



***ASSESSMENT AND OUTCOME OF OPEN FRACTURE
TREATMENTS
(CLINICO-RADIOLOGICAL EVALUATION,
BACTERIOLOGICAL FINDINGS AND GAIT ANALYSIS)
IN DOGS AND CATS
PRESENTED TO UNIVERSITY VETERINARY HOSPITAL,
UNIVERSITI PUTRA MALAYSIA [UVH-VPM]***

ERNI WATI BINTI MOHD ARIP

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BY

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A project paper submitted to the
Faculty of Veterinary Medicine, University Putra Malaysia
in partial fulfilment of the requirement for the
MASTER OF VETERINARY MEDICINE

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DEDICATIONS

To my family especially parent and husband, for all the support encouragement and
love,

To my supervisors, for all the guidance, knowledge, motivation and understanding,

To all friends, for all their help and support,

To my cats, for their companion.



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ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of the course VPD 5908- Project.

ASSESSMENT AND OUTCOME OF OPEN FRACTURE TREATMENTS

**[CLINICO-RADIOLOGICAL EVALUATION, BACTERIOLOGICAL
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IN DOGS AND CATS

PRESENTED TO UNIVERSITY VETERINARY HOSPITAL,

UNIVERSITI PUTRA MALAYSIA (UVH-UPM)

By

Erni Wati binti Mohd Arip

2014

Supervisor: Dr.Loqman bin Mohamad Yusof

Co-supervisor: Dr.Chen Hui Chen

Total of 27 dogs and cats presented to UVH-UPM between early of September 2013 until end of April 2014 for open fracture treatments were studied prospectively. Out of 27 patients, 92.6% (25/27) were cats and only 7.4% (2/27) were dogs. This could be due the fact that cats were free-roamers (55.6%) and relatively being more exposed to accidents. Almost half of open fractures were due to traumatic injuries with fell down from high storey building (25.9%) and road traffic accidents (14.8%). Young patients (less than 2 years old) seemed to be particularly at risk with higher number of

cases presented at that age group. In this study, we found that 48.1% (13/27) of patients had tibial fractures, 14.8% (4/27) digital fractures or disarticulation, 14.8% (4/27) femoral fractures, 14.8% (4/27) radial fractures and 3.7% (1/27) humeral fractures. Six patients (22.2%) came with extensive skin and tissue damage at the fracture site (Grade III), fourteen patients with Grade II and seven patients with Grade I. Bacterial culture and antibiotic sensitivity test performed in 17 patients revealed presence of 18 different types of bacteria including *E.coli*, *Klebsiella pneumonia*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Enterobacter faecalis* and *Proteus mirabilis*. Preanaesthetics screening showed that 47.6% had increase in Alanine transaminase (ALT) and 86.7% Creatinine Kinase (CK) of the blood parameters. External skeletal fixation (ESF) with transarticular pin was performed in 4 patients, ESF only in 4 patients, amputation in 4 patients and 4 patients were sent home with splint bandage due to the owners' financial constraint. Radiographic findings showed callus formation started to develop within 4 weeks after surgical repair. Gait analyses were performed only on 9 patients due to owners' poor compliances post-surgery. Analysis showed only four could use the affected limbs normally with good bone alignment, satisfactory outcome in one patient showed weight bearing lameness with some degree of misalignment, unsatisfactory in three patients and one patient still under monitoring.

Keywords: Open fractures, external skeletal fixation, bacterial culture, antibiotic sensitivity, radiograph, traumatic accident

ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 5908- Projek

**PENILAIAN DAN HASIL RAWATAN FRAKTUR TERBUKA
[PENILAIAN KLINIKO-RADIOLOGI, PENEMUAN BAKTERIOLOGI
DAN ANALISA PERGERAKAN]
DALAM ANJING DAN KUCING
YANG DIDAFTARKAN DI HOSPITAL VETERINAR UNIVERSITI,
UNIVERSITI PUTRA MALAYSIA (UVH-UPM)**

