Evaluation of Vcheck Canine Antibody Tests for the Detection of Protective Antibodies

Key Words: BIONOTE, Vcheck, CPV Ab, CDV Ab, CAV Ab, VN Test, HI Test

Introduction

The canine viruses which cause distemper, parvoviral enteritis, and infectious hepatitis have a high correlation between the presence of antibody and protective immunity. Core vaccines are recommended for all puppies and dogs with an unknown vaccination history. These core vaccines include: canine distemper virus (CDV), canine adenovirus (CAV) and canine parvovirus type 2 (CPV-2). It is recommended to use an in-house serological testing for antibodies specific for vaccine antigens following vaccination.

The Vcheck CPV, CDV or CAV Ab Test is a one-step rapid test for the semi-quantitative detection of antibodies to parvovirus, distemper virus or adenovirus in canine serum or plasma. The purpose of this study is to verify the performance of the Vcheck compared to the gold standard test for CPV, CDV and CAV antibody titers.

Materials and Methods

CPV Ab titer test:

A total of 56 random canine serum samples were tested by Vcheck CPV Ab test kit according to manufacturer's instructions (BioNote, Korea). The Vcheck result of medium (3, 3.5) or high titer (from 4 to 6) is considered having a 'high' protective antibody, while one of negative (0) or low titer (1, 2) is considered having a 'low' protective antibody. They were also referred to Cornell University College of Veterinary Medicine (CUCVM) for Hemagglutination Inhibition (HI) test and evaluated with a commercial in-practice test (product 'I'). A titer result of 1:80 or greater is considered as 'high'.

CDV Ab (CAV Ab) titer test:

A total of 129 (219) random canine serum samples were tested by Vcheck CDV Ab (CAV Ab) test kit according to manufacturer's instructions. The Vcheck result of medium (3, 3.5) or high titer (from 4 to 6) is considered having a 'high' protective antibody, while one of negative (0) or low titer (1, 2) is considered having a 'low' protective antibody. They were also referred to CUCVM for Virus Neutralization (VN) test and evaluated with a commercial in-practice test (product 'I'). A titer result of 1:32 (1:16) or greater is considered as 'high'.

Results

The Vcheck antibody tests demonstrated higher sensitivities and specificities than commercially available 'I' kit, compared against the reference tests; The CPV Ab Test showed 100% sensitivity and 85.7% specificity, CDV Ab Test 100 and 83.1%, CAV Ab Test 87.8 and 98.2%. On the contrary, 'I' kit had 95.9% sensitivity and 71.4% specificity in CPV Ab, 97.1 and 79.7% in CDV Ab, 84.8 and 92.7% in CAV Ab (Refer to Table 1, 2 and 3).

Conclusion

The findings of the present study indicated that the Vcheck showed higher correlation with the gold standard tests (HI, VN test) than or equal to a commercial product 'I', so it can be used as a useful method of serological testing due to its rapidity and ease of performance, providing accurate antibody titer results against CPV, CDV and CAV in-house.

Reference

1. WSAVA GUIDELINES FOR VACCINATION OF DOGS AND CATS, Journal of Small Animal Practice – Vol 57, January 2016

Comparative Evaluation		Commercial 'I' kit		Total	Vcheck CPV Ab		Total
		High	Low		High	Low	
HI Test (Cornell Univ.)	High	47	2	49	49	0	49
	Low	2	5	7	1	6	7
Total		49	7	56	50	6	56
Sensitivity		95.9% (47/49)			100% (49/49)		
Specificity		71.4% (5/7)			85.7% (6/7)		
Overall Agreement		92.9% (52/56)			98.2% (55/56)		

Table 1. Correlation of Vcheck CPV Ab test and a commercial 'I' kit with HI test

Comparative Evaluation		Commercial 'I' kit		Total	Vcheck CDV Ab		Total
		High	Low		High	Low	
VN Test (Cornell Univ.)	High	68	2	70	70	0	70
	Low	12	47	59	10	49	59
Total		80	49	129	80	49	129
Sensitivity		97.1% (68/70)			100% (70/70)		
Specificity		79.7% (47/59)			83.1% (49/59)		
Overall Agreement		89.1% (115/129)			92.2% (119/129)		

Table 2. Correlation of Vcheck CDV Ab test and a commercial 'I' kit with VN test

Comparative Evaluation		Commercial 'I' kit		Total	Vcheck CAV Ab		Total
		High	Low		High	Low	
VN Test (Cornell Univ.)	High	139	25	164	144	20	164
	Low	4	51	55	1	54	55
Total		143	76	219	145	74	219
Sensitivity		84.8% (139/164)			87.8% (144/164)		
Specificity		92.7% (51/55)			98.2% (54/55)		
Overall Agreement		86.8% (190/219)			90.4% (198/219)		

Table 3. Correlation of Vcheck CAV Ab test and a commercial 'I' kit with VN test