



MOLECULAR SCREENING OF FELINE MORBILLIVIRUS

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MOLECULAR SCREENING OF FELINE MORBILLIVIRUS.

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It is hereby certified that we have read this project paper entitled “Molecular Screening of Feline Morbillivirus”, by Hemadevy Manoraj and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Project.



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DEDICATIONS

“You don’t choose your family.
They are God’s gift to you, as you are to them”
-Desmond Tutu

*To my dearest siblings,
Dr. Thiban Raj Manoraj
and
Shandini Devy Manoraj,
for being there whenever I needed you.*

*To my dear and lovely parents,
DSP Manoraj Appookutty
and
Mrs. Rajeswary Palanyappan,
for making me who I am today.*

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CONTENTS

TITLE	i
CERTIFICATION	ii
DEDICATION	iv
ACKNOWLEDGEMENTS	v
CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	x
ABBREVIATIONS	xi
ABSTRAK	xii
ABSTRACT	xiv
1.0 INTRODUCTION	1
2.0 LITERATURE REVIEW	3
2.1 Paramyxoviruses	3
2.2 Morbillivirus	3
2.3 Diagnostic assay available for morbillivirus.....	4
2.4 Feline morbillivirus.....	5
2.5 Association between tubulointerstitial nephritis and FmoPV.....	6
2.6 Detection rate of FmoPV in Hong Kong and Japan using RT-PCR.....	7
3.0 MATERIALS AND METHODS	9
3.1 Animals	9
3.2 Inclusion criteria	9
3.3 Sample collection.....	10
3.4 Serum urea-creatinine analysis and urine specific gravity.....	11
3.5 Viral RNA extraction for blood and urine samples	11
3.6 RNA quantification.....	12

3.7 Two-steps conventional reverse transcriptase polymerase chain reaction (RT-PCR)	12
3.8 Agarose Gel Electrophoresis.....	13
3.9 Statistical Analysis.....	13
4.0 RESULTS	14
4.1 Descriptive data of the sample size.....	14
4.1.1 Age.....	14
4.1.2 Sex.....	15
4.1.3 Type of management.....	16
4.2 Healthy and renal/urinary diseased cats.....	17
4.3 Detection rate of FmoPV in blood samples (<i>n</i> =25)	18
4.4 Detection rate of FmoPV in urine samples (<i>n</i> =27)	19
4.5 Prevalence of FmoPV	20
4.6 Association between renal/urinary system diseases and FmoPV	21
5.0 DISCUSSION	22
5.1 Detection rate of feline morbillivirus.....	22
5.2 Prevalence rate of feline morbillivirus.....	22
5.3 Association between renal/urinary system diseases and FmoPV	23
6.0 CONCLUSION AND RECOMMENDATIONS	25
7.0 REFERENCES	26

8.0 APPENDICES	28
8.1 Client consent forms (English and Bahasa Melayu).....	28
8.2 Patient information form.....	30
8.3 Instructions for QIAamp® RNA Blood Mini Kit.....	31
8.4 Instructions for QIAamp® Viral RNA Mini Kit	34
8.5 Instructions for SensiFAST™ cDNA Synthesis Kit.....	37
8.6 Instructions for MyTaq™ Mix.....	38
8.7 AFFP-AAHA Feline Life Stage Guidelines	39
8.8 Anigen Rapid CDV Ag Test Kit.....	40
8.9 Patient details	41

LIST OF TABLES

	Page No.
Table 1: Age categories of the cats sampled	14
Table 2: Sex categories of the cats sampled	15
Table 3: Type of management of the cats sampled	16
Table 4: Healthy and renal/urinary diseased cats sampled	17
Table 5: Detection rate of FmoPV in blood samples by using RT-PCR	18
Table 6: Detection rate of FmoPV in urine samples by using RT-PCR	19
Table 7: Data analysis to obtain the association between renal/urinary system diseases and FmoPV	21

LIST OF FIGURES

Page No.

Figure 1: Prevalence of FmoPV

20



LIST OF ABBREVIATIONS

%	percentage
°C	degree celcius
AAFP	American Association of Feline Practitioners
AAHA	American Animal Hospital Association
cDNA	complementary DNA
CDV	Canine Distemper Virus
C.I	confidence interval
CRFK	Crandell-Rees feline kidney
DNA	Deoxyribonucleic Acid
EDTA	Ethylenediaminetetraacetic acid
FmoPV	Feline morbillivirus
FPV	Fakulti Perubatan Veterinar
IACUC	Institutional Animal Care and Use Committee
ID	Identification
IFA	indirect immunofluorescence assay
IgG	Immunoglobulin G
kb	kilobase
n	number of cats sampled
RNA	Ribonucleic acid
RT-PCR	reverse transcriptase polymerase chain reaction
TIN	tubulointerstitial nephritis
UPM	Universiti Putra Malaysia
USG	urine specific gravity
UVH	Universiti Veterinary Hospital

ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek.

SARINGAN MOLEKULAR MORBILLIVIRUS FELIN.

