Platelet Volumes and Numbers

In

Normal Pregnancy and Pre-eclampsia

Thesis

For Partial Fulfillment of MasterDegree

In Obstetrics and Gynecology

By

Mahmoud Ahmed Ahmed Mohammed

M.B.B.Ch. (Ain Shams)

Under Supervision of

Prof. Dr. Khaled Mohammed Al Maamoun El-Soudiby

Professor of Obstetrics and Gynecology

Ain Shams University

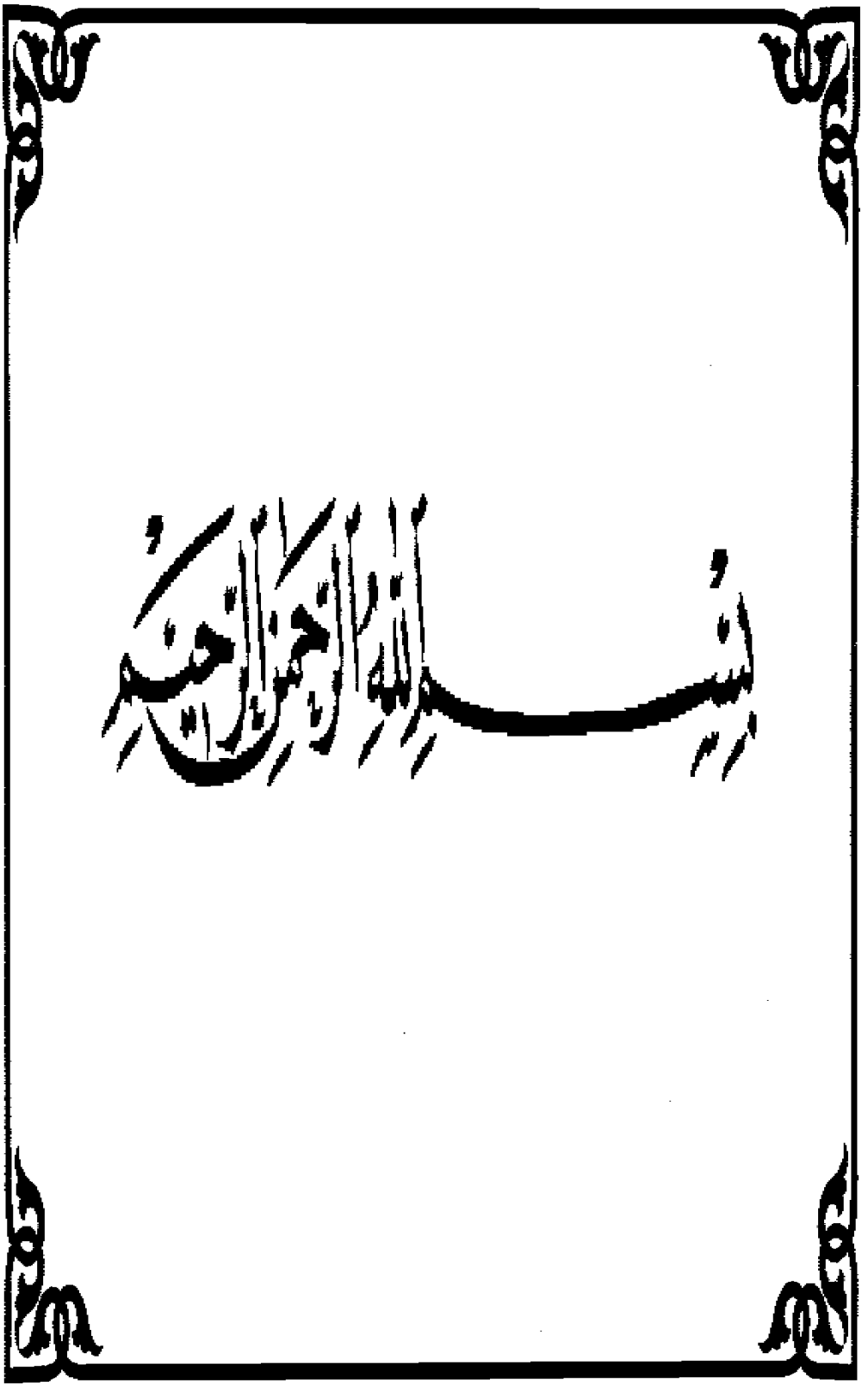
Dr. Alaa El-Din Abd El-Aziz El-Gindy

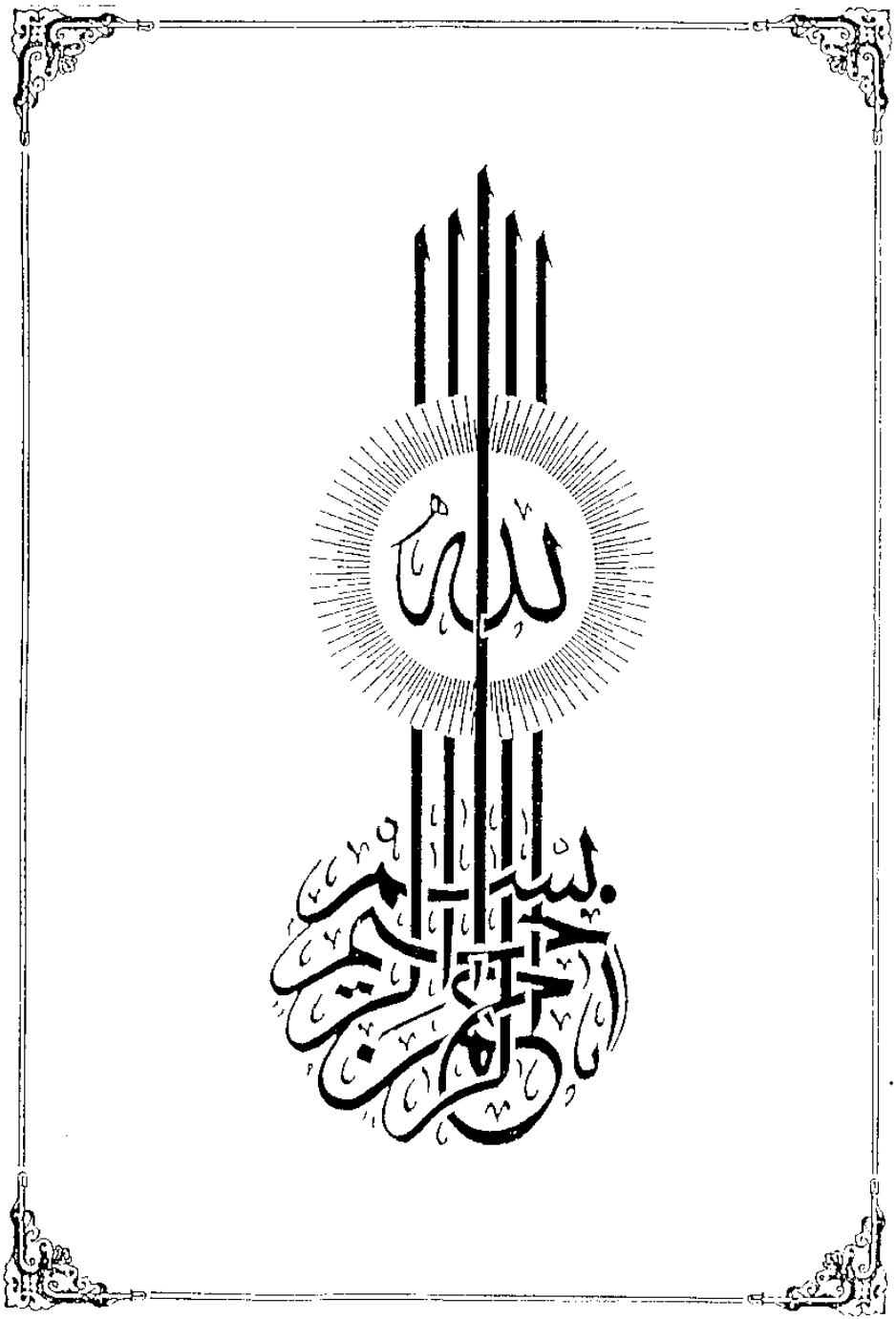
Lecturer of Obstetrics and Gynecology

Ain Shams University

Ain Shams University

1995


بسم الله الرحمن الرحيم



Acknowledgment

I would like to express my deepest gratitude and appreciation to *Prof. Dr. Khaled Mohammed Al Maamoun El-Houdiby* Professor of Obstetrics and Gynecology, Faculty of medicine, Ain Shams University for his continuous guidance, precious advice and continuous encouragement. I felt a great honor to work under his kind supervision.

I am also greatly indebted to *Dr. Alaa El-Din Abdel El-Aziz El-Gindy*, Lecturer of Obstetrics and Gynecology, Faculty of medicine, Ain Shams University, for his faithful help, sincere guidance and constant support that facilitated the completion of this work.

Also, I would like to express my thanks and gratitude to *Dr. Salwa Saad Mostafa Khoder*, Lecturer of clinical pathology, Faculty of medicine, Ain Shams University for her assistance in the Laboratory part of this work.

