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Análisis epidemiológico retrospectivo de Distemper Canino en la ciudad de Pachuca de Soto, Estado de Hidalgo

Retrospective epidemiological analysis of Canine Distemper in Pachuca of Soto city, Hidalgo State

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Resumen

El virus del distemper canino (VDC) ha sido el causante de la enfermedad vírica multisistémica más difundida, altamente contagiosa y letal de los cánidos, cuya morbilidad varía entre 25-75% y la mortalidad entre 50-90%. El objetivo de la presente investigación fue realizar un estudio epidemiológico de distemper canino de un Hospital Veterinario en la ciudad de Pachuca de Soto, Estado de Hidalgo. Se obtuvo información de 7280 historias clínicas de pacientes caninos atendidos durante el período 2017-2018, de las cuales 65 cumplieron con los criterios de caso positivo al VDC. Se realizó un estudio epidemiológico observacional, de tipo trasversal y con una búsqueda retrospectiva de casos. Se determinó que 8 de cada 1000 pacientes que asisten a la clínica fueron positivos al VDC, observándose que una mayor frecuencia de machos con un 63%, con Riesgo Relativo (RR) de 0.67 y una Odds Ration (OR) de 0.47, los pacientes menores de 6 meses tienen la mayor frecuenta de casos con un 62% (RR de 8.0 y OR de 19.2); Pese a la variabilidad de las razas dentro del análisis efectuado, se encontró la mayor frecuencia en los perros mestizos con un 52% (RR de 1.79 y OR de 2.66), por otra parte, se determinó que la estacionalidad influye en el grado de presentación de esta enfermedad, siendo mayor en invierno con un 45% de los casos (RR 1.81 y OR 2.47). En conclusión en el Hospital Veterinario en estudio el VDC afecta más a los caninos criollos machos menores de siete meses de edad no vacunados y la enfermedad se presenta con mayor frecuencia en invierno.

Abstract

Canine distemper virus (CDV) is the causative agent of one of the most spread, highly contagious and lethal viral disease in canines, whose morbidity varies between 25-75% and mortality between 50-90%. The present study aimed to carry out an epidemiological study of CDV from a Veterinary Hospital in the city of Pachuca of Soto, State of Hidalgo. The information was obtained from 7280 medical records of canine patients treated during the 2017-2018 period, of which 65 met the positive case criteria for the CDV. An observational, cross-sectional epidemiological study with a retrospective search of cases was carried out. It was determined that 8 out of every 1000 patients attending the clinic were positive for CDV, observing that a higher frequency of males with 63%, with Relative Risk (RR) of 0.67 and an Odds Ratio (OR) of 0.47, patients under 6 months have the highest frequency of cases with 62% (RR of 8.0 and OR of 19.2); Despite the variability of the breeds within the analysis performed, the highest frequency was found in mongrel dogs with 52% (RR of 1.79 and OR of 2.66), on the other hand, it was determined that seasonality influences the degree of presentation of this disease, being greater in winter with 45% of cases (RR 1.81 and OR 2.47). In conclusion, in the Veterinary Hospital

understudy, the CDV affects male Creole dogs less than seven months of age unvaccinated more and the disease occurs most frequently in winter.

Introducción

Canine Distemper Virus (CDV) also known as distemper or Carré as discovered by Henri Carré in 1905, this virus has been the cause of the most widespread, highly contagious and lethal multisystemic viral disease of canids and other members of the *Procyonidae* and *Mustelidae* families[1], it is a disease of high morbidity and variable mortality[2]. The virus belongs to the family *Paramyxoviridae* of the genus *Morbillivirus*, the infection in dogs can lead to severe multisystemic disease, which affects the gastrointestinal, respiratory, and neurological systems[3].

Viral replication produces cellular destruction, which clinically results in vomiting, diarrhea, bronchitis, pneumonia, dermatitis, and behavioral disturbances, including neurological manifestations such as myoclonus, spasms, paresis, skin hyperesthesia, and seizures[4]. Consequently it doesn´t exist effective antiviral treatment, it is nonspecific and palliative.

