



**UNIVERSITI PUTRA MALAYSIA**

***ULTRASONOGRAPHY IMAGING STUDY OF THORACIC ORGAN  
IN GOAT***

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**FPV 2016 14**

**ULTRASONOGRAPHY IMAGING STUDY OF  
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**FACULTY OF VETERINARY MEDICINE**

**UNIVERSITI PUTRA MALAYSIA**

**SERDANG, SELANGOR**

**2016**

**ULTRASONOGRAPHY IMAGING STUDY OF  
THORACIC ORGAN IN GOAT**

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A 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 Darul Ehsan

MARCH, 2016

It is hereby certified that I have read this project paper entitled “Ultrasonography Imaging Study of Thoracic Organ in Goat”, by Nurul Syahirah Husna Sulaiman. In our opinion, it is satisfactory in terms of scope, quality and presentation as partial fulfilment of the requirement for the course VPD 4999- Project.

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**DEDICATIONS**

To the love of my life.....

Abah, Ummi and Along,

Ummi, for loving me unconditionally and be a good friend to me

Abah, for always support and motivate me.

Along, for be the best cooker ever

Love all of you.

## ACKNOWLEDGEMENTS

First of all, I would like to express my greatest gratitude to everyone that directly or indirectly involved in making the objectives of this paper accomplished. Most sincere appreciation and thanks to my supervisor, Prof. Dr. Abd Wahid Haron for all his guidance, motivation, and encouragement throughout these 6 weeks of final year project period. I would also like to take this opportunity to thank Dr. Siti Zubaidah Ramanoon for her keenness to help and support me in doing this project. My heartily thankful also goes to En. Fahmi and Mr. Yap Keng Chee for helping me in taking and bringing the ultrasound machine and for your moral support, Kak Zie and Boey for accompany me throughout this project, Dr. Mark for his motivation and Dr. Khor for her suggestion and advice. My special thanks for Kak Shidah, Atty and Farah for the support. Finally, I wish to deliver my special thanks to my family.

Thank you,

NURUL SYAHIRAH HUSNA SULAIMAN

**ABBREVIATION**

AO= aorta

IAS= interatrial septum

IVS= interventricular septum

LA= left atrium

LC= left coronary

LV= left ventricle

LVW= left ventricular wall

MV= mitral valve

NC= noncoronary

P= pleural line

PM= papillary muscle

PV= pulmonary valve

RA= right atrium

RC= right coronary

Rev= reverberation

RV= right ventricle

**CONTENTS**

	Page
<b>TITLE</b>	i
<b>CERTIFICATION</b>	ii
<b>DEDICATION</b>	iii
<b>ACKNOWLEDGEMENTS</b>	iv
<b>ABBREVIATION</b>	v
<b>CONTENT</b>	vi
<b>LIST OF FIGURES</b>	ix
<b>ABSTRAK</b>	x
<b>ABSTRACT</b>	xii
<b>1.0 INTRODUCTION</b>	1
<b>2.0 LITERATURE REVIEW</b>	2
<b>2.1 Introduction</b>	2
<b>2.2 Transducer</b>	2
<b>2.3 Frequency</b>	2
<b>2.4 The heart of a goat</b>	3



2.5 Non-cardiac thoracic ultrasound	3
2.6 Echocardiography	3
<b>3.0 MATERIALS AND METHODS</b>	<b>5</b>
3.1 Animals	5
3.2 Pre imaging preparation	5
3.3 Ultrasonography procedures	5
3.3.1 Examination of the heart	6
3.3.2 Examination of the pleura	6
<b>4.0 RESULTS</b>	<b>9</b>
4.1 Right Parasternal Long Axis Left Ventricular Outflow view	8
4.2 Right Parasternal Long Axis Four Chamber view	8
4.3 Right Parasternal Short Axis views	8
4.3.1 Papillary Muscle level	9
4.3.2 Mitral Valve level	10
4.3.3 The Heart Base with Aorta level	11
4.4 Left Parasternal Long Axis Four Chamber view	12
4.5 Left Parasternal Short Axis of Heart Base view	13
4.6 Lung	14

<b>5.0</b>	<b>DISCUSSION</b>	15
<b>6.0</b>	<b>CONCLUSION AND RECOMMENDATIONS</b>	17
<b>7.0</b>	<b>REFERENCES</b>	18



