# Effect of Maternal Hypertension on Neonatal Neutrophils

Thesis
Submitted in partial fulfillment of M. Sc. degree in pediatrics
by

# M.B.B.Ch. Hala Abdallah Ahmed



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Under the supervision of

Sulug

Prof. Saadia Mohamed Abdel Fattah Prof. of pediatrics - Ain Shams University

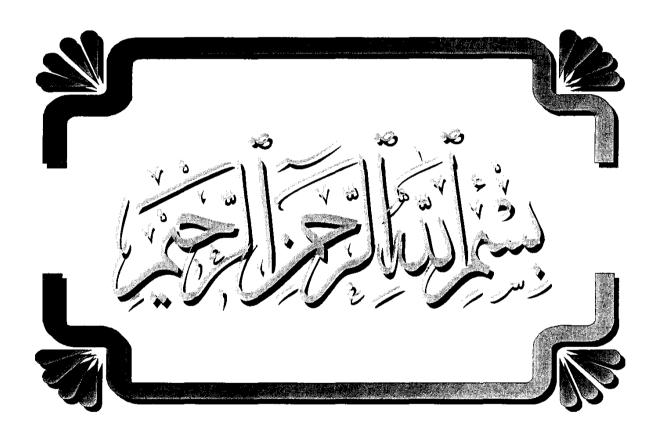
Dr. Heba Hassan El Sedafy
Lecturer in pediatrics - Ain Shams University

Dr. Hoda Mohamed El Gendi Lecturer in clinical pathology - Ain Shams University

> Faculty of Medicine Ain Shams University 1995

B. El nortan







# TO MY PARENTS

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#### **ABBREVIATION**

AGA = Apropriate for Gestational Age

ATN = Absolute Total Neutrophil

CSF-GM = Colony Stimulating Factor-Granulocytes Monocytes

CSF-M = Colony Stimulating Factor - Monocytes

CSFs = Colony Stimulating Factors

FHR = Fetal Heart Rate

HIV = Human Immunodeficiency Virus

I:T = Immature: Total

IHM = Infant of Hypertensive Mothers

IL-3 = Interleukin-3

IUGR = Intra Uterine Growth Retardation

LBW = Low Birth Weight

LDL = Low Density Lipoproteins

LI = Lytic Index

MPO = Myeloperoxidase

NBT = Nitroblue Tetrazolium

NN = Neonatal Neutropenia

PI = Phagocytic Index

PIH = Pregnancy-Induced-Hypertension

SD = Standard Deviation

SGA = Small for gestational Age

TNF = Tumour Necrosis Factor

 $TxA_2 = Thromboxane A_2$ 

VLBW = Very Low Birth Weight

VLDL = Very Low Density Lipoproteins

# TABLE OF CONTENT

Introduction and Aim of the work	1.
Review of Literature	
Chapter 1 : Normal Granulocyte Physiology	2.
Chapter 2 : Neonatal Neutropenia	25.
Chapter 3 : Neutrophil Dysfunction Syndrome	49.
Chapter 4 : Maternal Hypertension And The Newborn Infant	59.
Subjects and Methods	83.
Results	86.
Discussion	98.
Summary	102.
References	104.
Arabic Summary	

# LIST OF TABLES

Table (1): Haemopoietic Growth Factors.	4.
Table (2) : General Characteristics Of Myeloid And Lymphoid Growth Factors.	1 6.
Table (3) : The White Cell Count And The Differen Count During The First Two Weeks Of 1	
Table (4) : Contents Of Neutrophilic Cytoplasmic G	Franules. 17.
Table (5): Neutrophil Count Of IHM At 0,20 And	72 hours. 88.
Table (6) : T test Of Neutrophil Count Of IHM And Group At Birth ,20 And 72 hours.	l Control 89.
Table (7): Correlation between Neutrophil Count ( At 0,20 And 72 hours Versus Severity of Hypertension, Proteinuria, Gestational A Body Weight At Birth.	r
Table (8): Phagocytic And Lytic Indicies Of IHM And Control Group.	95.
Table (9): T test Of PI And LI Of IHM  And Control Group.	96.

