Effect of Maternal Hypertension on Neonatal Neutrophils

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

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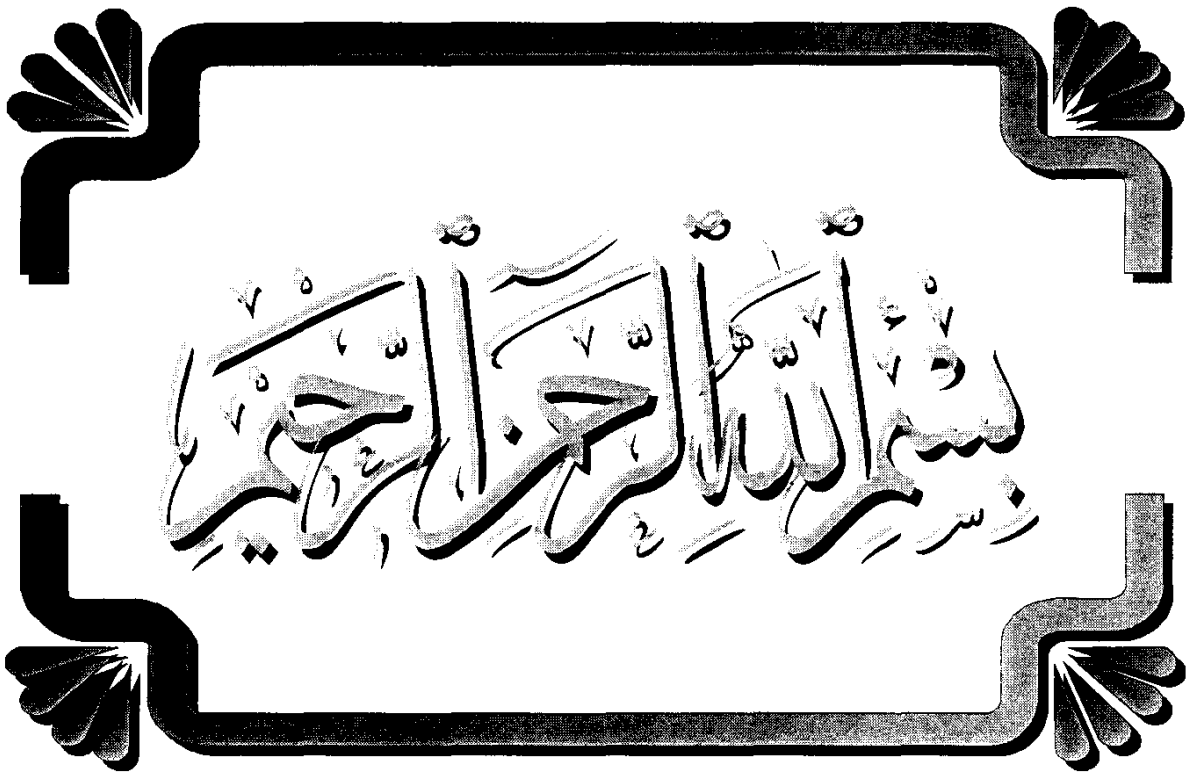

