UNIVERSITI PUTRA MALAYSIA

PREVALENCE OF CARDIOMYOPATHY IN APPARENTLY HEALTHY CATS

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FPV 2018 17

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UNIVERSITI PUTRA MALAYSIA

SERDANG, SELANGOR

2018

PREVALENCE OF CARDIOMYOPATHY IN APPARENTLY HEALTHY CATS

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A student project paper submitted to the

Faculty of Veterinary Medicine, Universiti Putra Malaysia

In partial fulfilment of the requirement for the

DEGREE OF DOCTOR OF VETERINARY MEDICINE

Universiti Putra Malaysia

Serdang, Selangor DarulEhsan.

MARCH 2018

CERTIFICATION

It is hereby certified that we have read this project paper entitled "**Prevalence of Cardiomyopathy in Apparently Healthy Cats**" by Chin Meixin and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the course VPD 4999 – Final Year Project.

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DEDICATION

This project paper is dedicated to:

The One Almighty God who made all things possible

My beloved family for their love and care

My supervisor for her great help along the journey

My dearest friends for their continuous support

All patients involved

All educators and clinicians for committing themselves towards the noble cause of education

ACKNOWLEDGEMENTS

I would like to thank the Almighty God for this wonderful and fruitful experience, and for guiding and inspiring me throughout the whole journey.

I would also like to express my deep gratitude and appreciation to my supervisor, Dr.KhorKuanHua, for herendless help and encouragementall these while. Thank you for showing me how a dedicated educator like you could change a student's life and mind set to see everything in a better way.

Last but not least, a big thanks to my family for their encouragement and prayers, also to my best friends, Jinrhu, Kai, Vivian, and Cheng for their continuous support and love. You guys are the best and will always be.

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LIST OF ABBREVIATIONS

HCM	Hypertrophic Cardiomyopathy
DCM	Dilated Cardiomyopathy
RCM	Restrictive Cardiomyopathy
UCM	Unclassified Cardiomyopathy
CHF	Congestive Heart Failure
FATE	Feline Arterial Thromboembolism
VHS	Vertebral Heart Score
VSD	Ventricular Septal Defect
TD	Tricuspid Valve Dysplasia
MD	Mitral Valve Dysplasia
PS	Pulmonic Stenosis
AS	Aortic Stenosis
PDA	Patent DuctusArteriosus
TOF	Tetralogy of Fallot
AV	Atrioventricular
UVH	University Veterinary Hospital
UPM	Universiti Putra Malaysia
CLA	Cardiac Long Axis
CSA	Cardiac Short Axis
IVSD	InterventricularSeptal Defect
LVOT	Left Ventricular Outflow Tract Obstruction
SAM	Systolic Anterior Motion

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ABSTRAK

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

PrevalensPenyakitJantungdalamKucingKelihatanSihat

oleh

CHIN MEIXIN

2018

Penyelia: Dr.Khor Kuan Hua

Kajian retro spektif ini menunjukkan bahawa prevalens penyakit jantung dalam kucing-kucing kelihatan sihat ialah 40.7% (*n*=24/59), dengan kardiomiopati hipertrofik (HCM) (62.5%) sebagai penyakit jantung yang paling biasa di diagnos, diikuti dengan kardiomiopati terhad (RCM) (25.0%), kecacatan septum interventrikel (IVSD) (4.2%), halangan aliran keluar ventrikel kiri (LVOT) (4.2%), dan gerakan anterior sistolik (SAM) injap mitral (4.2%). Min umur kucing-kucing tersebut ialah 4.9 tahun (julat umur, 7-bulan sehingga 19-tahun). Prevalens adalah lebih tinggi dalam kucing jantan (45.0%; *n*=17/38), terutamanya dalam kucing domestic (DSH) (46.0%; *n*=11/24). Antara kucing- kucing yang kelihatan sihat dengan saiz jantung vertebra (VHS) > 8.0, hanya 52% (*n*=12/23) yang didiagnos dengan kardiomiopati. Walaubagaimanapun, terdapat 33% (*n*=12/36) daripada kucing-kucing yang kelihatan sihat dengan VHS ≤ 7.9 juga didiagnos dengan penyakit jantung. Semua kucing yang nampaknya sihat dengan suara jantung yang tidak normal telah didiagnos dengan