Therapeutic actions are symptomatic and supportive, aimed at limiting secondary bacterial infections via using broad-spectrum antibiotics, maintaining fluid balance, and in the case of respiratory disturbances, expectorants, and brochodilators[5].

From a public health point of view, it is believed that CDV doesn´t infect human cells or causes diseases in humans, nevertheless, some studies have found that said virus has taken place in Piaget bone disease[6], in the same way, it has been shown that the virus infects and replicates in human osteoclast precursors, increasing concern about the possibility of zoonotic transmission of CDV[7].

According to with a study carried out by Costa in 2019[8], in Mexico until 2018 there is no report of studies carried out in the country, regarding the prevalence of CDV, therefore in Pachuca city and the rest of Hidalgo State, the study of this disease is null, mainly due to the lack of analysis of the information that is collected in veterinary consultations, this limitation is attributed to the lack of an adequate experimental design to address the problem.

Due to the aforementioned, the present investigation is aimed to carry out an epidemiological study of Canine Distemper Virus in a veterinary hospital (VH) in the city of Pachuca de Soto, belonging to Hidalgo State.

Material and methods

Study área. The study was carried out in the veterinary Hospital "Petterra", located in Pachuca de Soto city, capital of Hidalgo State. The city is geographically located between the coordinates 20°, 07 'and 21" north and 98°, 44 '09" west longitude, with a height of 2400 to 2800 masl. The city is bordered to the north by Mineral del Chico and Mineral del Monte, to the south by Zempoala and Zapotlán de Juárez, to the east by Mineral de la Reforma and Epazoyucan, and to the west by San Agustín Tlaxiaca. The climate is temperate semi-cold, with rains in summer, its rainfall from 400 to 800 mm

annually. The prevailing winds occur 9 months a year and generally come from the northeast, having an extreme speed of 60 to 65 km/h. Its annual average temperature is 24 ºC.

Sampling unit. A search was carried out in the medical records archives of the canine patients admitted and attended in general consultation at the VH during the period 2017-2018. The clinical diagnosis of CDV was performed considering the clinical signs and manifestations, which the patient evidenced during the general clinical examination, such as appetite loss, depression, hyperthermia or fever, ocular and nasal discharge, conjunctivitis, neurological signs, and pads hyperkeratosis (palmar and plantar) and in the nasal plane. The clinical diagnosis of CDV cases was confirmed by laboratory analysis (biometrics) and rapid tests (Test Kit Materlab[9]).

Inclusion and exclusion criteria. Any canine with clinical sinology and biometrics associated with CDV was considered as a positive case, as well as those confirmed by rapid tests (Test Kit Materlab[9]). Respect to the age, those canines younger than two months, with nervous signs during admission or with presumptive clinical manifestations of another pathology, and were receiving any pharmacological treatment, were excluded.

Study design. It was carried out a non-experimental, descriptive, cross-sectional epidemiological study (period 2017-2018) with a retrospective case search. The study cases (n=65) and the reference population(7280) were tabulated in electronic spreadsheets from Microsoft Excel® software, considering gender, vaccination history, age, same which was stratified into age groups: less than or equal at 6 months (puppies), from 7 to 12 months (puberty), from 13 to 36 months (adults), from 37 to 72 months (mature) and animals older than 72 months (senile), respect to the breed, only the breeds with more than

three cases were tabulated, breeds with only one case were considered in other breeds and seasonality (date of medical history). CDV cases were compared to canines attended for some different CDV reasons in the same study period.

Statistical analysis. Once data was obtained, a descriptive statistical analysis was performed, the information was represented in tables and figures, the effect of the variables aforementioned was analyzed over the disease presence, through a case-control design, it was calculated relative risk (RR), Odds ratio (OR) and Chi-Square test (X^2), calculations were carried out in the statistical package EPIDAT 3.1[10].