# LIST OF FIGURES

Figure (1)	: Diagrammatic representation of the bone marrow pluripotent stem cell and the cell lines arising from it.	3.
Figure (2)	: Role of growth factors in normal haemopoiesis.	5.
Figure (3)	: Maturation of granulocyte series.	7.
Figure (4)	: The major killing mechanisms inside the phagocytes.	20.
Figure (5)	: Mean of neutrophil count of IHM and control group at 0.20 and 72 hours.	90.
Figure (6)	: Correlation between neutrophil count of IHM versus severity of hypertension, proteinuria, gestational age and body weight at birth.	92.
Figure (7)	: Correlation between neutrophil count of IHM versus severity of hypertension, proteinuria, gestational age and body weight at 20 hours.	93.
Figure (8)	: Correlation between neutrophil count of IHM versus severity of hypertension, proteinuria, gestational age and body weight at 72 hours.	94.
Figure (9)	: Mean of PI and LI of IHM and control group.	97.
Figure (10	): Phagocytic neutrophils in normal newborn.	97'.

INTRODUCTION

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#### INTRODUCTION AND AIM OF THE WORK

#### Introduction :-

Neutropenia is common in neonates delivered of women with pregnancy-induced hypertension (PIH) [Manroe et al, 1979; Brazy et al, 1982; and Engle and Rosenfeld, 1984]. This neutropenia was found to affect 50% of these newborns and to be transient and independent of birth weight and gestational age. Moreover these neonates were observed not to be at increased risk for early or late - onset infections [Engle and Rosenfeld, 1984].

More recently however, **Koenig and Christense**, **1989** reported a significant relationship between the severity of maternal hypertension and the presence of neonatal neutropenia (NN). With a higher prevalence of NN among low birth weight neonates. This was also observed by **[Mouzinho et al, 1992]**. Furthermore **Koenig and Christense**, **1989** suggested that these neonates may be at increased risk for development of late onset or nosocomial infections.

#### Aim of the work :-

The aim of this study was to evaluate the presence of neutropenia in infants born to hypertensive mothers (either pregnancy induced or chronic); the pattern of this neutropenia and also to evaluate the function of neutrophils in those neonates delivered to hypertensive women.

# CHAPTER I NORMAL GRANULOCYTE PHYSIOLOGY

### Normal Granulocytes Physiology

Leukocytes have a central role in host defense against infection. Granulocyte generation is governed by a self-renewing hierarchy of progenitor stem cells [Jandi, 1987].

#### ORIGIN OF GRANULOCYTE

It is now thought that a common (Pluripotential) stem cell gives rise after a number of cell divisions and differentiation steps to a series of progenitor cells for three main marrow cell lines: (a) erythroid, (b) granulocytic and monocytic, and (c) megakaryocytic, as well as to a common lymphoid stem cell (Figure 1) [Bybee and Thomas, 1991].

The stem cell also has the capability of self-renewal so that, although the marrow is a major site of new cell production, its overall cellularity remains constant in a normal healthy steady state. The precusor cells are, however, capable of responding to haemopoietic growth factors with increased production of one or other cells line when the need arises. There is considerable amplification in the system: one stem cell, for example is normally capable of producing about 10<sup>6</sup> mature blood cells after 20 cell divisions [Hoffbrand and Pettit, 1993].

#### HAEMOPOIETIC GROWTH FACTORS

The haemopoietic growth factors are glycoprotein hormones that regulate the proliferation and differentiation of haemopoietic progenitor cells and the function of mature blood cells (**Table 1**) (**Figure 2**). They may act locally at the site where they are

produced or circulate in plasma. They share a number of common properties (Table 2).

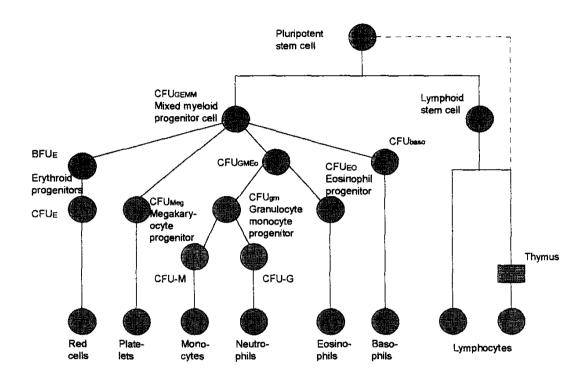


Figure (1):

Diagrammatic representation of the bone marrow pluripotent stem cell and the cell lines that arise from it. Various progenitor cells can now be identified by culture in semi-solid medium by the type of colony they form. BFUE, burst-forming unit, erythroid; CFU, colony-forming unit; E, erythroid; Eo, eosinophil; GEMM, mixed granulocyte, erythroid, monocyte, megakaryocyte; GM, granulocyte, monocyte; Meg, megakaryocyte [Hoffbrand and Pettit, 1993].