Oleh

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2015

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Morbillivirus felin (FmoPV) adalah virus negatif RNA yang tergolong dalam keluarga *Paramyxoviridae*. FmoPV telah dikesan baru-baru ini pada kucing di Hong Kong dan Jepun, dan dihubungkan dengan nefritis tubulointerstisial. Dalam kajian ini, sampel darah dan air kencing telah diambil daripada 35 kucing milik pelanggan yang dibawa ke Hospital Veterinar Universiti- Universiti Putra Malaysia (UVH-UPM) dan klinik veterinar swasta yang turut menyertai kajian. Kriteria pemilihan untuk kajian ini adalah termasuk kucing yang sihat, dan mempunyai penyakit buah pinggang/sistem urinari. Analisis serum urea dan kreatinin serta graviti khusus air kencing telah dijalankan untuk menilai status kucing samaada berpenyakit buah pinggang/sistem

urinari. Saringan FmoPV dijalankan dengan menggunakan sampel yang telah dikumpul dan ujian reaksi rantai polimerase transkriptase membalik (RT-PCR) dua langkah konvensional untuk membesarkan sebahagian daripada urutan N-gen virus ini. Daripada 25 kucing yang diuji bagi sampel-sampel darah, 1 kucing (4.0%) telah disahkan positif FmoPV. Di samping itu, 17 daripada 27 kucing (63.0%) yang diuji untuk sampel air kencing adalah positif untuk FmoPV. Selain itu, daripada 17 kucing yang diuji untuk kedua-dua sampel darah dan air kencing, 1 kucing (5.9%) telah disahkan positif FmoPV. Prevalens FmoPV di Malaysia adalah 48.6%. Analisis chi square menunjukkan tiada hubungan yang signifikan antara kucing yang berpenyakit buah pinggang/sistem urinari dan FmoPV ($P=0.11$).

Kata kunci: Morbillivirus felin, kucing, berpenyakit buah pinggang/sistem urinari, prevalens, ujian RT-PCR konvensional.

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial requirement for the course VPD 4999 – Project.

MOLECULAR SCREENING OF FELINE MORBILLIVIRUS.

By

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2015

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Dr. Gayathri Thevi Selvarajah

Feline morbillivirus (FmoPV) is a negative-sense, single stranded RNA virus that belongs to the family *Paramyxoviridae*. The FmoPV has been recently detected in cats in Hong Kong and Japan, and is associated with tubulointerstitial nephritis. In this study, urine and blood samples were collected from 35 client-owned cats presented to the Universiti Veterinary Hospital- Universiti Putra Malaysia (UVH-UPM) and

participating private veterinary clinics. Healthy and renal/urinary-diseased cats were included in this study. Serum urea-creatinine and urine specific gravity analyses were performed to assess the renal or urinary disease status in these cats. FmoPV screening of the collected samples were conducted using two-steps conventional reverse-transcriptase polymerase chain (RT-PCR) assay amplifying a part of N-gene sequence of the virus. Of the 25 cats screened for the blood samples, 1 cat (4.0%) was tested positive for FmoPV. In addition, 17 out of 27 cats (63.0%) screened for urine samples were tested positive for FmoPV. From 17 cats screened for both blood and urine samples, 1 cat (5.9%) was tested positive for FmoPV. The prevalence of FmoPV in Malaysia is 48.6%. Chi square analysis revealed no significant association between renal/urinary diseased cats and FmoPV (P=0.11).

Key words: Feline morbillivirus, cats, renal/urinary-diseased, prevalence, conventional RT-PCR assay.

1.0 INTRODUCTION

Feline morbillivirus (FmoPV) is a negative-sense, single stranded RNA virus that belongs to the family *Paramyxoviridae*. Paramyxoviruses are divided into two subfamilies, which are *Paramyxovirinae* and *Pneumovirinae*. There are seven genera classified under the subfamily *Paramyxovirinae* besides the *Morbillivirus*, namely *Respirovirus*, *Rubulavirus*, *Henipavirus*, *Ferlavirus*, *Aquaparamyxovirus* and *Avulavirus* (Audsley & Moseley, 2013). FmoPV was first isolated and characterized in 2012 in Hong Kong (Woo *et al.*, 2012). The FmoPV was later detected in Japan with similar pattern of phylogenetic analysis that has been done previously in Hong Kong. The sequence from Japan isolates are similar to the Hong Kong isolates, with 92.0-94.0% nucleotide sequence identity (Furuya *et al.*, 2013). According to Park *et al.*, (2014), the FmoPV genomes encodes eight types of structural and non-structural proteins, which are the N, P/V/C, M, F, H and L proteins. The L gene of the FmoPV was identified and sequenced in the study conducted in Hong Kong (Woo *et al.*, 2012).

FmoPV is related to the tubulointerstitial nephritis (TIN) in domestic cats which involves primary injury to the renal and eventually leads to renal failure. The virus is assumed to be involved in renal pathologic process as FmoPV was mostly detected in the urine samples (Woo *et al.*, 2012). However, a study that was conducted in Japan to isolate and characterize the FmoPV in domestic cats revealed that there was no association between the FmoPV infection and TIN (Sakaguchi *et al.*, 2014).

In Malaysia, no prevalence study has been conducted to detect the presence of FmoPV infection. In addition, it would be particularly interesting to determine the association between FmoPV and renal/urinary system diseases.

Thus, the objectives of this study include:

1. To detect the presence of feline morbillivirus in Malaysia.
2. To determine the prevalence of feline morbillivirus in Malaysia.
3. To determine the association between renal/urinary system diseases and feline morbillivirus.

The hypotheses for this study were:

1. Feline Morbillivirus is prevalent in cats in Malaysia.
2. There is a significant association between renal/urinary system diseases and feline morbillivirus.

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