Results

During the period 2017-2018, it was diagnosed 65 positive CDV cases, representing a prevalence rate of 9 cases for every 1000 patients who attend the VH under study. Respect to the association of the studied variables and the relation with the disease presence it was determined, that males are the most affected with 63% (41 of 65) compared to females with 37% (24 of 65), a statistically significant association (P = 0.034) was observed for this variable, with a RR of 0.67 and 0.46 (OR) more possibilities to acquire CDV in the case of males (table 1).

Regarding vaccination history, is important to highlight that 65% of the cases under study was not vaccinated (40 of 65), it was determined a statistically significant association (P=0.003) respect to the patients which was not vaccinated and the presence of CDV, patients without vaccination history had a RR (2.50) and 3.44 (OR) more times the possibility of contracting the disease (table 1).

The first six months of life (≤6 months), is the age at which 62% (40 of 65) of patients contract the

virus, it was determined that the patient's age is statistically associated (P=0.0001) with the presence of the disease, observing a descent of the RR and the OR according to the age of patients increase, nevertheless the age group with patients under six months is the most affected with a RR of 8, significantly higher than that of the other considered age groups, and 19 (OR) more times the possibility to contract the disease at this age (table 2). However it was determined a statistically significant association in the group of adult patients (P=0.014) and senile (P=0.008), noticing that the RR and OR for these groups are less compared with the group above described (table 2).

Table 1 Gender and vaccination association with the presence of Canine Distemper virus in Pachuca of Soto City, Hidalgo State

Factor		Number of cases	%	RR	CI 95%		OR	CI 95%		X^2	*P*-value
Gender	Female	24	37	0.67	0.45	0.98	0.47	0.23	0.95	4.46	0.034*
	Male	41	63								
Vaccinated	yes	25	39	2.50	1.31	4.78	3.44	7.95	3.31	8.80	0.003*
	No	40	61								

RR relative risk, CI confidence interval 95%, OR Odds ratio, *Statistically significant value to 95%

Tabla 2 Age association with with the presence of Canine Distemper virus in Pachuca of Soto City, Hidalgo State

Age (months)	Number of cases	%	RR	CI 95%		OR	CI 95%		X^2	*P*-value
≤ 6	40	62	8.00	3.37	18.98	19.2	6.78	54.33	41.63	0.000*
7-12	6	9	0.75	0.28	2.04	0.72	0.24	2.22	0.32	0.577
13-36	12	18	0.52	0.28	0.96	0.41	0.18	0.93	3.27	0.070
37-72	5	8	0.33	0.13	0.86	0.28	0.09	0.82	5.91	0.015*
> 72	2	3	0.18	0.04	0.79	0.16	0.03	0.73	6.92	0.008*

≤ Less or equal than, >Greater than, RR relative risk, CI confidence intervale 95%, OR Odds ratio, * Statistically significant value to 95%

Table 3 Breed association with with the presence of Canine Distemper virus in Pachuca of Soto City, Hidalgo State

Breed	Number of cases	%	RR	CI 95%		OR	CI 95%		X^2	*P*-value
Mestizo	34	52	1.79	1.15	2.79	2.66	1.29	5.47	7.52	0.0061*
Chihuahua	5	8	0.63	0.22	1.81	0.59	0.18	1.92	0.77	0.3805
German Shepherd	4	6	0.57	0.18	1.86	0.54	0.15	1.95	0.84	0.3583
Siberian Husky	3	5	0.75	0.17	3.22	0.74	0.16	3.44	0.15	0.6976
Pug	3	5	0.75	0.17	3.22	0.74	0.16	3.44	0.14	0.7131
Others	16	25	2.00	0.92	4.35	2.33	0.92	5.90	3.27	0.0705

RR relative risk, CI confidence interval 95%, OR Odds ratio, * Statistically significant value to 95%

