Comparative evaluation of Vcheck M Feline Diarrhea 8 with Real-time & Conventional PCR

Key Words : Vcheck M, Feline Infectious Diarrhea, Real-time PCR, Conventional PCR

Introduction

Diarrhea is one of the most common causes of veterinary consultation. A recent survey of the Association of Shelter Veterinarians identified kitten diarrhea as one of the top two concerns of veterinarians who treat shelter cats, second only to upper respiratory infections [1]. There are various causes of diarrhea and initial evaluations of diarrhea focus on diagnosing dietary, parasitic, and infectious causes [2]. Infectious diarrhea, which can stem from bacteria, viruses, protozoa, or a combination thereof, requires specific pathogen identification for accurate diagnosis. This step is crucial as it informs prognosis and guides treatment and preventive measures [3].

Molecular tools have revolutionized the identification and diagnosis of infectious diseases, supplementing traditional methods such as fecal smear or culture techniques. Previously, samples necessitating PCR testing were typically sent to external laboratories, where pathogens were sometimes identified individually. However, with advancements like the Vcheck M Feline Diarrhea 8, veterinary clinics can now conduct comprehensive testing on-site. This analyzer allows simultaneous detection of up to 8 different pathogens, significantly enhancing diagnostic efficiency within the clinic setting.

Purpose

The objective of this study was to evaluate the diagnostic sensitivity and specificity of the newly developed Vcheck M Feline Diarrhea 8 Panel (POCT PCR kit) to laboratory based real-time PCR or conventional PCR as a comparative test.

Materials and Methods

A total of 91 feline fecal samples were evaluated (81 randomly selected samples and 10 from cats showing clinical symptoms of diarrhea).

Tests were carried out by 'A' Laboratory and 'B' Laboratory using the Vcheck M system. In the comparative analysis, 'A' Laboratory utilized their in-house real-time PCR method while 'B' Laboratory used in-house conventional PCR with primers listed in guidelines from the Korea Animal and Plant Quarantine Agency. Discrepancies in results were verified through confirmation tests using third-party reagents and sequencing methods.

Sample Information		Equipment Used		
Evaluation site	Sample size	Vcheck M	Reference method	
			Comparative test	Confirmation test
'A' Laboratory (Korea)	81	Feline Diarrhea 8 panel	Real-time PCR	Third-party reagents and sequencing (for discrepant result)
'B' Laboratory (Korea)	10		Conventional PCR	

Results

The study identified concordance in 79 feline fecal samples. However, discrepancies between Vcheck M and the comparative test were observed in 12 samples. To validate these inconsistencies, supplementary confirmation tests utilizing third-party reagents and sequencing methods were undertaken. These tests confirmed the accuracy of Vcheck M results.

Detailed comparisons of Vcheck M with reference method are described in Tables 1 and 2.

Conclusion

Based on these findings, it was confirmed that the Vcheck M Feline Diarrhea 8 Panel excels not only in convenience but also in clinical performance.

Reference:

1. Hurley, K. "Survey of shelter veterinarian's research priorities, Shelter Vet Chat Group." Personal communication (2003).
2. Sherding RG, Johnson SE. Diseases of the Intestines. *Saunders Manual of Small Animal Practice*. 2006:702–38.
3. Gizzi AB, Oliveira ST, Leutenegger CM, Estrada M, Kozemjakin DA, Stedile R, Marcondes M, Biondo AW. Presence of infectious agents and co-infections in diarrheic dogs determined with a real-time polymerase chain reaction-based panel. *BMC Vet Res.* 2014 Jan 16;10:23.

Feline parvovirus		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	14	0	17
	Neg	0	72	72
	Total	14	72	86
	Sensitivity	100% (14/14)		
	Specificity	100% (72/72)		

Feline coronavirus		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	39	0	39
	Neg	0	47	47
	Total	39	47	86
	Sensitivity	100% (39/39)		
	Specificity	100% (47/47)		

Salmonella spp.		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	0	0	0
	Neg	0	81	81
	Total	0	81	81
	Sensitivity	-		
	Specificity	100% (81/81)		

Campylobacter spp.		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	2	0	2
	Neg	0	79	79
	Total	2	79	81
	Sensitivity	100% (2/2)		
	Specificity	100% (79/79)		

Toxoplasma gondii		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	0	0	0
	Neg	0	81	81
	Total	0	81	81
	Sensitivity	-		
	Specificity	100% (81/81)		

Giardia lamblia		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	6	0	6
	Neg	0	77	77
	Total	6	77	83
	Sensitivity	100% (6/6)		
	Specificity	100% (77/77)		

Cryptosporidium spp.		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	0	0	0
	Neg	0	81	81
	Total	0	81	81
	Sensitivity	-		
	Specificity	100% (81/81)		

Tritrichomonas blagburni *(formerly T.foetus)*		Reference method		
		Pos	Neg	Total
Vcheck M	Pos	6	0	6
	Neg	0	75	75
	Total	6	75	81
	Sensitivity	100% (6/6)		
	Specificity	100% (75/75)		

Table 1. Sensitivity and specificity of Vcheck M Feline Diarrhea 8 Panel compared with reference method for each pathogen

	Feline parvovirus	Feline coronavirus	*Salmonella* spp.	*Campylobacter* spp.	*Toxoplasma gondii*	*Giardia lamblia*	*Cryptosporidium* spp.	*Tritrichomonas blagburni* *(formerly T.foetus)*
Sensitivity	100% (14/14)	100% (39/39)	-	100% (2/2)	-	100% (6/6)	-	100% (6/6)
Specificity	100% (72/72)	100% (47/47)	100% (81/81)	100% (79/79)	100% (81/81)	100% (77/77)	100% (81/81)	100% (75/75)

Table 2. Overall sensitivity and specificity of Vcheck M Feline Diarrhea 8 Panel compared with reference method