

IDEXX SNAP® 4Dx® Plus Test provides sensitive and specific detection of tick-borne diseases



Poor performance of Abaxis® VetScan® Canine Anaplasma Rapid Test has clinically relevant implications

Introduction

Tick-borne diseases, including Lyme disease, ehrlichiosis, and anaplasmosis, are becoming increasingly prevalent as tick distributions expand through climate change, wildlife migration, and increased relocation of companion animals. Both dogs and humans are susceptible to these infections. In fact, serologic detection of specific tick-borne infections in dogs is generally recognized as a sentinel indicator of regional disease risk for humans. Comprehensive screening for transmission of tick-borne infections in dogs is, therefore, both diagnostically important for veterinarians and epidemiologically important for public health.

Since 2001, IDEXX Laboratories, Inc., has been the world leader in tick-borne disease testing by offering generations of high-quality diagnostic products (SNAP® 3Dx®, SNAP® 4Dx®, and SNAP® 4Dx® Plus tests). The latest version, the SNAP® 4Dx® Plus Test, detects antibodies to five pathogens, *A. phagocytophilum*, *A. platys*, *B. burgdorferi* (Lyme), *E. canis*, and *E. ewingii*, in addition to detection of heartworm antigen.¹ The SNAP 4Dx Plus Test allows comprehensive screening for infections transmitted by three major tick species (*Ixodes* spp., *Amblyomma americanum*, and *Rhipicephalus sanguineus*).¹

Recently, Abaxis® developed the VetScan® Canine Anaplasma Rapid Test with product claims for detection of antibodies to *A. phagocytophilum* and *A. platys*. This is a single test for antibody detection of these two *Anaplasma* species only. IDEXX Laboratories conducted a study to evaluate sensitivity and specificity of the VetScan Canine Anaplasma Rapid Test.

Study design

To evaluate sensitivity and specificity of the VetScan Canine Anaplasma Rapid Test, 234 random canine samples were sourced from different regions of the United States.

Samples (n=137) from endemic regions for *A. phagocytophilum* were first tested by the *A. phagocytophilum* immunofluorescence assay (IFA) reference method, which was performed independently by a commercial reference laboratory. *A. platys*-specific samples (n=97) were sourced from dogs living in the southwest, an *A. platys*-endemic region. These samples were tested by an *A. platys*-specific peptide enzyme-linked immunosorbent assay (ELISA) that has been validated as a reference method.²

All samples were tested on the VetScan Canine Anaplasma Rapid Test and the SNAP 4Dx Plus Test according to the manufacturers' instructions. Sensitivity and specificity were calculated relative to the IFA for samples derived from *A. phagocytophilum* endemic areas or the *A. platys*-specific peptide ELISA for samples derived from *A. platys*-endemic areas.



SNAP® 4Dx® Plus Test



VetScan® Canine Anaplasma Rapid Test

Results

The VetScan Canine Anaplasma Rapid Test demonstrated 29.9% sensitivity relative to the *A. phagocytophilum* IFA (table 1). Most notably, the VetScan Canine Anaplasma Rapid Test failed to detect more than 60% of the medium to high titer (> 1:400) positive samples, including samples that tested positive on the SNAP 4Dx Plus Test (figure 1). The sensitivity of the SNAP 4Dx Plus Test compared to IFA for *A. phagocytophilum* antibodies was 92.0%.

The sensitivity and specificity for *A. platys* antibody detection were 68.1% and 86.0% for the VetScan Canine Anaplasma Rapid Test and 89.4% and 96.0% for the SNAP 4Dx Plus Test, respectively (table 1). The specificity for both analytes was higher for the SNAP 4Dx Plus Test than for the VetScan Canine Anaplasma Rapid Test.

Organism	Reference test (pos/neg)	VetScan® Canine Anaplasma Rapid Test		SNAP® 4Dx® Plus Test	
		Sensitivity	Specificity	Sensitivity	Specificity
<i>A. phagocytophilum</i>	IFA (87/50)	29.9%	88.0%	92.0%	98.0%
<i>A. platys</i>	ELISA (47/50)	68.1%	86.0%	89.4%	96.0%

Table 1. Comparative performance of the SNAP 4Dx Plus Test and the VetScan Canine Anaplasma Rapid Test

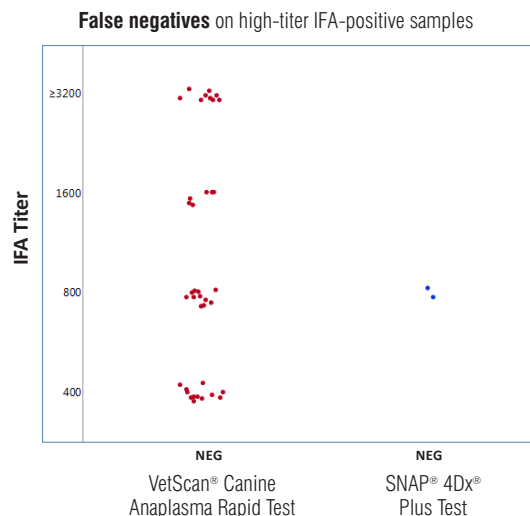


Figure 1. Many high-titer, IFA-positive samples produce false-negative results on the VetScan Canine Anaplasma Rapid Test.

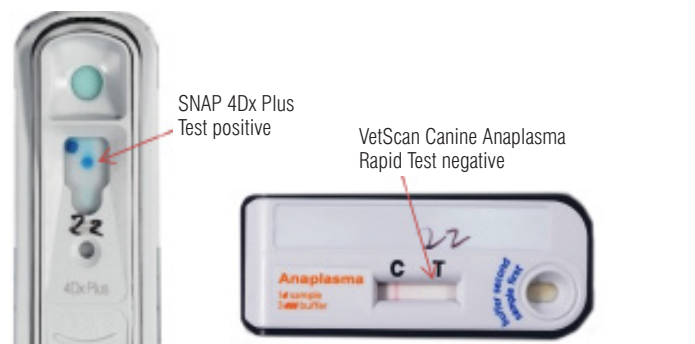


Figure 2. A SNAP 4Dx Plus Test strong positive sample, missed by the VetScan Canine Anaplasma Rapid Test

Conclusions

The IDEXX SNAP® 4Dx® Plus Test was more sensitive than the Abaxis® VetScan® Canine Anaplasma Rapid Test (table 1). In this population of 87 *A. phagocytophilum*-seroreactive dogs, the SNAP 4Dx Plus Test identified 54 more dogs than the VetScan Canine Anaplasma Rapid Test. The study revealed the sensitivity limitation of the VetScan Canine Anaplasma Rapid Test—almost 70% of confirmed positive samples were negative on the rapid test (figure 2). These conclusions are consistent with those presented at the 58th AAVLD/119th USAHA Annual Meeting, October 22–28, 2015.³

Because the VetScan Canine Anaplasma Rapid Test only detects antibodies to *Anaplasma* spp., it fails to provide the comprehensive medical information related to coinfections or coexposures. Studies have demonstrated that dogs exposed to or infected with more than one tick-borne pathogen may be twice as likely to show clinical signs or have more severe hematologic abnormalities.^{4,5} In addition, depending on the tick vector, dogs infected with *A. platys* or *A. phagocytophilum* can be coinfecting with either *E. canis* or *B. burgdorferi* (Lyme)⁶ respectively, and thus a single Abaxis *Anaplasma* test will fail to identify those patients at increased risk for disease. The SNAP 4Dx Plus Test provides high accuracy and comprehensive screening for multiple pathogens in a single assay, resulting in more complete medical information for better patient care.^{2,4-6}

References

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