RETROSPECTIVE STUDY ON FELINE HEART DISEASE IN UNIVERSITY VETERINARY HOSPITAL, UNIVERSITI PUTRA MALAYSIA (UVH-UPM) FROM 2013 - 2015

ZAKARIA BIN AHMAD

FPV 2016 66

RETROSPECTIVE STUDY ON FELINE HEART DISEASE IN UNIVERSITY VETERINARY HOSPITAL, UNIVERSITI PUTRA MALAYSIA (UVH-UPM) FROM 2013 - 2015

ZAKARIA BIN AHMAD

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

JUNE 2016

CERTIFICATION

It is hereby certified that we have read this project paper entitled "**Retrospective Study on Feline Heart Disease in University Veterinary Hospital, Universiti Putra Malaysia (UVH-UPM) from 2013 - 2015**", by Zakaria bin Ahmad 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.

_____

Dr.KhorKuan Hua

DVM (UPM), PhD (Queensland),

Senior lecturer,
Department of Veterinary Clinical Studies,
Faculty of Veterinary Medicine,
Universiti Putra Malaysia
(Supervisor)

_____

Assoc. Prof.Dr.Malaika Watanabe

DVM (UPM), PhD (Yamaguchi),

Associate Professor,
Department of Companion Animal Medicine & Surgery,
Faculty of Veterinary Medicine,
Universiti Putra Malaysia
(Co-Supervisor)

DEDICATION

This project paper is dedicated to the One Almighty God, who had created me and made all things possible,

To my family dedicated with bunch of Loves –

To my late father

My mother

My siblings

My supervisor and co-supervisor with full of respect

To all the cats

And to all my lecturers and teachers who have committed themselves towards the noble cause of education

ACKNOWLEDGEMENTS

Alhamdulillah with divine grace and blessing from the Almighty God, Allah S.W.T. whom gave me good health and pouring miscellaneous ideas throughout the study and those who have made this project paper a reality.

I am very thankful and grateful to work through this wonderful experience under the guidance of my supervisor and co-supervisor, Dr.KhorKuan Hua and Assoc. Prof.Dr.Malaika Watanabe for spending their precious time sharing experiences and knowledge on feline heart diseases that they have handled. Special thanks to Dr.KhorKuan Hua for her persistent guidance and comments that had improved me to be better and Assoc. Prof.Dr.Malaika Watanabe for her insightful comments and suggestions. Both of them helped me to spread my wings broader and wider in Small Animal practices.

I also would like to thanks to Deputy Dean of UVH, Assoc. Prof.Dr.Gurmeet Kaur Dhaliwal for allowing me to conduct my project in UVH for five weeks. Besides, I would like to thanks to UVH staff at the clinic, and Secretary of Deputy Dean of UVH, Miss NurulAlwani Abdul Hamid for their assistance.

Last but not least, a big thanks to my most heartfelt gratitude to my family; my beloved mother, brothers and sisters for their prayers, my best friends for all the love and support throughout my studies.

CONTENTS

LIST OF ABBREVIATIONS

ASD	Atrial Septal Defect
DCM	Dilated Cardiomyopathy
DSH	Domestic Shorthair
HCM	Hypertrophic Cardiomyopathy
IVS	Interventricular Septum
LV	Left Ventricle
LVFW	Left Ventricle Free Wall
MYBPC3	Myosin Binding Protein C3
NYHA	New York Heart Association
RCM	Restrictive Cardiomyopathy
UCM	Unclassified Cardiomyopathy
UVH-UPM	University Veterinary Hospital – Universiti Putra Malaysia
VHS	Vertebral Heart Score
VSD	Ventricular Septal Defect

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRAK

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

KAJIAN RETROSPEKTIF PENYAKIT JANTUNG FELIN DI HOSPITAL VETERINAR UNIVERSITI, UNIVERSITI PUTRA MALAYSIA (UVH-UPM) DARI 2013 - 2015

Oleh

ZAKARIA AHMAD

2016

Penyelia: Dr.Khor Kuan Hua

Penyelia Bersama: Prof. Madya Dr.Malaika Watanabe

Kajian retrospektif yang dikendalikan di UVH-UPM menunjukkan bahawa prevalens kucing yang didiagnos menghidapi penyakit jantung adalah 1% (*n*= 155/15,493) dengan tren yang meningkat sepanjang tempoh tiga tahun (2013-2015). Min umur pesakit jantung felin adalah 5.2 tahun (julat umur, 2-bulan sehingga 20-tahun) dengan kekerapan tertinggi dapat dilihat pada kucing jantan (57%) berbanding dengan kucing betina (43%). Dua baka kucing yang lazim terlibat ialah kucing domestik (54%) dan kucing Parsi (26%). Sepuluh daripada 155 ekor pesakit kucing yang menghidapi penyakit jantung adalah asimptomatik manakala selebihnya (145 ekor kucing) pesakit jantung adalah simptomatik dan dikemukakan dengan