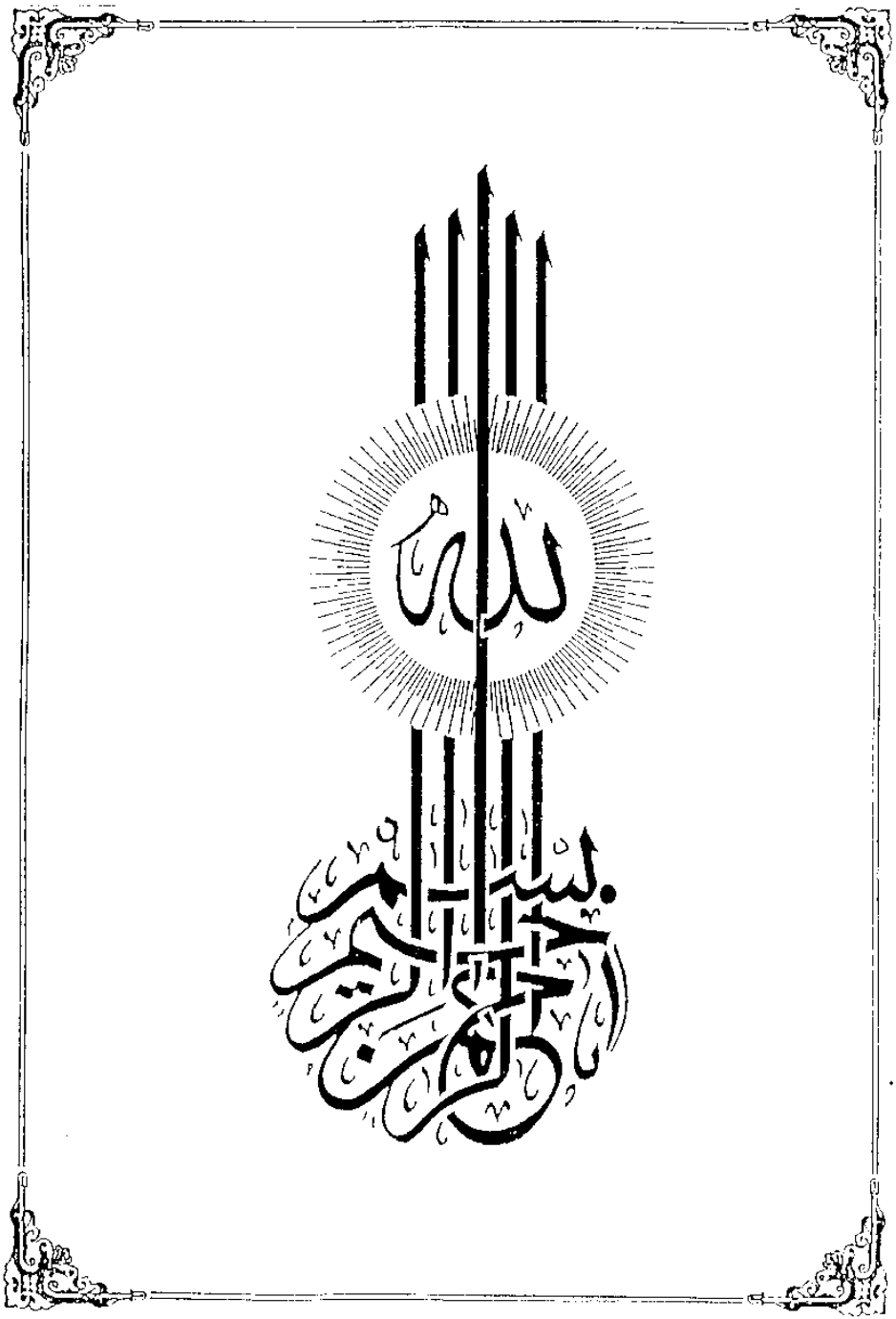

TO MY PARENTS

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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*

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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 **[Jandl, 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 10^6 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)**.

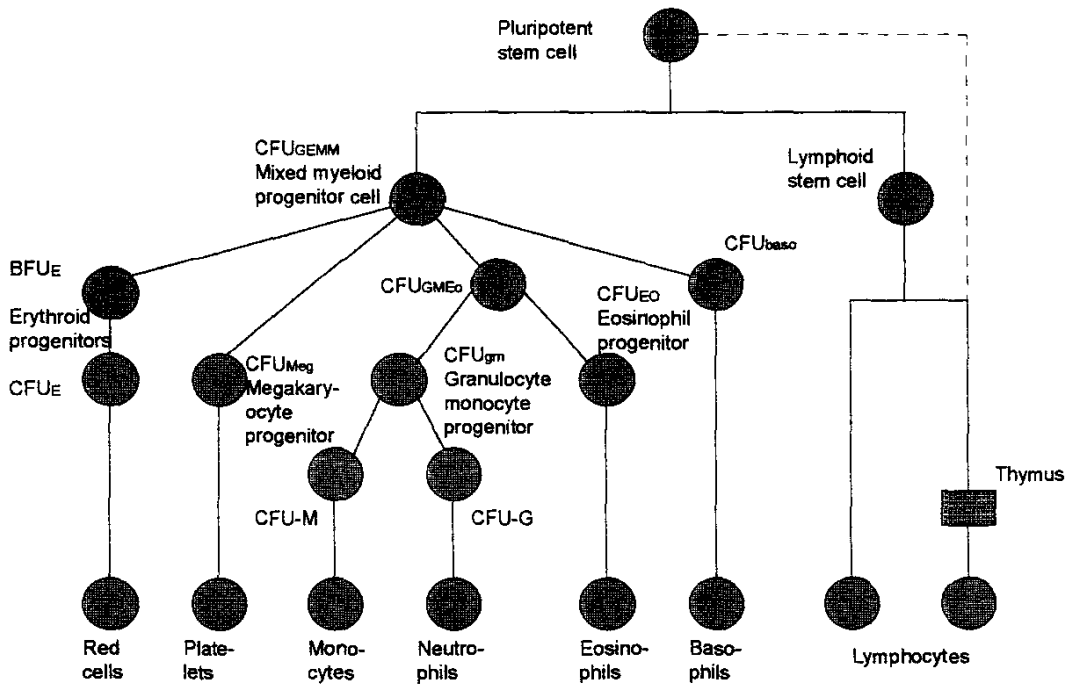

Figure (1) :

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]**.