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RESEARCH ARTICLE

ENZOOTIC CHANNELS OF THE *CANINE PARVOVIROSIS* IN THE CANTON GUARANDA, BOLIVAR PROVINCE, ECUADOR

***[1]Jaime Wilfrido Aldaz Cárdenas, [2]Rigoberto Fimia Duarte, [3]Juan Ramón García Díaz, [4]Jenny Janeth Segura Ochoa, [4]Nancy Guadalupe Aldaz Cárdenas and [4]Jorge Jagger Segura Ochoa**

[1]Career of Veterinary Medicine and Zootecnia, Faculty of Agricultural, Natural Sciences and Environmental Resources, Bolivar State University, Bolívar Province, Ecuador
[2]Faculty of Technology of the Health. University of Medical Sciences of Villa Clara, Cuba
[3]Faculty of Agricultural Sciences, University "Marta Abreu" of The Villas, Villa Clara, Cuba
[4]Veterinary Hospital "Canine and Felines", Guaranda, Bolívar Province, Ecuador

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ABSTRACT

The objective was to know the behavior of the *canine Parvovirosis* (PVC) in mongrel dogs infected naturally by variants of PVC; for that reason, 2814 mongrel canines were used, beginning from retrospective data obtained among the years 2007-2010 in the Veterinary Hospital "Canine and Felines" of the city of Guaranda, Bolivar Province, Ecuador. The diagnosis of the illness was carried out by means of the application of the functional invariant of the clinical method and the use of the quick test Anigen (BIONOTE, seagu-dong Hwaseong-if, Gyeonggi-do, Korea). It was determined the occurrence of positive cases and the incidence of the PVC during the mentioned period, according to the procedures described by Thrusfield. The enzootic channels were built or of habitual behavior of the illness for the territory in the year 2011, starting from the series of time obtained among the years 2007-2010, by means of the method of the average of geometric mean of the rates of incidence, with the use of the program EPIDAT 3.1. To conclude, that the main epidemic indexes of the PVC will have the same behavior for the year 2011 and they can be modeled and predicted with high level of precision, whenever these can be expressed like a series of time.

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INTRODUCTION

The *canine Parvovirus* type PVC-2 cause the PVC (canine Parvovirosis) and one of the main causes of hemorrhagic gastroenteritis constitutes in dogs at world level (Decaro *et al*., 2006a; Decaro *et al*., 2006b). The PVC-2 it has evolved genetically, several types of antigens that their pathogenicity increases exist this way at the present time and they modify its epidemic behavior (Pérez *et al*., 2007; Gallo *et al*., 2011; Pinto *et al*., 2012). All the clinical symptoms of the PVC are rarely present simultaneously; they appear the unespecific like the anorexic, depression, lethargy and fever first. In 24- 48 hours the vomit appears in those more affected animals, those that can show quick and intense dehydration. The enteritis for PVC can progress quickly, especially in the infections for the new variants of PVC-2 (Macintire & Smith-Carr, 1997).

****Corresponding author:Jaime Wilfrido Aldaz Cárdenas***
Career of Veterinary Medicine and Zootecnia, Faculty of Agricultural, Natural Sciences and Environmental Resources, Bolivar State University, Bolívar Province, Ecuador

Once the vomits appear, they are generally serious, of lingering and commonly followed duration for the appearance of the diarrheas. The vomit is due to the local irritation and activation of the vomit center, caused by the liberation of mediators humorals associated to the endotoxemia like the citoquines, and for the stimulation of the vague nerve because of the local gastrointestinal inflammation (Washabau & Elie, 1995). The diarrhea is profuse, it can be or non hemorrhagic. The grounds have grizzly tonality, white or yellow-grizzly in the beginning of the illness and with their progression they can become dark due to the presence of blood (Tennant, 2001; McCaw & Hoskins, 2006). The presence of flowing grounds with grooves of blood or frankly hemorrhagic can be the first symptom in appearing and it can persist until the recovery or the death. The epidemic analyses in the transferable illnesses that affect the animals constitute the base to intervene appropriately and to prevent the illness, as well as to reduce their consequences. To elaborate a successful program of prevention and control of the PVC different types of models they can be used that they allow to know their current behavior

and to predict future values, whenever observations have been carried out in the time (Coutin *et al*., 2000; Wagner *et al*., 2001). The objective of the investigation was to know the behavior of the *canine Parvovirosis* (PVC) in mongrel dogs infected naturally by variants of PVC in the Canton Guaranda, Province Bolívar, Ecuador.

