



**UNIVERSITI PUTRA MALAYSIA**

***A RETROSPECTIVE STUDY OF PELVIC LIMBS FRACTURE  
MANAGEMENT IN AVIAN SPECIES PRESENTED TO UNIVERSITY  
VETERINARY HOSPITAL (UVH) UNIVERSITI PUTRA MALAYSIA***

**DR.SITI SARISMAHANIM BINTI ISMAIL**

**FPV 2014 5**



**UPM**  
UNIVERSITI PUTRA MALAYSIA  
BERILMU BERKUALITI

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By

**DR.SITI SARISMAHANIM BINTI ISMAIL**

Thesis Submitted to the School Of Graduate Studies, Universiti Putra  
Malaysia, in the Fulfillment of Requirements for the Degree of Master of  
Veterinary Medicine

2014

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in  
fulfilment of the requirement for the degree of master of veterinary  
medicine

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By

**DR. SITI SARISMAHANIM ISMAIL**

2014

**Supervisor: Assoc. Prof. Dr. Jalila Abu, PhD**

**Co-Supervisor: Dr. Lau Seng Fong, PhD**

**Faculty: Faculty of Veterinary Medicine**

In Malaysia, Avian Orthopedic is a remote field in Veterinary Medicine therefore most of the cases will be referred to University Veterinary Hospital (UVH), Universiti Putra Malaysia for further diagnostic work out and treatment. This is a retrospective study to determine the common pelvic limbs fracture cases in avian species presented to UVH from year 2009 to 2013 and to study the clinical pattern of each management of pelvic limbs fracture and the outcome of each management and factor influencing the outcome. For this study, the data was chosen from the birds (pets or wild birds) that presented with pelvic limbs fracture from year 2009 to 2013 (5 years). Patient Medical Record (PMR) for each case was carefully assessed retrospectively. Radiograph was not available for all cases; therefore PMR was used as the main information data. The main

data collections for this study were subdivided into four categories; patient data, fractured bone data, clinical management data, healing progress and outcome data. Results were analyzed using software IBM®SPSS® Statistics 20 System © Copyright IBM Corporation 1989, 2011. There were 36 birds (pet and wild birds) with 47 fractured limbs with complete inclusion criteria being evaluated in this study. The findings showed that the most common fractured bone was tibiotarsal (n=36/47 [78.72%]). The stabilization fractures method chosen, were highly significant with the body weight of the birds ( $P= 0.002$ ) and the duration of fracture (fracture's age)  $P$  Value was below 0.001. There are no significant differences of fracture stabilization method between pet birds and wild birds, between type of fracture or bone involved. 98% (n=46/47) of birds healed, from that 98%, 49% (n=23/47) healed within 3 to 6 weeks post stabilization. Healing period and target of healing (3 to 6 weeks) was significantly correlated with the duration of fractured bone, total number of fracture sites per bird, fracture types (open or close fracture), clinical management inclusive of stabilization method, supportive medication; antibiotic, anti-inflammation and nerve supplement ( $P<0.050$ ). Meanwhile 60% (n=28/47) had an excellent therapy outcome. In conclusion, a successful of clinical management of avian species fracture lies on various factors, the correct stabilization method with supportive treatment will increase the chances of a successful healing with excellent therapy outcome. Close fracture, short duration of fracture, and a single fracture site will increase the healing process.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia  
sebagai memenuhi keperluan untuk ijazah Master Perubatan Veterinar

**KAJIAN RETROSPEKTIF MENGENAI PENGURUSAN DAN RAWATAN  
FRAKTUR TULANG KAKI PELVIS PADA AVIAN DI HOSPITAL  
VETERINAR UNIVERSITI (HVU), UNIVERSITI PUTRA MALAYSIA**

