Blood & Blood Products Transfusion In Cardiac Surgery

Essay

Submitted For Partial Fulfillment of

Master Degree in Anaesthesia

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2008

بسم الله الرحمن الرحيم

سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

Acknowledgment

First and Foremost all thanks to ALLAH the most kind and merciful for giving me the power and strength to carry out this work.

Words stand short when they come to express my gratefulness to my parents and my wife to whom this work is dedicated.

I'm greatly honored to express my sincere appreciation to ***Prof. Dr. Fawzeya Mohammed Abou ElFetouh****, Professor of Anaesthesiology, Faculty of Medicine, Cairo University, for her remarkable effort, considerable help and continuous guidance which were the major factors behind the completion of this work.*

I am deeply indebted to Dr. ***Shereen Mostafa Amin****, Professor of Anaesthesiology, Faculty of Medicine, Cairo University, for her extreme patience and keen supervision. She generously offered me a great help through her experience, support and encouragement.*

ABSTRACT

Cardiothoracic surgeons and anesthesiologists have had a long-standing interest in the proper use of transfusion therapy for their patients.

When patients with cardiac disease undergo open heart surgery utilizing cardiopulmonary bypass, the hemostatic system is impaired leading to bleeding and the frequent need for transfusion of allogeneic blood products.

Issues such as the cost of blood, limited availability and the potentially harmful effects of transfusion (e.g., transfusion-transmitted diseases, mistransfusion, transfusion-related acute lung injury, circulatory overload and others) dictate continued research and the development of methods to appropriately minimize transfusion to patients having cardiac surgery.

Blood conservation strategies such as intraoperative and postoperative salvage, hemodilution and drug treatments to minimize bleeding were developed for cardiac surgery and promise to favourably affect blood use.

Keywords:
Blood, Blood Transfusion, Cardiac Surgery.

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List of Abbreviations

- **ACT** : Activated Clotting Time
- **ADP** : Adenosine Diphosphate
- **ANH** : Acute normovolemic hemodilution
- **APTT** : Activated Partial Thromboplastin Time
- **CABG** : Coronary Artery Bypass Grafting
- **CDP** : Citrate Dextrose Phosphate
- **CMV** : Cytomegalovirus
- **CPB** : Cardiopulmonary Bypass
- **DDAVP:** Desmopressin Acetate
- **DHTR** : Delayed Hemolytic Transfusion Reaction
- **DIC** : Disseminated Intravascular Coagulopathy
- **EACA** : Epsilon aminocaproic acid
- **ECC** : Extracorporeal Circulation
- **FDA** : Food and Drug Administration
- **FFP** : Fresh Frozen Plasma
- **FG** : Fibrinogen
- **GP** : Glycoprotein
- **HBOC** : Hemoglobin-Based Oxygen Carriers
- **HBV** : Hepatitis B Virus
- **HCV** : Hepatitis C Virus
- **HES** : Hydroxyethyl Starch
- **HHV-8** : Human Herpes Virus 8
- **HIV** : Human Immunodeficiency Virus
- **HLA** : Human Leukocyte Antigen

- **HTLV :** Human T-Cell Lymphotropic Virus
- **ICU :** Intensive Care Unit
- **Ig :** Immunoglobulin
- **JW :** Jehovah's Witnesses
- **OHS :** Open Heart Surgery
- **PAF :** Platelet-Activating Factor
- **PC :** Platelet Concentrates
- **PLT :** Platelets
- **PMNs :** Polymorphonuclear Leukocytes
- **PRBCs:** Packed Red Blood Cells
- **PT :** Prothrombin Time
- **RBC :** Red Blood Cell
- **rFVIIa :** Recombinant Activated Factor VII
- **TA :** Tranexamic acid
- **TA-GVHD:** Transfusion-Associated Graft-Versus-Host Disease
- **t-PA :** Tissue Plasminogen Activator
- **TRALI :** Transfusion-related acute lung injury
- **TSP :** Thrombospondin
- **vCJD :** New-Variant Creutzfeldt-Jakob Disease
- **vWF :** von Willebrand factor

Introduction & Aim of the Work

INTRODUCTION

With the development of cardiac surgery in the 1950s to correct congenital heart defects came the need for large-volume blood transfusions. In the 1960s and 1970s, the introduction of valve prostheses and direct grafting of coronary arteries made the correction of acquired heart disease a possibility. These landmarks, along with the liberal use of allogeneic blood transfusion therapy, led to the rapid growth of the field.[(1)]

Commensurate with the growth of cardiac surgery as a field was an increasing incidence of transfusion-transmitted hepatitis in the 1970s, ultimately alerting the public and treating physicians to the concept of blood conservation. The emergence of infection by HIV greater heightened the interest in this area, leading to the current practices of blood conservation therapy in cardiac surgery.[(1)]

Historically, open heart surgery has been associated with a high usage of blood transfusion. Some reports suggest that up to 70% of this patient population require blood transfusions, resulting in an average of 2 to 4 donor exposures per patient. It has been reported that 10% of all red blood cell units transfused in the United States are administered during coronary bypass surgery.[(2)]

The high transfusion rates associated with cardiac surgery have been well characterized andare likely due to the coagulopathy, platelet dysfunction, and red cell hemolysis that occur as a result of the cardiopulmonary bypass circuit.[(3)]

Almost all patients received blood transfusion in the early days of cardiac surgery. However, with an increased awareness of blood-borne infectious diseases, lack of donors, great cost to both the patient and the institution, allergic reaction, blood-type mismatch, and the needs of special populations such as Jehovah's Witnesses, a greater effort has been made to perform open heart procedures without blood transfusions even in high-risk patients. Advances in perioperative medications minimizing blood loss, greater tolerance of lower hematocrits especially on bypass, and improvements in surgical techniques resulting in shorter operative times have allowed for these extensive procedures to be performed without significant blood loss.[1]

AIM OF THE WORK

To review the importance, proper use and hazards of blood and blood products transfused to patients undergoing cardiac surgery .Also to point out blood conservation strategies and newer technologies used in modern cardiac operations to minimize transfusion of blood and blood products.