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**LIST OF FIGURES**

<b>Figure 1:</b> Transducer placement for the left parasternal long axis view	7
<b>Figure 2:</b> Transducer placement for the right parasternal short axis view	7
<b>Figure 3:</b> Right Parasternal Long Axis Left Ventricular Outflow view	8
<b>Figure 4:</b> Right Parasternal Long Axis Four Chamber view	9
<b>Figure 5a:</b> Right Parasternal Short Axis view with Papillary Muscle level	10
<b>Figure 5b:</b> Right Parasternal Short Axis with Mitral Valve level	11
<b>Figure 5c:</b> Right Parasternal Short Axis view with Aorta level	12
<b>Figure 6:</b> Left Parasternal Long Axis Four Chamber view	13
<b>Figure 7:</b> Left Parasternal Short Axis Heart Base with Aorta view	13
<b>Figure 8:</b> Lung ultrasound by using linear transducer	14
<b>Figure 9:</b> Lung ultrasound by using convex transducer	14

## **ABSTRAK**

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

### **KAJIAN PENGIMEJAN ORGAN TORAKS MENGGUNAKAN KAEDAH ULTRASONOGRAFI DALAM KAMBING**

oleh

**Nurul Syahirah Husna Sulaiman**

**2016**

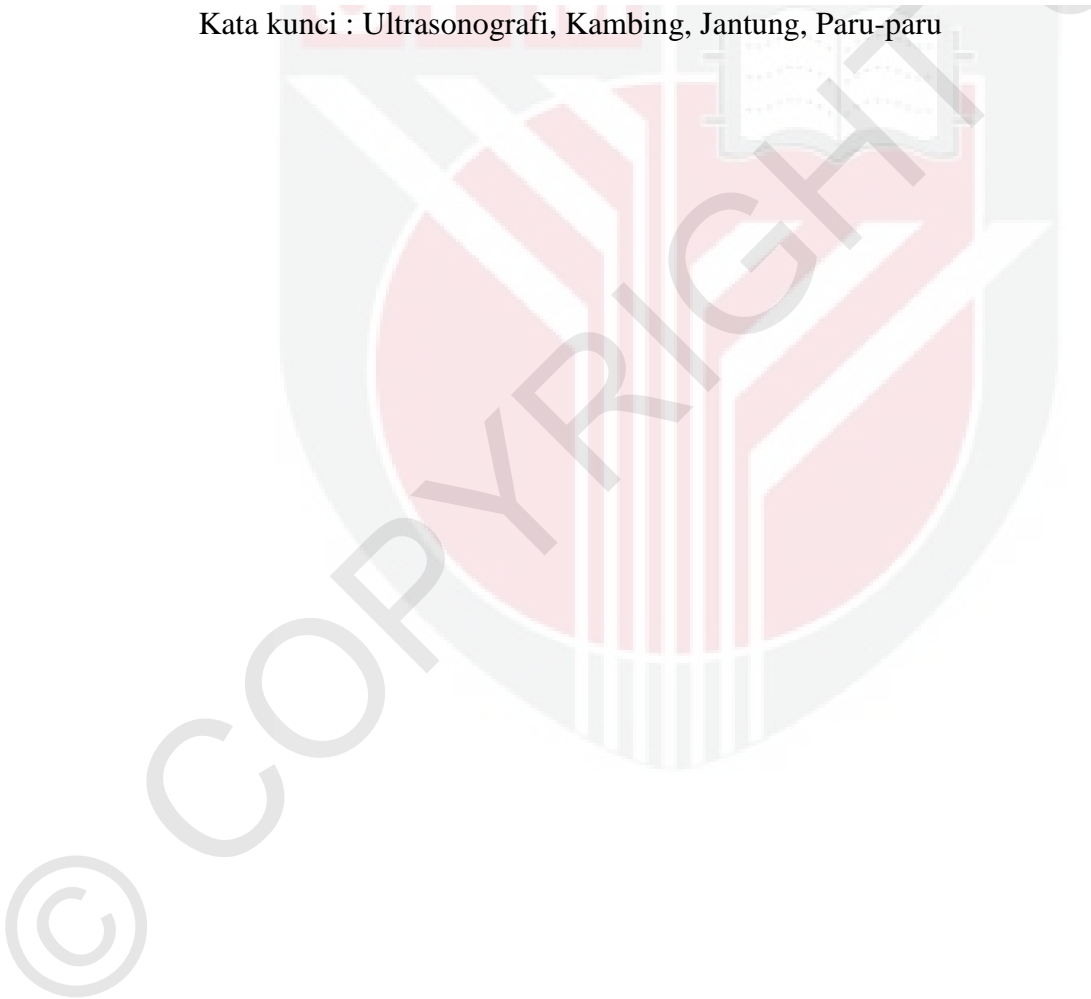
**Penyelia : Profesor Dr. Abd Wahid Haron**