pelbagai tanda klinikal seperti kegagalan jantung kongestif. Penyakit jantung perolehan sering kali didiagnos berbanding dengan penyakit jantung kongenital. Antara penyakit jantung perolehan adalah kardiomiopatihipertrofi (HCM) dengan prevalens yang tertinggi iaitu 47%, diikuti oleh kardiomiopatiterdilat (DCM) (18%), kardiomiopatiterhad (RCM) (15%), lain-lain jenis penyakit jantung (11%) (terdiri daripada lelehan perikardium, kekurangan aortik, tumor pangkal jantung, dan penyakit cacing jantung felin), miokarditis (7%), dan akhirnya, penyakit jantung kongenital (2%) (kecacatan septa atrium (ASD) dan kecacatan septa ventrikular (VSD)). Pemeringkatan penyakit pesakit jantung kucing diklasifikasikan mengikuti *New York Heart Association* (NYHA). Majoriti pesakit jantung kucing tergolong dalam Kelas II (*n*=52) dan Kelas III (*n*=67), diikuti dengan Kelas IV (*n*= 26), dan minority adalah Kelas I (*n*=10). Ekhokardiografi merupakan alat diagnosis yang terbaik berbanding dengan radiografi kerana saiz jantung yang normal tidak menolak kemungkinan penyakit jantung pada kucing.

Kata kunci: penyakit jantung kucing, prevalens, penyakit jantung perolehan, penyakit jantung kongenital, pemeringkatan penyakit jantung felin

ABSTRACT

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

RETROSPECTIVE STUDY ON FELINE HEART DISEASE IN UNIVERSITY VETERINARY HOSPITAL, UNIVERSITI PUTRA MALAYSIA (UVH-UPM) FROM 2013 - 2015

By

ZAKARIA AHMAD

2016

Supervisor: Dr.KhorKuan Hua

Co-Supervisor: Associate Prof.Dr.Malaika Watanabe

This restrospective study conducted in UVH-UPM revealed that the overall prevalence of cats diagnosed with heart disease was 1% (*n*=155/15,493) with an

increased trend over the period of 3 years (2013-2015). The mean age of feline heart disease patient was 5.2 years old (age range, 2-month to 20-year-old), more often seen in male (57%) compared to female (43%) cats. The two most common breeds presented with heart disease were Domestic Shorthair (54%) and Persian (26%) cats. Ten out of 155 cats diagnosed with heart disease were asymptomatic whereas the remaining (145 cats) patients were presented with varies clinical sign such as congestive heart failure. The acquired heart disease were often diagnosed compared to the congenital heart disease. Among the acquired heart diseases, hypertrophic cardiomyopathy (HCM) has the highest prevalence at 47%, followed by dilated cardiomyopathy (DCM) (18%), restrictive cardiomyopathy (RCM) (15%), and other types of heart disease (11%) (Consist of pericardial effusion, aortic insufficiency, heart base tumour, and feline heartworm disease), myocarditis (7%), and congenital heart disease (2%) (Atrial Septal Defect (ASD) and Ventricular Septal Defect (VSD)). These feline heart disease patients were stage using and the New York Heart Association (NYHA) Classification. Majority of the feline heart patient in this study were in Class II (*n*=52) and Class III (*n*=67), followed by Class IV (*n*=26), and minority was Class I (*n*=10). Echocardiography remains the best diagnostic tools compared to radiography, where normal size of heart does not rule out heart disease in cats.

Keywords: feline heart disease, prevalence, acquired heart diseases, congenital heart diseases, staging of feline heart diseases

CHAPTER 1.0

INTRODUCTION

1.1 INTRODUCTION

In Malaysia, the information on feline heart diseases has not been well documented. Heart diseases in cat are silent killer. The natural history of occult disease is variable and difficult to predict with certainty because majority of cats with heart diseases appear to remain asymptomatic throughout their life and only shows clinical sign when the disease became severe in case of congestive heart failure (CHF), feline arterial thromboembolism (FATE) and leading to death(Fox, 2015). Cats with asymptomatic heart disease often are undiagnosed due to their sedentary nature(Paige *et al.*, 2009)

Clinical signs presented were usually associated with the respiratory system such as dyspnoea, abdominal breathing and tachypnoea(Spalla *et al.*, 2015). Both, heart murmur and tachycardia were often auscultated (Ferasin*et al.*, 2003) and this is consistent with the observation by Ferasin (2009) and Paige *et al.*(2009), where the incidence of heart murmur and tachycardia were reported 60% and 30%, respectively. The mean age of cats diagnosed with heart disease was 6.8 years old (age range, 6-

month-old to 16-year-old) (Ferasin*et al.*, 2003). The prevalence of heart disease in feline patient appears more frequently in females than males for both, RCM and DCM at 73%, respectively, and followed by UCM at 64%. HCM was more prevalence in males at 64%(Ferasin*et al*. 2003). However, latest review by Ferasin (2009) stated that feline heart diseases were equally distributed between the male (50%) and female (50%) cats.

