STUDY OF RH BLOOD GROUP ALLOIMMUNIZATION IN EGYPTIAN NEONATES WHO SUFFER FROM HEMOLYTIC DISEASE OF THE NEWBORN

Thesis

Submitted for Partial Fulfillment of MD Degree in Clinical and Chemical Pathology

BY

Ahmed Hamed Abd EL Halim

(M.B, B.Ch, M. Sc.)

Supervised By

Prof. Dr. Azza Aboul Enein

Professor of Clinical and Chemical Pathology

Faculty of Medicine, Cairo University

Prof. Dr. Iman Seoud

Professor of Pediatrics and Neonatology

Faculty of Medicine, Cairo University

Prof. Dr Osama Khalaf Allah

Professor of Clinical and Chemical Pathology

Faculty of Medicine, Cairo University

Faculty of Medicine

Cairo University

2010

Acknowledgement

First of all and above all, I always feel indebted to ALLAH whose blessings can not be counted and who gave me the power to finish this Work.

I would like to express my deepest appreciation and gratitude to ***Prof. Dr. Azza Aboul Enein*** *Professor of Clinical Pathology Faculty of Medicine- Cairo University for her wise guidance and kind support during this work.*

I am also indebted to ***Prof. Dr.Iman Seoud*** *Professor of Pediatrics and Neonatology Faculty of Medicine-Cairo University for her encouragement and close supervision.*

Also I would like to thank ***Prof. Dr Osama Khalf Allah*** *Professor of Clinical and Chemical Pathology Faculty of Medicine, Cairo University.*

At this limit, I can't forget the great support from ***my wife*** *who offered me the most suitable atmosphere to end this work.*

Finally, I would like to dedicate this effort

To my ***parents' soul,*** *ALLAh have mercy upon them.*

God Bless You All

Abstract

The Rh blood group system is one of the most polymorphic and immunogenic systems known in humans. In the past decade, intense investigation has yielded considerable knowledge of the molecular background of this system. The genes encoding 2 distinct Rh proteins that carry C or c together with either E or e antigens, and the D antigen, have been cloned, and the molecular bases of many of the antigens and of the phenotypes have been determined. A related protein, the Rh glycoprotein is essential for assembly of the Rh protein complex in the erythrocyte membrane and for expression of Rh antigens. The purpose of this review is to provide an overview of several aspects of the Rh blood group system, including the confusing terminology, progress in molecular understanding, and how this developing knowledge can be used in the clinical setting. Extensive documentation is provided to enable the interested reader to obtain further information. The Rh blood group system is the most polymorphic of the human blood groups, consisting of at least 45 independent antigens and, next to ABO, is the most clinically significant in transfusion medicine. The ability to clone complementary DNA (cDNA) and sequence genes encoding the Rh proteins has led to an understanding of the molecular bases associated with some of the Rh antigens. Serologic detection of polymorphic blood group antigens and of phenotypes provides a valuable source of appropriate blood samples for study at the molecular level. This review summarizes our present understanding of the complexities of Rh blood group expression and how this knowledge impacts on clinical situations that arise through Rh blood group incompatibility.

Key words:

1-Rh incompatibility

2- HDN

3-Jaundice

List of Contents

List of Tables

List of figures

List of Abbreviation

2,3- DPG	**2, 3 Diphosphoglycerate.**
AE1	**Anion exchanger member 1.**
AHG	**Antihuman globulin.**
AS-1	**Adesol-1 (Dextrose, Adenine, Mannitol and Sodium Chloride).**
Amts	**Ammonia Transporters.**
ATP	**Adenosine Tri-Phosphate.**
CDC	**The Centers for Disease Control and Prevention.**
CMV	**Cytomegalovirus.**
CP	**Cerebral Palsy.**
CPDA-1	**Citric Acid, Sodium Citrate, Monobasic Sodium Phosphate, Dextrose, Adenine.**
CUPH	**Cairo University Pediatric Hospital.**
ECMO	**ExtraCorporeal Membrane Oxygenation.**
ELBW	**Extremely Low Birth Weight.**
EPO	**Erythropoietin.**
ETCO	**End Tidal Carbon Monoxide.**
FBS	**Fetal Blood Sampling.**
FMH	**FetoMaternal Hemorrhage.**
G6PD	**Glucose-6-Phosphate Dehydrogenase.**

GPA	Glycophorin A.
GPB	Glycophorin B.
Hb	Hemoglobin.
HDFN	Hemolytic disease of fetus and newborn.
HDN	Hemolytic disease of newborn.
HHy	Hereditary Stomatocytosis /Hydrocytosis.
HIDA	Hepatoiminodiacetic acid.
HIV	Human Immunodeficiency Virus.
HPP	Hereditary PyroPoikilocytosis.
IAP	Integrin-associated protein.
IAT	Indirect Antiglobulin Test.
ICAMs	Intercellular adhesion molecules.
IPT	Intraperitoneal transfusion.
IQR	Interquartile range.
IUT	Intrauterine transfusion.
IVIG	Intravenous Immunoglobulin.
IVT	Intravascular transfusion.
L/S ratio	Lecithin/Sphingomyelin ratio.
MCA	Middle cerebral artery.
MEP	Methyl-Amine Permease.

MEPs	**Methyl-Ammonia Permeases.**
NBTC	**National Blood Transfusion Center.**
NH_3	**Ammonia.**
NH_4^+	**Ammonium ion.**
NICU	**Neonatal Intensive Care Unit.**
PUBS	**Percutaneous Umbilical Blood Sampling.**
RBCs	**Red Blood Cells.**
RCRL	**Red Cell Reference Lab.**
Rh AG	**Rh Associated Glycoprotein.**
RhCG	**Rh C glycoprotein.**
RhoGAM	**Anti-D immunoglobulin.**
rHuEPO	**Recombinant Human Erythropoietin.**
SAO	**Southeast Asian Ovalocytosis.**
SnMP	**Tin-mesoporphyrin.**
TA-GVHD	**Transfusion-Associated Graft-vs-Host Disease.**
TCB	**Trans- Cutaneous Bilirubin.**
TSB	**Total serum bilirubin.**
US	**Ultrasound.**
VLBW	**Very Low Birth Weight.**
WHO	**The World Health Organization.**

Introduction
&
Aim of Work