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DETECTION OF LEPTOSPIROSIS IN A DOG SHELTER

BOO AO LIN

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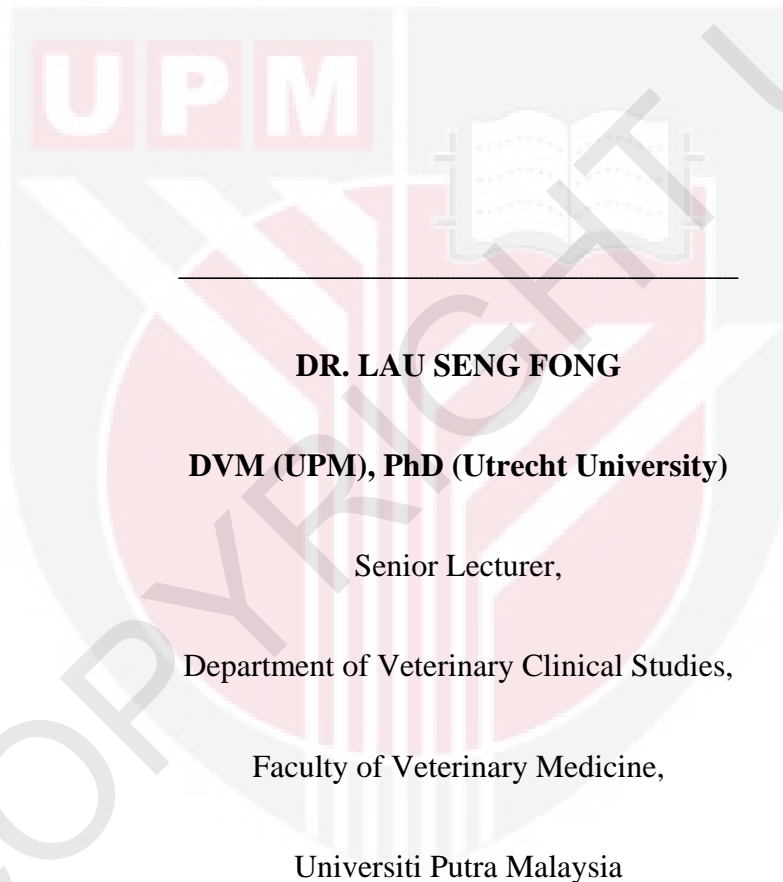
DETECTION OF LEPTOSPIROSIS IN A DOG SHELTER

BOO AO LIN

A Project Paper submitted to the
Faculty of Veterinary Medicine, Universiti Putra Malaysia
In partial fulfillment of the requirement for the
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It is hereby certified that we have read this project paper entitled “Detection of Leptospirosis in A Dog Shelter” by Boo Ao Lin 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-Final Year Project.



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DEDICATIONS

ALMIGHTY GOD

FAMILY

To my parents and siblings who give me continuous support all the time

LECTURERS AND STAFFS

To my supervisor and co-supervisors for all their guidance and assistance

To all lecturers and staffs of Faculty of Veterinary Medicine, UPM, for all the dedications and contributions in veterinary education

FRIENDS

To my beloved classmates of batch 2012/2017

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CONTENTS

	Page number
TITLE	i
CERTIFICATION	ii
DEDICATIONS	iv
ACKNOWLEDGEMENTS	v
CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
ABSTRACT	xii
ABSTRAK	xiv
1.0 INTRODUCTION	1
2.0 LITERATURE REVIEW	
2.1 Epidemiology and Transmission of Leptospirosis	3
2.2 Clinical Features and Pathogenesis of Leptospirosis	5
2.3 Laboratory Diagnosis	6
2.4 Seroprevalence of Canine Leptospirosis Worldwide	8
2.5 Seroprevalence of Canine Leptospirosis in Malaysia	12
2.6 Seroprevalence of Leptospirosis among Dog Population in Shelters	14

2.7 Public Health Concerns	17
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3.0 MATERIALS AND METHODS

3.1 Sample Collection	19
-----------------------	----

3.2 Transportation and Storage of Samples	19
---	----

3.3 Microscopic Agglutination Test (MAT)	19
--	----

4.0 RESULTS	23
--------------------	-----------

5.0 DISCUSSION	26
-----------------------	-----------

6.0 CONCLUSION	36
-----------------------	-----------

7.0 RECOMMENDATIONS	36
----------------------------	-----------

8.0 REFERENCES	37
-----------------------	-----------

9.0 APPENDICES	44
-----------------------	-----------

LIST OF TABLES	Page
Table I: Seroprevalence of canine leptospirosis in various countries	9
Table II : Recent studies of seroprevalence of leptospirosis in various types of dog population in Malaysia	14
Table III : Seroprevalence of canine leptospirosis reported in dog shelters in various countries	16



