



UNIVERSITI PUTRA MALAYSIA

***MORTALITY RATE AND SURVIVABILITY OF CATS DIAGNOSED WITH
CHRONIC KIDNEY DISEASE AND THE EFFECTIVENESS OF
TELMISARTAN IN MANAGEMENT OF PROTEINURIA***

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FPV 2018 34

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TELMISARTAN IN MANAGEMENT OF PROTEINURIA**

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A project paper submitted to the
Faculty of Veterinary Medicine, Universiti Putra Malaysia

In partial fulfillment for the requirement of the

MASTER OF VETERINARY MEDICINE

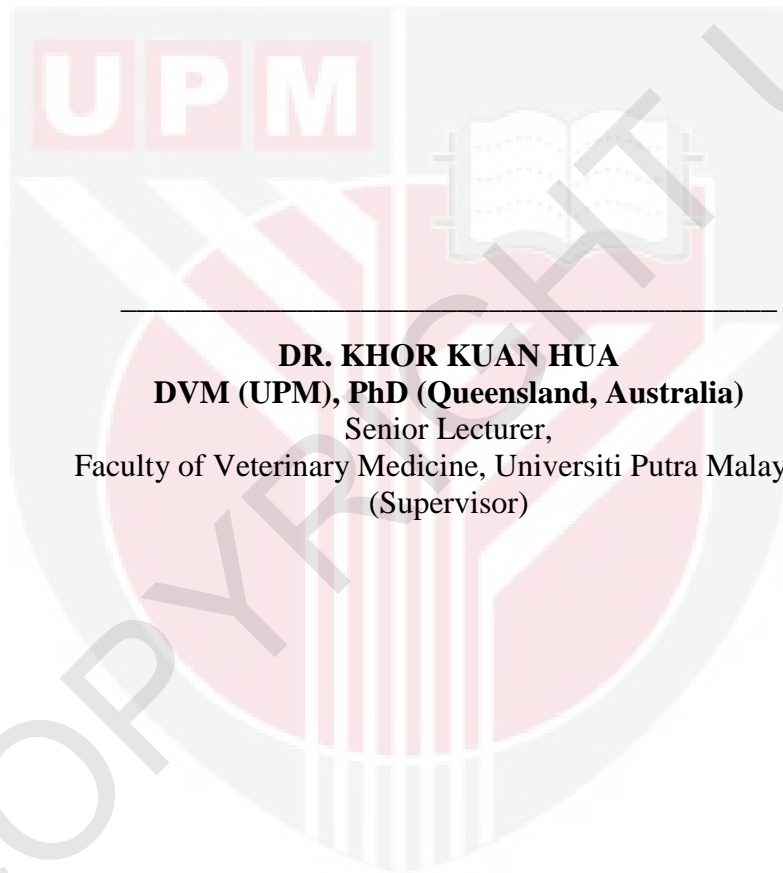
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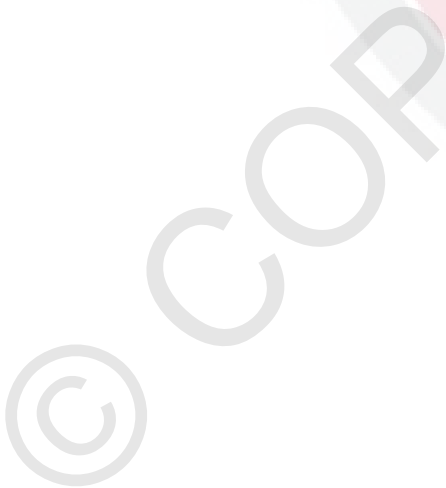
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JULY 2018

It is hereby certified that I have read this project paper entitled “Mortality rate and Survivability of Cats Diagnosed with Chronic Kidney Disease and the Effectiveness of Telmisartan in Management of Proteinuria”, 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 5908 – Project.