Oleh

Erni Wati binti Mohd Arip

2014

Penyelia: Dr. Loqman bin Mohamad Yusof

Penyelia Bersama: Dr. Chen Hui Chen

Sebanyak 27 ekor anjing dan kucing yang didaftarkan di UVH-UPM antara awal September 2013 sehingga akhir bulan April 2014 untuk rawatan fraktur terbuka telah dikaji secara prospektif. Daripada 27 pesakit, 92.6% (27/27) adalah kucing dan hanya 7.4% (2/27) adalah anjing. Ini mungkin disebabkan oleh hakikat bahawa kucing bergerak bebas di luar (55.6%) dan lebih terdedah kepada kemalangan. Hampir separuh daripada kepatahan terbuka adalah disebabkan oleh kecederaan trauma dengan jatuh ke bawah dari bangunan tinggi sebanyak 25.9% dan kemalangan jalan raya 14.8%. Pesakit

muda (kurang daripada 2 tahun) didapati lebih berisiko tinggi mendapat fraktur terbuka berbanding peringkat umur yang lebih tinggi. Dalam kajian ini, kami mendapati bahawa 48.1% (13/27) daripada pesakit mempunyai fraktur tibia, 14.8% (4/27) fraktur atau disartikulasi digital, 14.8% (4/27) fraktur tulang femur, 14.8% (4/27) fraktur radial dan 3.7% (1/27) fraktur humerus. Enam pesakit (22.2%) mengalami kerosakan besar pada kulit dan tisu di kawasan fraktur (Gred III), empat belas pesakit dengan Gred II dan tujuh pesakit dengan Gred I. Kultur bakteria dan ujian kepekaan antibiotik yang diambil dalam 17 pesakit mendapati kehadiran 18 jenis bakteria yang berbeza. Ini termasuk *E.coli*, *Klebsiella pneumonia*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Enterobacter faecalis* dan *Proteus mirabilis*. Pemeriksaan ujian darah sebelum bius menunjukkan bahawa 47.6% pesakit mempunyai peningkatan dalam Alanina transaminase (ALT) dan 86.7% Kretinina Kinase (CK). Fiksasi luar rangka (ESF) dan pin merentasi sendi telah dijalankan ke atas 4 pesakit, ESF sahaja ke atas 4 pesakit, 4 pesakit dipotong kaki dan sebanyak 4 pesakit dihantar pulang dengan pembalut anduh kerana masalah kekurangan kewangan tuannya. Menerusi pengimejan radiografi, pembentukan kalus mula terbentuk hanya bermula selepas 4 minggu selepas pembedahan. Analisa gaya berjalan hanya dapat dilakukan ke atas 9 pesakit disebabkan kekurangan komitmen daripada pemilik haiwan selepas pembedahan. Analisa pergerakan menunjukkan hanya empat pesakit boleh menggunakan kaki yang patah secara normal dengan kesejajaran baik tulang yang patah, satu pesakit menunjukkan penggunaan kaki yang memuaskan tetapi dengan ketempangan galas berat dan sedikit salah jajaran tulang yang patah, dan tiga pesakit menunjukkan pergerakan tidak memuaskan dan satu pesakit lagi masih di bawah pemantauan.

Kata Kunci: Fraktur terbuka, fiksasi luar rangka (ESF), kultur bakteria dan ujian kepekaan antibiotik, radiograf, kemalangan trauma

1.0 INTRODUCTION

An open fracture is defined as a broken bone that is or has come into contact with the environment¹, (1). The amount of communication can vary from a small puncture wound in the skin to a large avulsion of soft tissue that leaves the bone exposed (1). An open fracture is one of the orthopedic emergencies as the animal's prognosis will be significantly poorer if the fracture is not treated immediately (2).

Based on the severity of soft tissue damage and degree of contamination, open fractures can be classified from grade I to grade III (1,3,4). Grade I open fractures are clean with a wound smaller than 1 cm in diameter and a simple fracture pattern with the bone that may or may not be visible in the wound. Grade II open fractures are a laceration larger than 1 cm but without significant soft tissue crushing, including no flaps, degloving or contusion. Grade III open fractures are an open segmental fracture or a single fracture with extensive soft tissue injury with or without skin loss. Grade III can further be subdivided into IIIa, IIIb and IIIc. Grade IIIa involves open fractures with adequate soft tissue coverage despite high energy trauma or extensive laceration or skin flaps. Grade IIIb usually involves fractures with inadequate soft tissue coverage with periosteal stripping and reconstruction of the soft tissue is usually necessary. In Grade IIIc, it is associated with vascular injury that requires repair¹ (1,3).

¹ Wong Wing Tip, Centre for Veterinary Education (University of Sydney, 2013) 87-91

To my knowledge, there is no published studies on open fractures in dogs and cats in Malaysia. Therefore, this studies was conducted with the following objectives:

1. to survey the incidence of open fracture in dogs and cats based on signalment, home management and cause of trauma
2. to study the most common type, location and severity of open fractures in dogs and cats
3. investigate the most common bacteria and determine the most suitable antibiotic for any open fractures
4. evaluate hematology and biochemistry changes
5. assess radiographic finding during fracture healing
6. evaluate gait and outcome of open fracture treatment presented from September 2013 until April 2014

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