

CONDUCTION OF MONITORING OF CANINE PARVOVIRUS AT CONDITIONS OF CLINIC "HEALTH" OF THE SUMY REGION

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Canine parvovirus (CPV) was isolated in dogs in 1978. It is an off-shoot of feline panleukopenia virus (FPLV). Because of widespread nature of the CPV infection and paucity of information on its epidemiology in Ukraine, there is need to carry out a retrospective study of the disease in Ukraine. Data on reported and confirmed cases of CPV infection presented to Health Veterinary Clinic, Sumy between 2015 and 2018 were reviewed. The data were sorted according to age, sex, breed, and treatment regimen and vaccination status. The overall prevalence rate was 2.1 %. Age, sex, breed, vaccination status showed association with the rate of infection. Puppies less than 6 month old 43 (68.3 %) had higher incidence rate than those older than 6 months. Males 36 (57.1 %) were more affected than the females 27 (42.9 %), while exotic breeds 43 (68.3 %) were more affected than the local breeds 20 (31.7 %) and the number of dogs 59 (93.7%) that recovered from the disease was higher than those that died 4 (6.3 %). However, more dogs were not vaccinated 46 (73.0 %) as compared to the vaccinated dogs 17 (27.0 %). The incidence 25 (40.0 %) was observed in 2017. In conclusion, there is high prevalence of CPV infection in Ukraine with young, male and exotic breeds being affected much more than old, female and local breeds. Low incidence of death rate among the affected dogs may be attributed to successful immunization against the disease.

Keywords: dogs, canine parvovirus enteritis, epidemiology, prevalence, Ukraine.

Introduction. The first mammal to be domesticated by man was dog (*Canis familiaris*). They had since lived together as companions and were useful to man as working partners, pets [1, 3]. The affection developed by humans towards dogs continues till date [4, 5]. Canine parvovirus (CPV) infection is a highly contagious, fatal disease of dogs, affecting mostly, the gastrointestinal tract. The infection has no predilection for age, sex or breed of dogs. But Doberman pinscher, Rottweiler and German shepherd are at greater risk of the infection as compared to other breeds [2, 7]. It is a major cause of morbidity and mortality in puppies [8, 9]. It is transmitted from infected to susceptible dogs through faecal-oral route and exposure to fomites [2, 6, 9]. It is also transmitted by house flies, flesh flies and blow/bottle flies [5, 9]. The disease is characterized by anorexia, vomiting, bloody diarrhea, lethargy, myocarditis and leucopaenia [10, 11]. CPV is a small, non-enveloped, linear, single-strand DNA virus of the family Parvoviridae [12]. Three antigenic variants of CPV-2 (2a, 2b and 2c) have been reported to be in circulation globally, and their frequency of occurrence varies according to the geographical location [12, 16, 19]. Diagnosis is by clinical signs including fever, nausea, abdominal pain, vomiting and bloody diarrhea [15, 17, 18]. Confirmatory diagnosis is by electron microscopy, viral isolation, fecal hemagglutination, latex agglutination, counter-immunoelectrophoresis, immunochromatography, and polymerase chain reaction, PCR [20, 21, 22]. PCR has been shown to be more sensitive and reliable than other diagnostic methods [23, 24].

CPV infection is primarily treated using supportive care, fluid therapy (crystalloid fluids, synthetic and natural colloids), combination of antibiotics, antiemetics, analgesics, nutritional support, and anthelmintics [25, 26]. Prevention of the disease is by vaccination, 3 doses given at 6, 9, and 12 weeks of age using attenuated or modified live vaccines [27, 28]. However, some commercial CPV vaccines lack ability to stimulate

immunity against CPV-2 infection in puppies with high titers of maternally derived antibodies [31, 35]. The cause of vaccine failure is maternal antibodies which should be checked before vaccination [30, 34]. Because of the widespread of CPV infection worldwide, there is need to study prevalence of the disease in Ukraine.

Materials and methods. The data were collected from Health Veterinary Clinic, a private veterinary clinic located in Sumy Oblast Ukraine. It is located on 50°55'17.76" N 34°48'1.04" E (<http://latitude.to/map/ua/ukraine/cities/sumy>).

The records of dogs presented with other diseases and canine parvovirus infection within a period between of 2015 and 2018 were collected and sorted according to age, sex, breeds, vaccination status, type of care and treatment regimen. Diagnosis of the cases were based on history, clinical signs and laboratory findings using X-ray, ultrasound and SensPERT® Canine Parvovirus Antigen Test Kit. The prevalence and associated risk factors of CPV disease were analysed and presented using chi square and significant differences was detected at 5 % level [23, 36].

