



UNIVERSITI PUTRA MALAYSIA

***FLUID THERAPY RESPONSE IN ENDURANCE HORSES WITH
METABOLIC AILMENTS***

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FPV 2015 7

**FLUID THERAPY RESPONSE IN ENDURANCE HORSES WITH
METABOLIC AILMENTS**

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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 2015

It is hereby certified that we have read this project paper entitled “Fluid Therapy Response in Endurance Horses with Metabolic Ailments” by Kuan Kit Leng and in our opinion it is satisfactory in terms of scope, quality, presentation as partial fulfilment of the requirement for the course VPD 4901 Project.

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Dedication

To my Loving Mummy & Daddy, Big Brother,

Awesome Horses,

Caring Family, Fantastic Friends,

& in Loving Memory of Poh Poh & Ah Mah

You All will be Loved Dearly as

Happiness is Real Only when Shared

Acknowledgements

First and foremost, I would like to thank God for giving me the will to go on. Next, I would like to acknowledge my supervisor, Dr. Noraniza Mohd Adzahan and co-supervisor, Assoc. Prof. Dr. Goh Yong Meng for their guidance and valuable advice throughout my entire final year project. I would also like to extend my gratitude to Dr. Mohamad Naguib Rais, Dr. Mohammad Fairuz Jamaluddin, Dr Syahirah Ahmad Affandi, Dr. Shri Kanth Kanaesalingam and rest of Fédération Équestre Internationale (FEI) veterinarians for encouraging me and providing assistance at the field. It was awesome working with such amazing equine veterinarians. Besides that, thanks to Prof. Dr. Mohamed Arif Omar for valuable tips on statistics. I would also like to thank Mr. Arifin to get us around safely and especially Mr. Halmi Othman for helping tremendously in processing my blood samples. Thanks to Mr. Veloo as well for his help in the practical aspects of handling horses.

It was also a pleasure working with all the cooperative and lovely horses and given the opportunity to do so by their respective horse owners and Royal Terengganu Endurance Stable/ Universiti Putra Malaysia (RTES/UPM) Equine Hospital. Not forgetting my fellow friends from Terengganu Department of Veterinary Service, Universiti Malaysia Kelantan, classmates (Rasul, Nadhirah, Pia, Wafaa, Akmal and Sujey). Special thanks to Kuiek Ah Meng for always supporting me throughout these 5 years and also to Nur Eershan Namira bt. Mohd. Hanafiah for being my FYP-mate. Last but not least, I would like to thank my dear family and friends for giving me tremendous support and cheering me on to achieve my dreams.

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LIST OF ABBREVIATIONS

AST	aspartate aminotransferase
beats min ⁻¹	beats per minute
BUN	blood urea nitrogen
Ca ²⁺	calcium ions
[Cl ⁻]	chloride ion concentration
CK	creatine kinase
CRI	cardiac recovery index
FEI	Fédération Équestre Internationale
G	gauge
GGT	gamma glutamyl transferase
Hb	haemoglobin
HCO ³⁻	bicarbonate ions
hr	hour
HR ₀	heart rate at beginning of inspection
HR ₁	heart rate after 40m trot within 1 minute
[K ⁺]	potassium ion concentration
kg	kilogram
km	kilometer
L hr ⁻¹	litres per hour
LDH	lactate dehydrogenase
MCHC	mean corpuscular haemoglobin concentration

MCV	mean corpuscular volume
MD	metabolically-disordered
Mg ²⁺	magnesium ion
mins	minutes
ml kg ⁻¹	millilitres per kilogram
N	total population
n	number of samples
[Na ⁺]	sodium ion concentration
p-value	significance level
PCV	packed cell volume
R	coefficient of correlations
r ²	coefficient of determination
RBC	red blood cells
RTES/UPM	Royal Terengganu Endurance Stable/ Universiti Putra Malaysia
SC	successfully completed
secs	seconds
WBC	white blood cells

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ABSTRAK

Abstrak kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar dalam memenuhi sebahagian daripada kursus VPD 4999 - Projek Tahun Akhir.

Respon Terapi Cecair dalam Kuda Lasak yang mengalami Masalah Metabolik

oleh :