LIST OF FIGURES

	Page
Figure I : Sterile 96-wells microtiter plate containing serum sample, positivecontrol and negative control	22
Figure II : Seroprevalence of Leptospirosis from the blood sample obtained from 73 shelter dogs and tested against 10 leptospiral serovars using MAT with the cut-off titer of 1:80	24
Figure III : Percentage of seropositive dogs against gender of the dogs	25

LIST OF ABBREVIATIONS

μl	microliter
$^{\circ}\text{C}$	degree Celsius
CDC	Centers for Disease Control and Prevention
CFR	Case Fatality Rate
CFU	Colony forming units
ELISA	Enzyme-linked immunosorbent assay
EMJH	Ellinhausen-McCullough-Johnson-Harris
IACUC	Institutional Animal Care and Use Committee
LPHS	Leptospirosis Pulmonary Haemorrhage Syndrome
LPS	lipopolysaccharide
MAT	Microscopic Agglutination Test
mL	milliliter
n	sample size
OIE	World Organisation for Animal Health
PBS	Phosphate Buffer Saline
PCR	Polymerase Chain Reaction
pH	Potential of Hydrogen
rpm	round per minute
sv.	serovar
UPM	Universiti Putra Malaysia

ABSTRAK

**Abstrak daripada kertas projek yang dikemukakan kepada Fakultin
Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus
VPD 4999- Projek Ilmiah Tahun Akhir**

PENGESANAN LEPTOSPIROSIS DI DALAM SATU PUSAT

PERLINDUNGAN ANJING

Oleh

Boo Ao Lin

2017

Penyelia: Dr. Lau Seng Fong

Penyelia Bersama: Dr. Khor Kuan Hua

Dr. Rozanaliza Radzi

Leptospirosis (Penyakit Kencing Tikus) adalah penyakit bakteria zoonotik yang dilaporkan di seluruh dunia dengan rekod lebih daripada satu juta kes manusia setiap tahun di dunia. Kajian yang dijalankan ke atas Leptospirosis dalam kalangan anjing adalah tidak mencukupi di Malaysia walaupun mereka mungkin mempunyai risiko yang tinggi untuk menyebarkan penyakit ini kepada manusia. Tujuan kajian ini adalah untuk mengesan Leptospirosis dan serovars yang terlibat dalam pusat perlindungan anjing di Johor, Malaysia. Sampel darah telah dikumpul daripada 73 anjing terdiri

daripada 50 anjing yang telah menerima vaksinasi dan 23 anjing yang tidak pernah menerima vaksinasi. Ujian serologi MAT (Microscopic Agglutination Test) telah digunakan untuk mengesani antibodi anti-leptospiral dalam serum sampel. Di titer antibody penentuan iaitu 1:80, dua daripada 73 anjing (2.7%) adalah positif kepada *Leptospira borgpetersenii* serovar *javanica*. Dua daripada 73 anjing (2.7%) adalah positif kepada *L. interrogans* serovar *Icterohaemorrhagiae* dan satu daripada 73 anjing (1.4%) menunjukkan titers antibodi terhadap *L.interrogans* sv. *Australis*. Kelaziman keseluruhan leptospirosis adalah 6.8% ($n = 5/73$) dalam 73 anjing yang telah disampelkan. Antara kelima-lima anjing yang positif, 80% adalah betina dan 20% adalah jantan, dan kesemuanya telah menerima vaksinasi. Dapatan kajian ini menunjukkan bahawa anjing berpotensi menyebarkan penyakit ini kepada manusia dan binatang lain. Justeru, kajian lanjutan untuk menyelidik peranan epidemiologi anjing dalam Leptospirosis adalah diperlukan.

Kata kunci: Leptospirosis, Penyakit Kencing Tikus, anjing, MAT, kelaziman, antibody

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfillment of the course VPD 4999 Final Year Project.