Result. Out of 3,010 cases presented to the Health Veterinary Clinic within the study period, 63 (2.1 %) cases were diagnosed of canine parvovirus infection. Dogs less than 6-month-old, 43 (68.3 %) were more affected than those more than 6-month-old, 20 (31.7 %). Females, 27 (42.9 %) were less susceptible as compared to males, 36 (57.1 %). Less affected also, were local breed of dogs, 20 (31.7 %) were less affected as compared to the exotic breeds, 43 (68.3 %). However, unvaccinated dogs, 46 (73.0 %) were more affected than the vaccinated dogs, 17 (27.0 %). In house dogs, 47 (74.6 %) had more incidence rate than the outhouse dogs, 16 (25.4 %) (tab. 1). The highest prevalence rate, 25 (40.0 %) was observed in the year 2017 and by monthly distribution in February and November 9 (14 %) respectively (tab. 3).

Table 1

Distribution of canine parvovirus infection		
Groups	Total number of diagnosed cases	
	Frequency (n)	Percentage (%)
Age (Months)		
<6	43	68.3
>6	20	31.7

Sex		
Male	36	57.1
Female	27	42.9
Breed		
Local	20	31.7
Exotic	43	68.3
Vaccination Status		
Vaccinated	17	27.0
Unvaccinated	46	73.0
Movement of dog		
In house	47	74.6
Out house (Stray)	16	25.4
Treatment		
Recovered	59	93.7
Dead	4	6.3

Table 2

The prevalence of canine parvovirus enteritis among various breeds of dogs at Health Veterinary Clinic, Sumy (2015-2018)

S/No	Breed	Number of affected dogs	Percentage (%)
1	Bernese	1	1.6
2	Mongrel	20	31.7
3	German Shepherd	10	15.9
4	Borzoi Greyhound	1	1.6
5	Siberian Husky	6	9.5
6	American Staffordshire	1	1.6
7	American Bulldog	2	3.2
8	Jack Russell Terrier	2	3.2
9	Chihuahua	1	1.6
10	German Jagdterrier	3	4.8
11	Cane Corso	1	1.6
12	Rottweiler	4	6.4
13	Labrador	4	6.4
14	Schnauzer	2	3.2
15	East European Shepherd	1	1.6
16	Alabai	1	1.6
17	American Pitbull	1	1.6

Table 3

Yearly and monthly distribution of canine parvovirus cases at Health Veterinary Clinic, Sumy between 2015-2018

Period	Total number of diagnosed cases	
	Frequency (n)	Percentage (%)
Year		
2015	13	20.6
2016	15	23.8
2017	25	39.7
2018	10	15.9
Months		
January	8	12.7
February	9	14.2
March	2	3.2
April	2	3.2
May	4	6.4
June	2	3.2
July	4	6.4
August	3	4.8
September	6	9.5
October	8	12.7
November	9	14.2
December	6	9.5

Discussion. This study shows that CPV infection was endemic in Sumy during the period (2015-2018). The prevalence of 2.1 % (63/3,010) disagrees with higher prevalence rate of 3.4 % (84/2486) reported in Slovenia [17, 18]. This may be due to increase awareness of dog vaccination by owners and breeders. The incidence of 43 (68.3 %) for <6-

month-old dogs as well as 20 (31.7 %) for >6-month-old dogs agrees with the reports that dogs within the age limits (i.e. puppies between 6 weeks and 6 months old) are at high risk of the disease [29, 30]. This may possibly be due to a decrease in maternally derived antibodies from vaccinated or naturally infected bitches before primary vaccination, leaving the puppies'

unprotected and therefore vulnerable to CPV infection [22, 23].

The higher prevalence rate 57.1 % (36) in males as compared to females 42.9 % (27) agrees with the findings that male dogs are more affected than the female dogs [27, 28], but disagrees with the finding that females are more susceptible than the males [25, 36]. However, Castro et al. (2007) reported that the disease does not have predilection for sex. Therefore, sex predilection may be due to the preference for male dogs as pets or for security, as compared to female dogs that may be needed much more by breeders.

Higher incidence rate 68.3 % (43) of exotic breed as compared to local breed 20 (31.7 %) as well as highest incidence rate of mongrel 20 (31.7 %), German shepherd 10 (15.9 %), Siberian husky 6 (9.5 %), Rottweiler and Labrador 4 (6.4 %), German Jagdterrier 3 (4.8 %), American bulldog, Schnauzer and Jack Russell terrier 2 (3.2 %), Bernese, Borzoi greyhound, American Staffordshire, Chihuahua, Cane Corso, East European shepherd, Alabai, American pit-bull, King Charles Spaniel and Samoyed breed 1 (1.6 %) agrees with the reports indicating that certain breeds are at increased risk of severe CPV-2 infection. The most affected breeds are Rottweiler, Doberman pinscher, American Pit bull terrier, Labrador retriever, and German shepherd dog [24, 26]. The reason for the breed's susceptibility remains unknown.