Oleh

**DR. SITI SARISMAHANIM ISMAIL**

2014

**Penyelia: Prof. Madya Dr. Jalila Abu, Phd**

**Penyelia Bersama: Dr. Lau Seng Fong, Phd**

**Fakulti: Fakulti Perubatan Veterinar**

Di Malaysia, bidang ortopedik avian adalah salah satu cabang perubatan dan pembedahan veterinar yang amat terpecil, oleh itu HVU menerima bilangan kes sebegini dengan kadar yang agak tinggi untuk saringan diagnostic mahupun rawatan lanjut. Ini adalah kajian retrospektif selama 5 tahun (2009-2013) bagi menentukan jenis atau lokasi tulang kaki pelvis yang lazimnya patah di dalam kes avian dan mengkaji pengendalian atau pengurusan perubatan untuk setiap kes dan mengkaji hasil dan faktor yang mempengaruhinya. Untuk projek ini, data diambil daripada kes fraktur tulang kaki pelvis bagi kes burung merangkumi semua kategori (burung liar dan burung peliharaan). Rekod Kesihatan Pesakit (RKP) bagi setiap kes dianalisa secara retrospektif dengan teliti. Tidak semua kes mempunyai radiograf, dengan itu RKP digunakan sebagai data utama.

Data ini kemudiannya di bahagikan kepada 4 kategori iaitu; data pesakit, data fraktur tulang pelvis, data pengurusan klinikal, data proses penyembuhan dan hasil rawatan. Data dianalisa menggunakan perisian daripada IBM®SPSS® Statistics 20 System © Copyright IBM Corporation 1989, 2011. Sebanyak 36 ekor burung (Burung Liar dan Burung Peliharaan) dengan 47 tulang pelvis patah yang lengkap kriteria telah dianalisa di dalam kajian ini. Hasil analisa menunjukkan tulang tibiotarsal (n=36/47 [78.72%]) adalah tulang yang paling lazim pada avian yang terlibat dalam masalah fraktur. Pengurusan klinikal ataupun cara klinikal merawat masalah fraktur, yang dipilih di HVU adalah berkaitrapat dengan berat badan dan saiz burung dimana, statistic menunjukkan signifikasi ketara ( $P= 0.002$ ). Jangkamasa fraktur juga menunjukkan signifikasi ketara nilai  $P$  adalah kurang daripada 0.001. Tiada perbezaan signifikasi dalam rawatan fraktur bagi kategori burung (Burung Liar dan Burung Peliharaan), jenis fraktur, mahupun jenis tulang yang terlibat. 98% (n=46/47) sembuh dari masalah fraktur dan dari 98% itu, 49% (n=23/47) telah sembuh di dalam anggaran jangkamasa 3 ke 6 minggu selepas rawatan. Jangkamasa sembuh dan sasaran jangkamasa sembuh (3 hingga 6 minggu) adalah berkaitrapat dan mempunyai signifikasi ketara dengan, jangkamasa fraktur, bilangan nombor fraktur pada seekor burung, rawatan klinikal masalah fraktur, rawatan sokongan seperti antibiotik, ubat keradangan dan ubat tahan sakit, dan ubat saraf ( $P<0.050$ ). Pada masa yang sama, 60% (n=28/47) mendapat hasil terapi yang terbaik. Kesimpulannya, kejayaan rawatan dan pengurusan klinikal fraktur dalam avian bergantung pelbagai faktor. Pemilihan cara rawatan dan pemberian rawatan sokongan yang tepat dapat meningkatkan kejayaan rawatan. Fraktur jenis tertutup, jangkamasa fraktur yang pendek dan satu fraktur lokasi dalam seekor burung dapat mempercepatkan masa penyembuhan.

