revealed that several Russian territories are still infected by feline panleukopenia and the disease is widespread in pets in recent years.

Therapy for feline panleukopenia should include the following components: intravenous drip infusion of solutions, combating dehydration, restoration of electrolyte and acid-base balance; symptomatic therapy (antiemetics, antidiarrheals, antispasmodics); antibiotics (prevention of secondary bacterial infections); antiviral agents; cellular nutrition and detoxification; hemo and immunostimulation. At the manifestation of the first symptoms, urgent consultation with a veterinarian is required, and therapeutic measures should be comprehensive and immediate.

An attentive approach to pet health and adherence to sanitary standards will help prevent the spread of the infectious agent both at home and in the environment. The primary method of preventing feline panleukopenia is timely vaccination, which provides reliable protection against the disease. It is recommended to begin vaccinating kittens at 8 weeks of age, followed by booster vaccination.

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