**Penyelia bersama : Dr. Siti Zubaidah Ramanoon**

Ultrasonografi adalah alat yang tidak invasif dan jarang digunakan dalam pemeriksaan organ toraks dalam kambing. Dalam kajian ini, organ toraks yang merupakan jantung dan paru-paru diperiksa dengan menggunakan teknik ultrasonografi untuk menggambarkan struktur dan lokasi anatomi organ. Bulu bagi lima kambing telah dicukur dari kawasan selepas tulang belikat sehingga tulang rusuk terakhir untuk kedua-dua toraks kiri dan kanan. Gel akustik diletak pada transduser. Pemeriksaan dilakukan di kedua-dua bahagian kiri dan kanan toraks dengan menggunakan 5 MHz transduser cembung dan linear. Dalam pemeriksaan jantung, lima jenis pengimejan diperolehi dari kanan dan dua dari sebelah kiri di kawasan ruang intercostal ke-4. Pengimejan ultrasonografi terhadap paru-paru

yang dilakukan di kawasan ruang intercostal ke 7 hingga 11 menunjukkan garis mendatar hyperechoic dengan gema artifak .Kesimpulannya, semua jenis pengimejan echocardiography boleh diperolehi dari ruang intercostal-4 lebih kurang 2 cm di atas olecranon dan paru-paru ultrasonografi adalah di antara 7 sehingga 11 ruang intercostal.

Kata kunci : Ultrasonografi, Kambing, Jantung, Paru-paru



**ABSTRACT**

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

**ULTRASONOGRAPHY IMAGING STUDY OF THORACIC ORGAN IN  
GOAT**

by

**Nurul Syahirah Husna Sulaiman****2016****Supervisor: Prof. Dr. Abd Wahid Haron****Co-supervisor : Dr. Siti Zubaidah Ramanoon**

Ultrasonography is a non-invasive tool that is less commonly used for thoracic examination in goat. In this study, the thoracic organ which is the heart and lung is examined by using the ultrasonography technique to describe the structure and the anatomical location of the organ. Five animals were clipped from area caudal to scapula until the last rib for both left and right thorax. Coupling gel was applied to the transducer. Examination was done for both left and right side of the thorax by using the 5 MHz convex and linear probe. In echocardiography, five imaging plane were obtained from the right and two from the left side of the 4<sup>th</sup> intercostal space. Lung ultrasound shows the hyperechoic horizontal line with reverberation artifact. In conclusion, all echocardiography imaging plane were obtain at the 4<sup>th</sup> intercostal space slightly 2 cm above the olecranon and lung ultrasound is at between the 7<sup>th</sup> until 11<sup>th</sup> intercostal space.

**Keywords:** Ultrasound, Goat, Heart, Lung

## CHAPTER I

### GENERAL INTRODUCTION

Ultrasonography of the thorax organs enables the evaluation of pleural surface of the lung and superficial lung parenchyma, heart and mediastinal region (Palgrave, 2015). Normal pleural surface which is in contact with aerated lung will appear as a uniformly hyperechoic line which moves in synch with respiration (Kimberly Palgrave). The normal lung should extend to the margin of the thoracic wall and appear as a highly echogenic line with reverberation artifact. Internal parenchyma of the lung cannot be assessed in normal animal due to air interface (Armburst, 2011). The mediastinum is difficult to image because it is surrounded by lung, which results in reflection of the ultrasound beam but cranial mediastinum can be imaged through the intercostal space (Armburst, 2011).

Ultrasonography of the heart is called an echocardiography. Echocardiography is a non-invasive method for assessment of the goat heart and it can provide a good to excellent technique and measurement reliability which can be obtained from echocardiographic dimensions and time indices (Hallowell *et al.*, 2012). The most technically challenging views to obtain were the short axis views of the mitral valves and aortic valves due to poor visualization due to hyperechogenicity of the pleural space and therefore specific species reference ranges in cardiac dimension is required (Hallowell *et al.*, 2012). This study was conducted with the objective to describe the anatomical structure and location of the thoracic organ of goat using ultrasonography imaging technique.

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