Contents

Introduction

Introduction

Pre-eclampsia is a complication of pregnancy characterized by hypertension, edema and proteinuria, beginning after twenty weeks of gestation (*Forest et al., 1989*). It develops in 5% of first pregnancies and 1% multigravid women (*Davey and MacGillivary, 1988*) and it is associated with increased morbidity and mortality for the mother and her baby (*Forest et al., 1989 and Schiff and Mashiach, 1992*).

The pathophysiology of pre-eclampsia remains uncertain despite of many research efforts. Among the many factors influencing vascular reactivity and possibly implicated are the renin-angiotensin system, prostaglandins, progesterone and its metabolites, calcium, magnesium, immunoreactive substances, auricular natriuretic factor, substances secreted by platelets and leukotriens (*Forest et al., 1989*).

Although, It is generally accepted that many hematological investigations are known during normal pregnancy. There is less informations regarding changes in platelet indices (*Taylor and Lind, 1976*).

Pregnancy is accompanied by significant alteration in hemostatic mechanism and its parameters including decrease in platelet count (*O`brien et al., 1986*).

The advent of automated platelet count has led to the recognition that during late pregnancy many healthy women become thrombocytopenic by conventional criteria (*Platelet count* $<150\ x10^9/L$). The development of mild

pregnancy-associated thrombocytopenia (*Platelet count 100-150 x 10^9/L*) towards term is common in heallhy pregnant women and provided it is an isolated finding does not require intervention (*Pillai, 1993*).

Platelet involvement may be an important and primary step in the alteration of hemostatic process in some abnormal pregnancies e.g. pre-eclampsia (*Whigham and Howie, 1978*).

In pregnancy-induced hypertension and pre-eclampsia studies have shown changes in platelet numbers, platelet survival and mean platelet volume, which have been interpretated as evidence of increased platelet consumption (*Walker et al., 1989*).

Platelet numbers and volumes as well as platelet aggregation in vitro have been investigated in normal pregnancy and it has been shown that there is a small increase in platelet aggregation which is compensated for by increased synthesis (*Stubbs et al., 1986*).

Platelet numbers are generally decreased in women with pre-eclampsia compared with corresponding pregnant control women (*Redman et al., 1978*) but only a minority of women develop thrombocytopenia (*Stubbs et al., 1986*).

Tygart et al., (*1986*) has suggested that changes in platelet volumes may be more sensitive than platelet numbers as a measure of altered platelet function.