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***When the world says 'Give Up', Hope whispers 'Try it one more time'***



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## LIST OF ABBREVIATION

|        |                                |
|--------|--------------------------------|
| ESF    | External Skeletal Fixation     |
| GA     | General Anaesthesia            |
| IM Pin | Intramedullary Pin             |
| LA     | Local Anaesthesia              |
| MRJB   | Modified Robert Jones Bandage  |
| PMR    | Patient Medical Records        |
| RJB    | Robert Jones Bandage           |
| TIF    | Tie in Fixator                 |
| UPM    | Universiti Putra Malaysia      |
| UVH    | University Veterinary Hospital |

# Chapter I

## Introduction

### 1.1 Background

Pelvic Limbs of birds consist of femur, tibiotarsus, tarsometatarsus, and phalanges. The relatively different structure, morphology and the uniqueness of bird's bone make the fracture management in avian contra distinct to other species of animals. As an adaptation for flight, avian bones are designed to be thin and light (Eshar and Briscoe, 2009) and with the fact that these bones have minimal soft tissue coverage, commonly results in bone fragmentation on impact (Bennet, 1992; Eshar and Briscoe, 2009). In Malaysia, avian orthopedic is a remote field in Veterinary Medicine therefore most of the cases will be referred to University Veterinary Hospital (UVH), Universiti Putra Malaysia for further diagnostic work out and treatment. Trauma of pelvic limbs in avian species is one of the most common orthopedic problems that commonly presented to UVH. Various pet birds and wild birds' species were referred to UVH with leg fractures due to traumatic injuries. This situation was supported by McLuggage (1997) and Stejskal et al. (2011) where tibiotarsal fractures are among the most common orthopedic problems encountered in caged birds. It is suggested that bone fractures can heal faster in birds than in mammals. Newton and Zeitlin (1977) reported that various fractures and fixation methods in avian fractures repaired showed that the fractured avian bones can form a stable callus within 3 weeks and have complete bone remodeling within 5 weeks post treatment. Avian fracture healing is dependent on the amount of displacement, the integrity of the blood supply, the presence of infection and the degree of motion at the site of the fracture (Bennett & Kuzma, 1992). An External fixation, with coaptation or Kirschner-Ehmer splints, is a viable treatment for many fractures in captive and wild birds (MacCoy, 1992; Redig, 1986). Internal fixation can be apply to certain condition and depends on species of birds. Most fractures of the tibiotarsus are best treated with internal stabilization, especially in larger birds due to weight bearing factors (Bennet, 1997 and Stejskal, 2011) where as in small birds may be managed with coaptation or splinting (MacCoy, 1992). At UVH, pelvic limbs fractures are commonly presented and therefore further assessment on the outcomes of the fracture cases need to be further evaluated.

## **1.2 Problem Statement / Justification**

The information on avian fracture management's technique is still lacking in Malaysia. Currently, there is an increasing number of avian, exotic pet owners and the awareness of public on injured wildbirds.

## **1.3 Objectives**

Based on the problem statement, the objectives of this study are;

- I. To determine common pelvic limbs fractures cases in avian species presented to UVH from year 2009 to 2013
- II. To study the clinical managements of each pelvic limbs fracture
- III. To evaluate the outcome of each fracture management and factors influencing the outcome

## **1.4 Hypothesis**

Avian bone healing of pelvic limbs fracture is expected between 3 to 6 weeks post stabilization, based on type of bird (pet birds and wild birds) and type of fractures and the location.

## 1.5 Outline of Thesis

In this **Chapter I: Introduction**; a brief description of project is presented. Followed by a presentation of the problem statement and objective of the system. The outline of the thesis is as follows.

In **Chapter II: Literature Review**, an overall assessment and different theories related to the study is presented. It consists of review or related fields and technique.

In **Chapter III: Methodology**, covered the study design and implementation of retrospective study inclusive the statistical analysis method and programmed involved.

In **Chapter IV: Results**, this section explained the finding based on the objectives listed. The statistical evaluation and findings will be documented in this chapter.

In **Chapter V: Discussion**, a thorough assessment on the findings will be discussed in this chapter.

A **Conclusion** of the study will be discussed in **Chapter V**.

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