kardiomiopati secara konsistennya. Terdapat 31.4% (*n*=16/51) kucing-kucing tersebut dengan suara jantung yang normal juga didiagnos dengan kardiomiopati. Kejadian kardiomiopati dalam kucing-kucing kelihatan sihat adalah tidak berkaitan dengan umur, jantina, dan VHS kucing tersebut, kecuali suara jantung. Ekhokardiografi merupakan alat diagnosis yang terbaik disebabkan suara and saiz jantung yang normal tidak dapat menolak kemungkinan kejadian kardiomiopati dalam kucing-kucing yang kelihatan sihat ini.

Kata kunci: felin, sihat, kardiomiopati, prevalens

ABSTRACT

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

Prevalence of Cardiomyopathy in Apparently Healthy Cats

by

CHIN MEIXIN

2018

Supervisor: Dr.KhorKuanHua

This retrospective study revealed that the prevalence of cardiomyopathy in apparently healthy cats was 40.7% (*n*=24/59), with hypertrophic cardiomyopathy (HCM) (62.5%) as the most common type of cardiomyopathy diagnosed, followed by restrictive cardiomyopathy (RCM) (25.0%), interventricularseptal defect (IVSD) (4.2%), left ventricular outflow tract obstruction (LVOT) (4.2%), and systolic anterior motion (SAM) of the mitral valve (4.2%). The cats' mean age was 4.9 years old (age range, 7-month-old to 19-year-old). The prevalence was higher in male (45.0%; *n*=17/38) cats, especially the domestic short hairs (DSH) (46.0%; *n*=11/24). Among the apparently healthy cats with vertebral heart size (VHS) > 8.0,only 52% (*n*=12/23) of them were diagnosed with cardiomyopathy. However, 33% (*n*=12/36) of the cats with normal VHS ≤ 7.9 were diagnosed with heart disease. Consistently, all

of the apparently healthy cats with abnormal heart sound were diagnosed with heart disease. About 31.4% (*n*=16/51) of these cats with normal heart sound had cardiomyopathy too. Occurrence of cardiomyopathy in apparently healthy cats has no association with the patient's age, sex, and VHS, except for the heart sound. Echocardiography remains the best diagnostic tool, as normal heart size and normal heart sound do not exclude cardiomyopathy in this group of apparently healthy cats.

Keywords: feline, healthy, cardiomyopathy, prevalence

CHAPTER 1.0

INTRODUCTION

1.1 INTRODUCTION

Cats diagnosed with heart disease are often associated with congestive heart failure due to the combination of abnormal structure and function of the cardiac muscles. There are four main classifications of acquired cardiomyopathy in cats, namely hypertrophic cardiomyopathy (HCM), dilated cardiomyopathy (DCM), restrictive cardiomyopathy (RCM), and unclassified cardiomyopathy (UCM). Ahmad *et al*. (2016) documented that HCM was the most prevalent heart disease diagnosed in cats locally, and these cats has an increased in the thickness of the muscular wall of the left ventricle upon diagnosis. The prevalence of cats diagnosed with heart disease appears more frequently in males than in females (Ahmad*et. al.*,2016).

Studies have shown that some cats with cardiac disease may appear to remain asymptomatic throughout their life, and clinical signs often observed as a sequelaeof congestive heart failure (CHF) or feline arterial thromboembolism (FATE), leading to death (Fox, 2015). According to the New York Heart Association (NYHA) Classification by Atkins *et. al.*(2009), these asymptomatic cats are categorised as Class I, where heart disease is present in the affected cats

but with no clinical signs shown even with exercise. Ahmad *et al*. (2016) reported that out of 155 heart disease patients presented at the University Veterinary Hospital from year 2013 to 2015, ten of these cats (n=10/155) were asymptomatic and heart disease was diagnosed only during annual health screening or pre-anaesthestic health screening. Otherwise, these cats seemed healthy upon presentation. Another study by Paige *et. al.* (2009) showed that 16 out of 103 cats which appeared healthy had heart disease. Out of the 16 cats, murmur was not detected in 11 cats with heart disease. Most of the cats appeared and had no signs of cardiomyopathy perhaps due to the sedentary nature of cats. To date, there are no studies locally that determine the prevalence of cardiomyopathy in apparently healthy cats.