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DEDICATIONS

“Courage is not having the strength to go on; it is going on when you don’t have the strength”

-Theodore Roosevelt

*To my dearest mom,
Mrs. Rajeswary Palanyappan,
Please keep fighting.*

*To my dearest supervisor,
Dr. Khor Kuan Hua,
Thank you for being there whenever I needed you and not giving up on me.*

*To my dearest dad and siblings,
Supt. Manoraj Apookutty,
Dr. Thiban Raj Manoraj
And
Dr. Shandini Devy Manoraj,
Thank you for the endless support.*

ACKNOWLEDGEMENT

First and foremost, I would like to thank God, the Almighty for giving me strength and making everything possible. Sincere thanks to my Appa, Amma, Anna and Shandini for the unconditional love, support and prayers. My deepest gratitude to my supervisor, Dr. Khor Kuan Hua for the continuous support and guidance till the very end. Words can't express how thankful I am for the endless moral support and love from my best friend, Dr. Jessie Bay Ji Xi throughout this MVM programme. My project would have definitely not been a success without the help from you. This achievement will be impossible without the assistance from Dr. Evonne Lim (Boehringer Ingelheim), Dr. Dalton Low (Ritma Prestasi), Dr. Melissa Phoon and Dr. Joanna Ng (Royal Canin Malaysia). I am forever thankful for all the support from you. I would also like to thank all the staff of the UVH Small Animal Clinic, Wards and Intensive Care Unit (ICU) for being very helpful during my sampling and study. My sincere thanks to Dr. Chen Hui Cheng for the support given. Lastly, thank you to my classmates, MVM 2017!

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LIST OF ABBREVIATIONS

%	percentage
AAFP	American Association of Feline Practitioners
AAHA	American Animal Hospital Association
BCS	body condition scoring
CKD	Chronic kidney disease
EDTA	Ethylenediaminetetraacetic acid
IACUC	Institutional Animal Care and Use Committee
n	number of cats sampled
SBP	systolic blood pressure
UP/C	urine protein: creatinine ratio
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 5908 – Projek.

KADAR MORTALITI DAN KEMANDIRIAN KUCING DIDIAKNOSIS DENGAN PENYAKIT BUAH PINGGANG KRONIK DAN KEBERKESANAN TELMISARTAN DALAM PENGURUSAN PROTEINURIA.

Oleh

HEMADEVY MANORAJ

2018

Penyelia: Dr. Khor Kuan Hua

Penyakit buah pinggang kronik (CKD) biasanya didiagnosis dalam kucing; terutamanya pesakit geriatrik. Pengurusan awal pesakit CKD adalah penting untuk melambatkan perkembangan penyakit. Pengurusan kucing CKD termasuk mengawal proteinuria, mengekalkan tahap kreatinin serum, tahap fosfat tak organik, dan hipertensi (jika ada). Tahap proteinuria yang lebih tinggi dikaitkan dengan perkembangan pesat penyakit ini termasuk pada manusia, anjing dan kucing. Satu kajian yang dijalankan membuktikan bahawa telmisartan dapat membantu mengurangkan kadar proteinuria dalam pesakit CKD.

Objektif 1. Untuk menentukan kadar kematian dan kebolehcaraan kucing yang didiagnosis dengan penyakit buah pinggang kronik; 2. Untuk menentukan keberkesanan telmisartan untuk mengawal proteinuria, tekanan darah dan kadar kreatinin serum dalam kucing yang didiagnosis dengan CKD.

Haiwan, bahan dan kaedah Kucing dari tahun Januari 2016 hingga Disember 2017 yang didiagnosis dengan penyakit buah pinggang kronik dikaji semula dan pemiliknya dihubungi untuk susulan keadaan pesakit. Berdasarkan maklumat yang diperoleh, setiap keadaan buah pinggang pesakit kucing akan dipentaskan dan kadar kematian dan kelangsungan hidup akan dikira menggunakan analisis Kaplan Meyer. Kucing yang tidak menunjukkan peningkatan dengan kawalan proteinuria telah direkrut untuk rawatan dengan telmisartan.

Dalam kajian ini, 5 kucing milik pelanggan (pesakit CKD yang stabil dengan terapi cecair subkutaneus yang menyokong dan suplemen buah pinggang) telah direkrut. Tahap kreatinin serum asas, pengukuran tekanan darah arteri dan protein air kencing ke nisbah kreatinin (UP/C) telah diperolehi dan dinilai semula pada hari ke-14, -30 dan -60 selepas terapi telmisartan. Data akan dianalisis dengan menggunakan One-way ANOVA untuk membandingkan kesan telmisartan pada proteinuria, tekanan darah dan tahap kreatinin serum.

Keputusan dan Kesimpulan Kajian ini menunjukkan kadar kematian kucing yang didiagnosis dengan CKD dari tahun 2016 hingga 2017 di UVH adalah 81.1%. Kami

juga mendapati bahawa tiada persefahaman yang ketara antara pematuhan pemilik dan survivabiliti pesakit CKD dalam kajian ini. Kajian ini membuktikan bahawa telmisartan berkesan dalam mengurangkan proteinuria dan tekanan darah sistolik dalam kucing CKD.