Table 4 Season year effect over the presence of Canine Distemper virus in Pachuca of Soto City, Hidalgo State

Season year	Number of cases	%	RR	CI 95%		OR	CI 95%		X^2	*P*-value
Winter	29	45	1.81	1.09	3.00	2.47	1.17	5.21	5.74	0.0165*
Spring	15	23	0.94	0.51	1.73	0.92	0.41	2.06	0.04	0.8369
Summer	12	18	0.75	0.93	1.46	0.69	0.30	1.61	0.73	0.3934
Fall	9	14	0.56	0.27	1.18	0.49	0.20	1.21	2.43	0.1193

RR relative risk, CI confidence interval 95%, OR Odds ratio, * Statistically significant value to 95%

It was determined that 52% of CDV cases occurred in mestizo breed (34 of 65) and 48% belong to a specific breed (31 of 65), according to with the statistical analysis it exists a statistically significant association (P=0.0061) among Mestizo patients and CDV, Mestizo breed presents a RR OF 1.79 and 2.66 (OR) more times the possibility to contract the disease (table 3).

Regarding the season year effect over the presence of CDV, it was determined that 45% of the cases were presented during the winter, 23% in the spring, 18% in summer and 14% during the fall being the winter the season statistically associated (P=0.0165) with the presence of CDV, for winter it was calculated an RR of 1.81 and 2.47 (OR) more times the possibility that during this season patients were infected by CDV (table 4).

Discussion

Once carried out the CDV epidemiologic study, it was determined a prevalence rate of 9 cases for every 1000 patients into the VH under study, which is located in Pachuca de Soto City. Related to the association variables it was determined that the gender, vaccine or not vaccine applications, age, breed and season year, they can make a canine more or less susceptible to contract and develop the disease, regarding the gender it was observed a higher incidence in males (63%) than in females (37%), data that agree with that reported by González-Chávez et al[11] who reported an incidence of 67% and 33% in males and females respectively, according to with Soto et al12, it exists a higher prevalence in males, due to them ambulatory habit, which favors contact between infected individuals, increasing the exposition and therefore the infection risk.

On the other hand, the vaccine application is a practice that can lead to decrease the risk to contract the virus, since it was observed a 61% in disease presentation frequency is not vaccinated dogs, a situation similar to that shown by González-Chávez et al[11], who reported a presentation frequency of 95%, according to with Sykes[3], an opportune immunization is the key for the prevention of the infection caused by CDV, nevertheless, according to with obtained data in the present study this practice is not carried out.

Age is a determining factor in the presentation of CDV, in the present study it was determined a higher prevalence in those individuals under 6 months, according to with described by Martella et al[13], puppies become more susceptible due maternal antibodies decrease, while older individuals are protected by immunization via vaccination, nevertheless it is possible cases occurring. In a study carried out by Almuna[14], it was shown that as age increase the number of seropositive dogs increases too, which coincides with that reported by Lechner et al[15], who mention that it exists a higher risk to contract the disease according to individuals age increases, due to the individual has more time to be exposed to the virus and become naturally infected.

Despite the existence of reports, which indicate a high presentation frequency in pure breed canines, in this study it was reported that Mestizo breed individuals had a 52% presentation frequency, similar to that reported by González-Chávez et al11, who reported a 43% presentation frequency in Mestizo breed canines.

Respect to disease seasonality, according to the reported by Ettinger & Feldman[16] and Martella et al[13], the presentation degree for this disease is higher during fall and winter, similar to that reported in the present study.

CDV is an infectious disease with a high prevalence of the VH understudy, males and individuals under 7 months are the most affected, as well as the Mestizo breed dogs, the disease occurs more frequently during the winter. Animals without vaccines are the most affected, although an important percentage of vaccinated animals presented the disease.

Conflicts of interest

Authors declare that they have no potential conflicts of interest regarding the research, authorship, and / or publication of this article.

Acknowledgments

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