MATERIALS AND METHODS

The study was carried out with retrospective data of the cases of PVC consulted among the years 2007 at the 2010 in the Veterinary Hospital "Canine and Felines" of the city of Guaranda, Bolivar Province, Ecuador; with which the enzootic channels of the illness were determined in the territory. The Canton is located among the 1° 34' 20" LN and the 78° 58' 10" LW, to a height of 2668 msnm, in the center of the country, in the interandine region, specifically in the western mountain range of the Andes. It possesses a territorial extension of 1898 km2, it limits to the north with the county of Cotopaxi, to the south with San Miguel's Canton, to the east with the counties Tungurahua and Chimborazo and to the west with the Cantons of Chimbo, Caluma and Echeandia (Figure 1). The temperature averages yearly it is of 15,2ºC; the maxims oscillate between 22 and 24ºC (July and August) and the minimum ones between 5 and 7ºC (December and January). The annual precipitation is of 980,3 mm, with a monthly average of 81,3 mm; the rainiest month is March with 184,3 mm and the less rainy one is September with 11,5 mm. The relative humidity I average yearly it is of 70%.

Figure 1. Political Administrative Map of the Bolivar Province, Ecuador

The diagnosis of the illness was carried out by means of the application of the functional invariants of the clinical method (Cuesta *et al*., 2007) and the use of the quick test Anigen (BIONOTE, seagu-dong Hwaseong-if, Gyeonggi-do, Korea), according to the procedures described by the maker (Shashidhara & Kapil, 2009). It was determined the occurrence of positive cases and the incidence of the PVC during the mentioned period, according to the procedures described by Thrusfield (Thrusfield, 2005), starting from a population of 2814 canines of the territory. The enzootic channels were built or of habitual behavior of the illness for the territory in the year 2011 starting from the series of time obtained among the years 2007-2010 by means of the method of the average of the geometric mean of the rates of incidence, with the use of the program EPIDAT 3.1.

RESULTS AND DISCUSSIONS

The limits of habitual variation or enzootic channel could settle down, for that the method of the geometric mean of the rates of incidence was used; what allowed showing the ranges of prospective behavior for the PVC in the territory, for next years, based on the historical incidence of the period of five years of the series of time. These results allow detecting figures of incidence precociously, if it settles down the corridor or enzootic channel, by means of a graphic representation of the current incidence about the historical incidence; whose results coincide with Pérez *et al*. (2007) and Gallo *et al*. (2011) and other authors for helminthes diseases (Giraldo *et al*., 2005; Thrusfield, 2006; Endrias *et al*., 2010; Castillo *et al*., 2016). This way it is possible to confirm a situation of alert, if the incidence overcomes the superior limit of the enzootic channel or it enters in the epizooticarea. In the figure 2 the enzootic channel of the PVC is exposed in the Canton Guaranda. The behavior of the illness for the different four weeks in 2011 (reflected by the black line) it is in the area of alert in all the cases, what indicates that this pathology will maintain high incidence in the studied territory and that the measures of prevention and control should be elaborated, especially in the months of more presentation risk (Decaro *et al*., 2006b; Pinto *et al*., 2012).

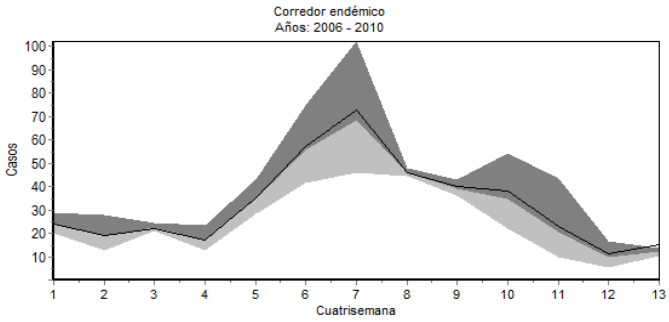

Figure 2. Channels enzootics or of habitual behavior of the PVC in the Guaranda, Canton Bolivar, Ecuador for 2011, starting from data obtained in the years 2007 at 2010

The enzootic channels or of habitual behavior they are very important to establish the plans of measures against epizootics of an illness; presently study for the construction of the same one the method of the average of the geometric mean of the rates of incidence was used, that confers high dependability to the obtained results, because the geometric mean is the measure of more appropriate central tendency when a normal distribution doesn't exist and it is specially suitable for aberrant values, like they can be the buds or epizooties with a much higher number of that or habitual and subregister problems that can give values very below the real ones, without distorting the historical series (Coutin *et al*., 2000; Wagner *et al*., 2001; Shashidhara & Kapil, 2009). The main epidemic indexes of the PVC will have the same behavior for the year 2011 and they can be modeled and predicted with high level of precision, whenever these can be expressed like a series of time.

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