1.2 OBJECTIVES

The objectives of this study were:

1. To determine the prevalenceof cardiomyopathy in apparently healthy cats in UVH, UPM from 2016 to 2017.
2. To determine the most common type ofcardiomyopathy in apparently healthy cats.
3. To determine the sex, breed, age, heart sound, and vertebral heart size (VHS) as the associated factors that may contribute to the occurrence of cardiomyopathy in apparently healthy cats.

1.3 HYPOTHESIS

The hypothesis of this study was:

H_o : Cardiomyopathy cannot be found in apparently healthy cats.

H_a : Cardiomyopathy can be found in apparently healthy cats.

CHAPTER 7.0

REFERENCES

Abbott, J.A. (2010). Feline hypertrophic cardiomyopathy: an update. *Vet Clin North Am Small AnimPract*, 40(4), 685 – 700.

Ahmad, Z.B., Khor, K.H. and Watanabe, M. (2016). Retrospective study on feline heart disease in University Veterinary Hospital, Universiti Putra Malaysia from 2013-2015. Serdang, Selangor, Malaysia.

Atkins, C., Bonagura, J., Ettinger, S., Fox, P., Gordon, S., Haggstrom, J., Hamlin, R., Keene, B., Luis-Fuentes, V., Stepien, R. (2009). Guidelines for the diagnosis and treatment of canine chronic valvular heart disease. *Journal of Veterinary Internal Medicine*, 23, 1142 – 1150.

Bright, J.M., Golden, A.L., Daniel, G.B. (1992). Feline hypertrophic cardiomyopathy: variations on a theme. *Journal of Small Animal Practice*, 32, 266–274.

Côté, E., MacDonald, K. A., Meurs, K. M., & Sleeper, M. M. (2011). *Feline Cardiology*. United Kingdom: Wiley-Blackwell.

Ferasin, L., Sturgess, C.P., Cannon, M.J., Caney, S.M.A., Gruffydd-Jones, T.J., Wotton P.R. (2003). Feline idiopathic cardiomyopathy: a retrospective study of 106 cats (1994–2001). *Journal of Feline Medicine & Surgery*, 5(3), 151 - 159.

Ferasin, L. (2009a). Feline Myocardial Disease 1: Classification, Pathophysiology and Clinical Presentation. *Journal of Feline Medicine and Surgery, 11*, 3-13.

Ferasin, L. (2009b). Feline Myocardial Disease 2: Diagnosis, Prognosis, and Clinical Management. *Journal of Feline Medicine and Surgery, 11*, 183-194.

Fox, P.R.A.S., Karsten E. (2015). Management of asymptomatic (occult) feline cardiomyopathy: challenges and realities. *Volume 17*, S150 - 158.

Guglielmini, C., Toaldo, M. B., Poser, H., Menciotti, G., Cipone, M., Cordella, A., et al. (2014). Diagnostic accuracy of the vertebral heart score and other radiographic indices in the detection of cardiac enlargement in cats with different cardiac disorders. *Journal of Feline Medicine and Surgery*, 16(10), 812 – 825.

Paige, C.F., Abbott, J.A., Elvinger, F., & Pyle, R.L. (2009). Prevalence of cardiomyopathy in apparently healthy cats. *Journal of American Veterinary Medical Association, 11,* 1398 - 1403.

Spalla, I., Locatelli, C., Riscazzi, G., Santagostino, S., Cremaschi, E., & Brambilla, P. (2015). Survival in cats with primary and secondary cardiomyopathies. *Journal of Feline Medicine and Surgery* 1-9.

Tidholm, A., Ljungvall, I., Michal, J., Haggstrom, J., & Hoglund, K. (2015). Congenital Heart Defects in Cats: a Retrospective Study of 162 Cats (1996 - 2013). Journal of Veterinary Cardiology, 17, S215 - S219.