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Application of Fresh Whole Blood Therapy in Some Critically Ill Dogs

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For the degree of

M.V.Sc. (Internal medicine)

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Abstract

The objectives of the present studies were to demonstrate the impact of the application of fresh whole blood (FWB) transfusion therapy for critically ill dogs. The studies were applied on a total 62 dogs, from which 12 normal ones used as DONOR candidates. The other recipient critically ill dogs were diagnosed as a canine babesiosis, anticoagulant rodenticide poisoning, canine parvovirus, blood loss (hemorrhages), hepatorenal failure and septic shock.

After blood typing and cross matching, a compatible fresh whole blood was transfused and the patients were monitored. Transfusion have resulted in significant ($P \leq 0.05$) evolution of the basic erythrocyte count, hemoglobin concentration and packed cell volume percent after 48 hours and maintained for one month post transfusion. The alleviation of anemia and the recovery rate (50-100%) support the efficacy of fresh whole blood therapy. Fresh compatible whole blood transfusion to specific disease could be life saving in critically ill dogs especially when it is performed in time and is based on the corporation of the clinical and hematological data of the patients.

Key words : Fresh Whole Blood (FWB), DONOR, Blood typing , Cross matching.

To My Family

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Thanks for Allah. The Master of Universe

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List of Abbreviations

ALT	Alanine Amino Transferase.
AST	Aspartate Amino Transferase.
CRT	Capillary Refilling Time.
DEA	Dog Erythrocyte Antigen.
E	Erythrocyte count.
Hb	Hemoglobin concentration.
FFP	Fresh Frozen Plazma.
FWB	Fresh Whole Blood.
MCH	Mean Corpuscular Hemoglobin.
MCHC	Mean Corpuscular Hemoglobin concentration.
MCV	Mean Corpuscular Volume.
PCV	Packed cell volume percent.
PRBCs	Packed Red Blood Cells
Urea-N	Urea Nitrogen.

Introduction

History:

The history of transfusion medicine dates back to the early modern period immediately following the development of **William Harveys theory of circulation (1628)**, making advances in this field possible. It was until the 19th century that transfusion became a more common occurrence, albeit as a high risk procedure, in women suffering from post-partum hemorrhage. The 20th century saw several major break thoughts that made this practice safer and more wide spread, including the discovery of anti-coagulants and preservatives for blood products, the description of human blood groups and the development of compatibility assays (**Brid 1971)**, The tragic occurrence of world war II enhanced developments in transfusion medicine including large scale blood banking under the Red Cross association. In the veterinary field, transfusion medicine emerged as a practice from 1950 onward **(Hosgood 1990).**

Recently, research on subtitles for oxygen transport led to the approval in 1998 by the United States food and drug administration of a hemoglobin based oxygen carrying solution for using in dog practice.

Blood component therapy or transfusion medicine is a vital part of the veterinary emergency and critical care medicine.

Adequate blood transfusion is crucial to a successful patient outcome.

Veterinary hospitals or clinics engaged in emergency or critical care need to have a plan of transfusion or blood component therapy.

Canine transfusion is commonly provided as components such as Fresh Whole Blood (FWB), packed red blood cells (PRBCs) and fresh frozen plasma (FFP).

The indications for transfusion in emergency and critical care practice are often similar both in surgery or internal medicine and include most commonly anemia, (normovolimic and hypovolemic) and coagulopathy.

Transfusion should be considered when clinical signs attributed to anemia are present (i.e.tachypnea, tachycardia, weakness or when an intervention is completed)

Transfusions may be indicated as therapy in patients with sepsis, multiple organ dysfunction syndrome pancreatitis, hypoalbum-inemia and disseminated intravascular coagulation (DIC).

Acquired coagulopathys are common in critically ill dogs and include underline causes, such as anticoagulated rodentcide toxicities, sepsis with or without disseminated intra vascular coagulation, neoplasia and liver failure.

Fresh whole blood (FWB) is composed of red cells, white Blood cells, platelets, coagulation factors and plasma proteins.

Although (FWB) was potentially lifesaving, the procedure does carry some risk and in addition to selecting the appropriate blood product, several steps need to be completed to prepare the product for administration and the patient for receiving a transfusion (**Deirde Chiaramonte, 2004)**

The present Clinical Studies Aim to Investigate the Following;

1. Investigation of the hematological profile and blood typing of the donor dogs.
2. Application of blood transfusion therapy in cases of canine babesiosis.
3. Application of blood transfusion therapy in cases of anticoagulant rodenticides poisoning.
4. Application of blood transfusion therapy in cases of canine parvovirus.
5. Application of blood transfusion therapy in cases of bleeding.
6. Application of blood transfusion therapy in cases of hepatorenal failure.
7. Application of blood transfusion therapy in cases of septic shock.

Review of Literature

1.Medical Significance of Blood Transfusion:

Lvan der Merwe (2002) mentioned that, blood transfusion was indicated in patients suffering from hypovolemic shock, canine parvovirus with clinically hemorrhagic gastro enteritis, babesiosis, septic shock, renal diseases and coagulopathy, based on their clinical evaluation and hematological parameters of the patients.

Elizabeth Rozanski and Armelle M.de Laforcade (2004) reported that**,** the indications for blood transfusion in emergency and critical care practice were often similar to those in surgery or internal medicine, and include most commonly anemia and coagulopathy**. Weingart et al., (2004)** stated that red blood cell (RBC) transfusion had become an important tool in veterinary critical care and emergency medicine.

Richard W. Nelson et al., (2009) reported that several commercial blood banks are now available for pets, and most of them store blood components derived from processing units of whole blood. The transfusion of whole blood was indicated in several clinical situations such as anemic patient.

Helm, J.; Knottenbett,C (2010) reported that the transfusion therapy is the mainstay of supportive treatment for dogs and cats. The commercial availability of blood and blood products for dogs has resulted in an increase in the number of patients benefiting from transfusion therapies.

Merck (2010) reported that the need for a blood transfusion was an emergency, such as severe bleeding or sudden destruction of red blood cells due to other diseases. Transfusion may also be needed to treat anemia and fortunately most transfusions were safe and effective.

Morikawa, M. K et al ., (2010) said that transfusion therapy had a great potential to save lives in small animals practice, and it had been used mainly in the emergency treatment for anemic patients**.**