Cairo University

Faculty of Veterinary Medicine
Department of Medicine and Infectious Diseases

Clinical Studies on Anemia in Critically-Ill Horses

Thesis presented by

AbdelRahman Mostafa Mahmoud
(B. V. Sc., 2013, Faculty of Veterinary Medicine, Cairo University)
Submitted To Faculty of Veterinary Medicine, Cairo University
For

The Degree of M. V. Sc.

(Internal Medicine)

Under supervision of

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Supervision Sheet

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APPROVAL SHEET

Clinical Studies on Anemia in Critically-Ill Horses

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Title of thesis: Clinical Studies on Anemia in Critically-Ill Horses

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Abstract

This study was carried out to investigate classification of most common anemia etiology in Egyptian horses and its impact on the health, hematological and biochemical parameters of horses. A total number of 165 horses (Thoroughbred, Native and Arabian), their ages ranged between (2 – 20) years were used in this study. The study took place in the duration from March 2016 to May 2017. These horses were divided into 73 healthy horses used as control group and 92 diseased (Anemic) horses belonging to faculty of veterinary medicine clinic, private and administrative farms. GIT parasitic anemic group and blood parasitic anemic group, their results revealed normocytic hypochromic anemia with significant decrease in TP and significant increase in liver enzyms; nutritional deficient anemic group horses, its data showed normocytic normochromic anemia with significant increase in BUN, while envenomed anemic group revealed macrocytic hypochromic anemia, significant increase in liver and kidney function tests. All anemic horses showed hypercupremia, hypozincemia and hypoferremia. So we can conclude that regular hematological and biochemical investigations must be carried out on all horses for exclusion of underlying causes of anemia.

(**Key words**: Anemia, Equine, Hematology, Liver function tests, Kidney function tests)

To My Family

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LIST OF ABBREVIATIONS

%	Percentage
^{o}C	Celsius
µl	Micro litre
AST	Aspartate transaminase
ALB	Albumin
BUN	Blood urea nitrogen
Ca	Calcium
GLU	Glucose
CRT	Capillary refill time
Cu	Copper
DAT	Direct antiglobulin test (Coombs)
EIA	Equine infectious anemia
Fe	Iron
fl	Femto litre
g/dl	Gram per deciliter
g/l	Gram per litre
GGT	Gamma glutamic transaminase
GIT	Gastro-intestinal tract
GLU	Glucose
Hb	Hemoglobin
IMHA	Immune mediated hemolytic anemia
LYM	Lymphocytes
MaA	major agglutination
MiA	minor agglutination
MCH	Mean corpuscular hemoglobin
MCHC	Mean corpuscular hemoglobin concentration
MCV	Mean corpuscular volume
mg/l	Millie gram per litre
mmol/l	Millie mole per litre
PCV	Packed cell volume
pg	Picogram
RBCs	Red blood corpuscles
DB	Direct bilirubin
IB	Indirect bilirubin
TB	Total bilirubin
TP	Total protein
U/l	Unit per litre
WBCs	White blood cells
Zn	Zinc
TEC	Total Erythocytic Count
BNEU	Band neutrophils
SNEUT	Segmented neutrophils

INTRODUCTION

Different breeds of horses are available in Egypt. Arabian horses are used for shows, beauty and riding activities; Thoroughbreds for jumping, riding, racing and other activities; native horses are used for working, riding and preparation of antisera products. **(Salem, *et al.*, 2017)**

All horses are susceptible to critical illness due to infection, endemic parasitic diseases, bad management and bad supplementation of nutrient feed stuff thus anemia is commonly encountered in local equine population. Some of their illnesses are associated with anemia, but is not seriously considered within the diagnosis procedures or medical management protocols. The primary or secondary anemia may seriously delay the recovery and assessing the horse performance. Anemia is not a disease but a hematological sign that is secondary to a primary pathological process **(Radostits, et al., 2008)**.

Anemia is defined as a decrease in red-cell mass leading to a reduction in measured erythrocyte concentration, hemoglobin concentration, or hematocrit below the reference value **(Hardy, *et al.*, 2004)**.

When a horse is anemic, it is suffering from a lack of red blood cells whose main responsibility is ferrying oxygen around the body. For performance horses, this lack of oxygen to the muscles is especially damaging. It reduces both the horse's energy and recovery ability both of which make a huge difference in competition. Anemia makes your horse lethargic and perhaps even causes him to lose appetite and coat condition. In addition to the performance impact, it's also critical to understand that anemia in horses is always a sign that something is going wrong in a horse's body **(Connor, 2014)**.

Anemia was classified into 3 categories: anemia due to blood loss, hemolysis or inappropriate erythropoiesis and another classification into regenerative and non-regenerative **(Sprayberry and Robinson, 2015)**.