Radiography provides the primary means of assessing heart size in animals, however the accuracy and validity of interpretations in feline patient remains questionable (Nakamura *et al.*, 2011). Hence to date, the echocardiography provides a means of verifying the radiographic interpretation of cardiomegaly and it is the "gold standard" of assessing heart size, demonstrating the limits of radiography in this field. Interestingly, no objective studies have been performed to determine the accuracy of radiography in identifying generalized cardiomegaly based on the final diagnosis made after echocardiography was performed.

1.2 OBJECTIVES

The objectives of this study were:

1. To determine the prevalence of feline heart disease in UVH-UPM from 2013 to 2015.
2. To determine the age, sex, and breeds as associated factors that may contribute to occurrence of feline heart disease.
3. To determine the common clinical and radiographic findings for cats diagnosed with heart diseases.
4. To compare the Vertebral Heart Score (VHS) based on radiography to the definitive diagnosis of the heart (via echocardiography) and the stage of feline heart disease.

1.3 HYPOTHESES

The hypotheses for this study were:

1. HCM is the most prevalent type of feline heart disease diagnosed in UVH-UPM.
2. Feline heart diseases are often observed in older cats, breeds such as Maine coon and Persian and equally distributed among male and female.
3. The presenting clinical sign is associated with respiratory signs.

4. Radiography is not a sensitive diagnostic tool to diagnosed heart disease in cats.

REFERENCES

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

Boon, J. A. (1998). *The Echocardiographic Examination: Manual of Veterinary Echocardiography*.

Côté, E., Manning, A. M., Emerson, D., Nancy J. Laste, Malakoff, R. L., & Harpster, N. K. (2004). Assessment of the prevalence of heart murmurs in overtly healthy cats. *Journal of the American Veterinary Medical Association 225*(3), 384-388.

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

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.

Ferasin, L. (2012). Feline Cardiomyopathy. *Companion Animal Practice, 34*, 204 - 213.

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.

Fox, P. R. a. S., Karsten E. (2015). Management of asymptomatic (occult) feline cardiomyopathy: challenges and realities. *Volume 17*, S150–S158.

Guglielmini, C., & Diana, A. (2015). Thoracic Radiographic in a Cat: Identification of Cardiomegaly and Congestive Heart Failure. *Journal of Veterinary Cardiology, 17*, S87 - S101.

Guglielmini, C., Toaldo, M. B., Poser, H., Menciotti, G., Cipone, M., Cordella, A., et al. (2015). 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.

Litster, A. L., & Buchanan, J. W. (2000). Vertebral scale system to measure heart size in radiographs of cats. *Journal of the American Veterinary Medical Association, 216*(2), 210-214.

Meurs, K. M., Fries R., & Heaney, A. M. (2008). Prevalence of the Myosin-Binding Protein C Mutation in Maine Coon Cats. *Journal of Veterinary Internal Medicine, 22*, 893–896

Nakamura, R. K., Rishniw, M., King, M. K., & Sammarco, C. D. (2011). Prevalence of Echocardiographic Evidence of Cardiac Disease in Apparently Healthy Cats with Murmur. *Journal of Feline Medicine and Surgery, 13*, 266 - 271.

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.

Smith, S., & Dukes-McEwan, J. (2012). Clinical Signs and Left Atrial Size in Cats with Cardiovascular Disease in General Practice. *Journal of Small Animal Practice, 53,* 27 - 33.

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. (2014). Congenital Heart Defects in Cats: a Retrospective Study of 162 Cats (1996 - 2013). *Journal of Veterinary Cardiology, 17,* S215 - S219.

Wagner, T., Fuentes, V. L., Payne, J. R., McDermott, N., and Brodbelt, D. (2010). Comparison of auscultatory and echocardiographic findings in healthy adult cats. *Journal of Veterinary Cardiology,* 12(3), 171 - 182

Winter, M. D., Giglio, R. F., Berry, C. R., Reese, D. J., Maisenbacher, H. W., & Hernandez, J. A. (2015). Associations between "Valentine" Heart Shape, Atrial Enlargement, and Cardiomyopathy in Cats. *Journal of Feline Surgery and Medicine, 17*(6), 447 - 452.