DETECTION OF LEPTOSPIROSIS IN A DOG SHELTER

by

Boo Ao Lin**2017****Supervisor: Dr. Lau Seng Fong****Co-supervisors: Dr. Khor Kuan Hua****Dr. Rozanaliza Radzi**

Leptospirosis is a zoonotic bacterial disease of worldwide distribution with more than one million human cases reported annually in the world. Limited study has been conducted on canine leptospirosis in Malaysia despite they may have high risk of transmitting the disease to human. The purpose of this study was to detect the canine leptospirosis and possible serovars involved in a dog shelter in Johor, Malaysia. Blood samples were collected from 73 dogs consisted of 50 vaccinated dogs and 23 non-vaccinated dogs. Microscopic agglutination test (MAT) was used to screen the serum samples for anti-leptospiral antibodies. At the cut –off titer of 1:80, two out of 73 dogs (2.7%) were seropositive for *Leptospira borgpetersenii* serovar Javanica. Another two out of 73 dogs (2.7%) were seropositive for

L.interrogans serovar Icterohaemorrhagiae and one out of 73 dogs (1.4%) showed antibody titers against *L.interrogans* sv. Australis. The overall seroprevalence was 6.8% (n=5/73) in the 73 dogs studied. All seropositive dogs are vaccinated, consisting of 80% females and 20% males. The seropositive status of these shelter dogs showed that they could be potential disease disseminator to human and other animals warrant further investigation for their potential epidemiological role in leptospirosis.

Keywords: Leptospirosis, canine, MAT, seroprevalence, anti-leptospiral antibodies

1.0 INTRODUCTION

Leptospirosis is a zoonotic bacterial disease of worldwide distribution with more than one million human cases reported annually in the world. It is caused by a spirochete of the *Leptospira* genus which belongs to the family *Leptospiraceae*, order Spirochaetales. Leptospire comprise of both saprophytic and pathogenic species. Among the 300 serovars classified based on the expression of the surface-exposed epitopes in a mosaic of the lipopolysaccharide (LPS) antigens, 250 are pathogenic (Adler & Moctezuma, 2010; Goris, 2016). This wide spread zoonosis is depicted by Alder and Moctezuma (2010) as disease incidence have been reported in all continents and virtually all mammalian species examined. This disease has been recognized as a re-emerging disease particularly in tropical countries and is significant for public health concerns due to its zoonotic risk. Besides, leptospirosis is a main cause of disease in production and companion animals such as dogs, cattle, swine, horses, deer and probably sheep (Ellis, 2015).

Natural reservoir hosts of the disease range from rodents, companion animals such as dogs, livestock such as cattle, pigs, and wild animals. Dogs are considered maintenance hosts for serovar Canicola, incidental hosts for other serovars. They are considered a potential source of infection to human due to the close association with people and their unsanitary habits (Phumoonna *et al.*, 2009).

Leptospirosis is a systemic disease both in humans and domestic animals, predominantly dogs, cattle and swine. Clinical signs are variable in various kinds of animal species with most cases are subclinical and are related to host adapted serovars

such as Canicola in dogs and Hardjo in cattle. According to Adler & Moctezuma (2010), four syndromes have been recognized in dogs including icteric, hemorrhagic, uremic and reproductive (abortion and premature or weak pups). Typical leptospirosis in dogs may show signs such as fever, jaundice, vomiting, diarrhea, intravascular disseminated coagulation, uremia caused by renal failure, hemorrhages and death (Bolin, 1996).

Canine leptospirosis was first described in 1899. The causative agents which are most common in clinical cases of canine leptospirosis are *Leptospira interrogans* and the serovars Icteroahemorrhagiae and Canicola were described in 1960 (Carrasco, 2015). The incidence of infection seems to have reduced with the widespread use of the bivalent vaccines containing these two common serovars. However, there is increased incidence of the disease reported in the past 20 years and the most prevalent serovars nowadays are *L. kirschneri* serovar Grippotyphosa, *L. interrogans* serovar Pomona and *L. interrogans* serovar Bratislava (Carrasco, 2015). Species such as: *L. hebdomadis*, *L. autumnalis*, *L. australis*, *L. medanesis*, *L. bataviae* and *L. sejroe* also have been observed in studies from other countries (Robert, 1955).

To date, studies on canine leptospirosis among dog population in Malaysia is still not adequate which leads to limited knowledge on the prevalence and epidemiology of canine leptospirosis in Malaysia. The purpose of this study was to detect the canine leptospirosis and possible serovars involved in a dog shelter in Johor, Malaysia. The findings would provide information on the disease status of leptospirosis in local dog population in Malaysia and provide some insight into the epidemiology of leptospirosis in Malaysia.

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