The incidence rate 73.0 % (46) of unvaccinated dogs as compared to the vaccinated dogs 17 (27.0 %) agrees with the report indicating that some dogs may lack the ability to stimulate immune response and overcome interference of vaccination by maternal antibodies [11,18]. Young unvaccinated or incompletely vaccinated dogs are most susceptible to the disease [34, 35]. Other affected dogs may be due to poor quality and improper handling of vaccines that may lack the ability to stimulate immune response capable of protecting the puppy of the disease [28, 32]. The all-year-round incidence of infection agrees with the report of Kalli et al. (2010) indicating that breed predisposition and seasonal variation are among the risk factors of CPV infection. The recovery of 59 (93.7 %) from the infection may be due to effects of polypharmacy [12, 13].

Conclusion. CPVE is endemic in Sumy with prevalence rate of 2.1 % affecting young, male, exotic breed, unvaccinated and free roaming dogs more than adult, female, local, vaccinated and in house dogs. The disease occurs in every month of the year affecting mongrel, German shepherd, Siberian husky, Rottweiler, Labrador, German Jagdterrier, American bulldog, Schnauzer, Jack Russell terrier, Bernese, Borzoi greyhound, American Staffordshire, Chihuahua, Cane Corso, East European shepherd, Alabai, American pit-bull, King Charles spaniel and Samoyed breed.

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Фотина А. А., Тион М. Проведение мониторинга парвовируса собак в условиях клиники "Хелс" Сумской области.

В статье приведены разработанные и испытанные методы диагностики и лечения парвовирусного энтерита собак и их особенности. Первый парвовирус собак (называемый CPV-1) был выделен в 1967 году из фекалий здоровой собаки. В течение многих лет считалось, что CPV-1 не вызывает заболевания. Однако, в 1985 году ученые установили, что CPV-1 вызывает гибель плодов, аборт и дыхательные нарушения у новорожденных, когда беременных собак в ходе эксперимента подвергали воздействию вируса. Работа выполнялась на кафедре эпизоотологии и паразитологии Сумского национального аграрного университета, а также в ветеринарной клинике «Хелс», города Сумы. Для определения эффективности различных схем лечения парвовируса нами было подобрано, по соблюдению принципа аналогов, 2 группы больных животных разных пород. При клиническом осмотре обнаружено один из важнейших клинических проявлений парвовирусной инфекции собак - рвота и понос со зловонным запахом, которые приводят к быстрому обезвоживанию организма и смерти в течение первых 24-96 часов болезни.

Ключевые слова: собаки, парвовирусный энтерит, эпидемиология, распространенность.

Фотіна А. А., Тион М. Проведення моніторингу парвовірусу собак в умовах клініки "Хелс" Сумської області.

У статті наведено розроблені і випробувані методи діагностики і лікування парвовірусного ентериту собак і їх особливості. Перший парвовірус собак (званий CPV-1) був виділений в 1967 році з фекалій здорової собаки. Протягом багатьох років вважалося, що CPV-1 не викликає захворювання. Однак, в 1985 році вчені встановили, що CPV-1 викликає загибель плодів, аборт і дихальні порушення у новонароджених, коли вагітних собак в ході експерименту піддавали дії вірусу.

У 1978 році в популяції собак Сполучених Штатів з'явився другий парвовірус. Цей вірус був названий CPV-2, оскільки його властивості відрізнялися від властивостей CPV-1. Основна відмінність полягала в здатності вірусу CPV-2 викликати важку криваву діарею. Хоча точний джерело вірусу CPV-2 невідомий, вважали, що він виник в результаті мутації вже існуючого парвовіруса. Найбільш ймовірними "винуватцями" появи цього вірусу вважають вірус котячої панлейкопенії (чуми кішок), вірус ентериту норок, парвовірус єнотів і лисий парвовірус, оскільки всі вони генетично схожі з вірусом CPV-2. З роками вірус CPV-2 сам зазнав певних мутацій, в результаті яких з'явилися спочатку спіралі вірусу CPV-2a, а потім – CPV-2b. Обидві нові спіралі стали результатом генетичної адаптації вірусу CPV-2 з метою поліпшення його здатності до захоплення клітин і поширенню. В даний час більше 80 % всіх клінічних випадків парвовірусної інфекції у собак викликані вірусом CPV-2b. Вірусні захворювання домашніх тварин в міських умовах надзвичайно поширені і нерідко призводять до загибелі тварин. Робота виконувалася на кафедрі эпизоотології та паразитології Сумського національного аграрного університету, а також у ветеринарній клініці «Хелс», міста Суми. Для визначення ефективності різних схем лікування парвовіроз нами було підбрано, з дотриманням принципу аналогів, 2 групи хворих тварин різних порід. При клінічному огляді виявлено один з найважливіших клінічних проявів парвовірусної інфекції собак - блювота і понос зі смердючим запахом, які призводять до швидкого зневоднення організму і смерті протягом перших 24-96 годин хвороби. Діагностика випадків була заснована на історії, клінічних ознаках та лабораторних виявленнях з використанням рентгенівського, ультразвукового та SensPERT® Canine Parvovirus Antigen Test Kit.

Ключові слова: собаки, парвовірусний ентерит, епідеміологія, поширеність, Україна.