Kata kunci: penyakit buah pinggang kronik, proteinuria, Telmisartan, UP/C.



ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial requirement for the course VPD 5908 – Project.

MORTALITY RATE AND SURVIVABILITY OF CATS DIAGNOSED WITH CHRONIC KIDNEY DISEASE AND THE EFFECTIVENESS OF TELMISARTAN IN MANAGEMENT OF PROTEINURIA.

By

HEMADEVY MANORAJ

2018

Supervisor: Dr. Khor Kuan Hua

Chronic kidney disease (CKD) is commonly diagnosed in cats; especially in geriatric patients. Early management of CKD patients is up most important in order to slow down the disease progression. Management of feline CKD includes controlling proteinuria, maintaining the level of serum creatinine, inorganic phosphate level, and hypertension (if present). Greater level of proteinuria has been associated with faster progression of the kidney disease in humans and similarly in dogs and cats. A study conducted proven that telmisartan can help to reduce the degree of proteinuria in feline

CKD patients. Thus the objectives of this study were; 1) to determine the mortality rate and survivability of cats diagnosed with chronic kidney disease; and 2) to determine the effectiveness of telmisartan on controlling proteinuria, blood pressure and serum creatinine level in cats diagnosed with CKD. Feline cats patients from year January 2016 to December 2017 diagnosed with chronic kidney disease were reviewed and owners were contacted for follow-up of the patient condition. Based on the information obtained, each cat patient's kidney condition were staged, the mortality rate and estimated survivability rate were calculated. Five client-owned cats (stable CKD patients with supportive subcutaneous fluid therapy and renal supplement) were recruited for treatment with telmisartan.

Baseline serum creatinine level, arterial blood pressure measurement and urine protein to creatinine ratio (UP/C) were obtained and assessed again on Day-14, -30 and -60 of post telmisartan therapy. The data will be analyzed using One-way ANOVA to compare the effect of telmisartan on proteinuria, blood pressure and serum creatinine level.

Results and Conclusions This study revealed the mortality rate of cats diagnosed with CKD from year 2016 to 2017 in UVH is 81.1%. We also found out that there is no significant association between owner compliance and survivability of CKD patients in this study. In this preliminary study, telmisartan shown beneficial effects in reducing proteinuria and systolic blood pressure in feline CKD patients.

Keywords: chronic kidney disease, proteinuria, Telmisartan, UP/C.

CHAPTER 1

INTRODUCTION

Chronic kidney disease (CKD) is a commonly diagnosed disease in cats (Sparkes *et al.*, 2016). CKD may result from any condition that cause progressive and irreversible damage to the kidneys (Reynolds and Lefebvre, 2013). Azotemia occurs when there is an increased of both, the blood urea nitrogen (BUN) and serum creatinine. This condition could be either due to pre-renal, renal or post-renal factors. Azotemia in CKD patients does not develop until 75% of the nephron population has lost its functions (Chew *et al.*, 2011). The common clinical signs of feline CKD patients are polyuria and polydipsia (PUPD), anorexia, weight loss, muscle wasting, halitosis and sometimes vomiting (Canon, 2016). Therefore, often when these feline CKD patients were presented to the veterinarian with these clinical signs would tend to have azotemia and reduced ability to concentrate urine; and urine specific gravity (USG) <1.035. International Renal Interest Society (IRIS) is used as a guideline to manage all feline and canine CKD cases by the veterinarians.

Early management of CKD patient is significant in order to slow down the disease progression with an ultimate aim of improving the cats' quality of life (Sent *et al.*, 2015). Persistent renal proteinuria indicates the presence of CKD and has been associated with greater frequency of renal mortality and morbidity. Greater level of proteinuria was associated with greater progression of the disease including in humans, cats and dogs (Lees *et al.*, 2005). In the long term of management of cats with CKD, controlling proteinuria is crucial and studies had shown that it slower the

progression of CKD (Sparkes *et al.*, 2016). In Malaysia, no study has been conducted to determine the mortality rate and survivability of cats diagnosed with CKD. In addition, it would be particularly interesting to determine the effectiveness of telmisartan in management of proteinuria in cats diagnosed with CKD.

In this study, there were two objectives investigated. Study 1; determined the mortality rate and survivability of cats diagnosed with CKD, and Study 2; determine the effectiveness of telmisartan in controlling proteinuria, blood pressure and serum creatinine level in cats diagnosed with CKD. Both of the study was written in two different chapters, namely Chapter 3 and Chapter 4 of this thesis.

CHAPTER 7

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