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2015

Penyelia : Dr. Noraniza Mohd Adzahan

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Aktiviti kuda lasak adalah disiplin FEI yang berkembang pesat di seluruh dunia. Kuda lasak yang menghadapi penyingkiran metabolik umumnya memerlukan terapi cecair. Kajian ini menilai perubahan fizikal, hematologi dan biokimia dalam kuda lasak yang mengalami penyingkiran metabolik sebagai respon terhadap terapi cecair. Kajian ini juga mengkaji korelasi kelajuan tunggangan dan jarak perjalanan dengan keabnormalan fizikal, hematologi dan biokimia parameter yang mengakibatkan penyingkiran metabolik. Sembilan daripada enam puluh satu ekor kuda lasak yang menyertai aktiviti kuda lasak telah disingkirkan akibat masalah metabolik dan dihantar ke Hospital Ekuin RTES / UPM. Selepas pemeriksaan, terapi cecair intravena telah diperuntukkan dengan 0.9 % larutan garam pada kadar 5-10L jam⁻¹. Sampel darah diambil melalui vena leher sebelum dan selepas terapi cecair. Kadar denyutan jantung, tahap dehidrasi, kapilari isi semula, warna membran

mukosa dan bunyi gastrousus didapati bertambah baik dengan ketara berikutan terapi cecair. Parameter hematologi dan biokimia adalah konsisten dengan pencairan darah tetapi sebahagian daripadanya kembali kepada nilai rujukan biasa. Kesimpulannya terdapat perbezaan yang ketara dalam parameter fizikal, hematologi dan biokimia berikutan terapi cecair intravena. Prognosis kuda lasak yang mengalami masalah metabolik dalam kajian ini adalah baik kerana mereka bertindak balas dengan baik terhadap terapi cecair intravena (0.9% larutan garam). Walau bagaimanapun, tiada hubungan yang ketara antara kelajuan tunggangan dengan keabnormalan parameter fizikal, hematologi dan biokimia yang mengakibatkan penyingkiran metabolik kecuali jarak perjalanan dengan indeks ikterus, bilirubin dan urea.

Kata kunci: *kuda lasak, metabolik, terapi cecair, dehidrasi*



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.

Title: Fluid Therapy Response in Endurance Horses with Metabolic Ailments

By:

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2015

Supervisor: Dr. Noraniza Mohd Adzahan

Co-supervisor: Assoc. Prof. Dr. Goh Yong Meng

Endurance riding is a fast-growing FEI discipline worldwide. Metabolically-eliminated endurance horses generally necessitate provision of fluid therapy. This study evaluates the physical, haematological and biochemical changes of metabolically eliminated endurance horses in response to fluid therapy. This study also determines the correlation of riding speed and distance travelled with abnormalities in physical, haematological and biochemical parameters that constitute metabolic elimination. Nine out of sixty-one endurance horses participating in an endurance ride were metabolically eliminated and sent to RTES/UPM Equine Hospital. These horses were examined by veterinarians and intravenous fluid therapy was indicated with 0.9% saline solution at rate of 5-10L hr⁻¹. Blood sampling via

jugular venipuncture was performed before and after fluid therapy. Heart rate, skin tenting duration, colour of mucous membrane, capillary refill time and gastrointestinal sounds improved significantly following fluid therapy. Haematological and biochemical parameters were consistent with haemodilution but several were restored back to normal reference values. In conclusion, there was significant difference in physical, hematological and biochemical parameters following intravenous fluid therapy. Since endurance horses with metabolic ailments in this study responded well to intravenous fluid therapy (0.9% saline solution), their prognosis was good. However, there was no significant correlation between riding speed with physical, haematological and biochemical parameters except for distance travelled with icterus index, bilirubin and urea.

Keywords: *endurance horses, metabolic, fluid therapy, dehydration*

1.0 INTRODUCTION

Endurance is one of the most thriving FEI disciplines to date. Endurance riding is a long-distance competition to challenge the athlete's skill to safely manage the stamina and fitness of the horse over an endurance course crossing all kinds of track, distance, climate, terrain and not forgetting a race against the clock (Fédération Equestre Internationale, 2014). However, endurance riding poses greater emphasis on finishing in good condition rather than finishing first.

Equine welfare is of paramount importance, thus veterinary examinations are conducted at the end of each phase to ensure that the endurance horses are fit to continue the race. In fact, endurance horses may get disqualified from the race due to lameness or metabolic reasons. According to Robert (2014), although musculoskeletal injuries may arise at any point along an endurance ride, metabolic disorders generally pose an emergency situation. Besides that, endurance horses also face elimination if they fail to be present at the vet-gate after cooling within the stipulated time of 20 mins recovery period.

The most common reasons for metabolic elimination in endurance horses includes poor cardiovascular recovery, synchronous diaphragmatic flutter, reduced or absent borborygmi, exertional myopathy, colic and exhausted horse syndrome. In practise today, horses with metabolic elimination are submitted to the nearest Equine Hospital and receive fluid therapy as needed. However, question remains, "Is fluid therapy justifiable or able to improve the alarming metabolic status at hand?"

The purpose of this study was to find out if fluid therapy is justifiable on the grounds of metabolic elimination and to determine the response of fluid therapy based on changes in physical, haematological and biochemical parameters in metabolically eliminated horses. According to Jose-Cunilleras (2014), no wild horse will run over a protracted period of time at high speeds, as we force endurance horses to do so over long distances. Thus, the objective of this study was to determine the correlation of riding speed and distance travelled with abnormalities in physical, haematological and biochemical parameters that constitutes metabolic elimination of endurance horse.

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