Changes in platelet volume give additional information on in-vivo platelet function and may be of use in monitoring of at risk pregnancies as pre-eclampsia (*Sullivan et al., 1992*).

Aim of the Work

Aim of the work

The aim of this work is to study the changes of the platelet volumes and numbers in pre-eclamptic patients to be compared with changes in platelet volumes and numbers in women with normal pregnancy and also to detect which of these platelet indices (*mean platelet volume and platelet count*) is more sensitive in detecting the platelet changes in pre-eclampsia.

Review of Literature

Classification of Hypertensive Disorders in Pregnancy

Hypertensive disorders complicating pregnancy are common and form one of the great triad along with hemorrhage and infection that continues to be responsible for a large number of maternal deaths in many parts of the world (*Chesly, 1984*).

More recently with improved prenatal care and approach in the management of hypertensive disorders complicating pregnancy dramatic declines in maternal mortality rate have been reported (*Sachs et al., 1987*).

Definition and Classification:

The committee on terminology of the American College of Obstetricians and Gynecologists "*ACOG*" (*1986*), modified the classification of hypertensive states complicating pregnancy in order to separate hypertension generated by pregnancy from that merely coexisting with it.

I. Pregnancy-Induced Hypertension (PIH):

It is a hypertension which develops as a consequence of pregnancy and regress post partum.

This may be one of two types:

1. Without proteinura or edema "gestational hypertension".
2. With proteinuria and/or edema:

   a) Pre-eclampsia:

      - Mild.

      - Severe.

- Fulminating.

b) Eclampsia:

The same as pre-eclampsia along with convulsions.

II. Pregnancy Aggrevated Hypertension:

It is an underlying hypertension which becomes worsened by pregnancy, i.e superimposed this is either :

Superimposed Pre-eclampsia or Superimposed Eclampsia.

III. Coincidental Hypertension:

It is a chronic underlying hypertension which antecedes pregnancy or persists post partum, this may be:

1. Essential Hypertension:

   Which accounts for nearly one third of cases of hypertension with pregnancy and its prognosisis usually Excellent.

2. Secondary Hypertension :

   - Renal disease like renal artery stenosis.
   - Endocrinal disease like
     - •Conn's disease.
     - •Pheochromocytoma.
     - •Cushing disease.
     - •Vascular disease as coorctation of the aorta.

Davey (*1985*), introduced another classification to differentiate the multiple clinical varieties. Three main entities that can be distinghuished:

1. Pre-eclampsia:

Which is liable to progress to eclampsia, it is a disease of primigravida but may recur in the subsequent pregnancies. The disease occurs in late pregnancy and disappears after delivery not associated with residual hypertension in late life except in cases superimposed on chronic hypertension.

2. Gestational Hypertension:

which represents an inherited latent tendency to essential hypertension in late life, this tendency becomes unmasked by pregnancy. Gestational hypertension is diagnosed in woman who are normotensive in the beginning of their pregnancy but with a strong family history and not accompanied with proteinuria.

3. Chronic Renal Hypertension:

This is diagnonsed when chronic renal lesion causes an elevation of blood pressure. The disease is present before and persists after pregnancy although it may be discovered for the first time during pregnancy.

The international society for the study of hypertension in pregnancy (*ISSHP*) has proposed the following classification for hypertensive disorders in pregnancy (*Arias, 1993*):

A. Gestational hypertension or proteinuria:

Hypertension and/or proteinuria developing during pregnancy, labor or puerperium in previously normotensive non-proteinuric woman.
This group of patients is subdivided into:

(1) Gestational hypertension (without proteinuria):

a. developing antenatally.

b. developing during labor.

c. developing during puerperium.

(2) Gestational proteinuria(without hypertension):

a. developing antenatally.

b. developing in labor.

c. developing in puerperium.

(3) Gestational proteinuria hypertension (pre-eclampsia):

a. developing antenatally.

b. developing in labor.

c. developing in puerperium.

(B) Chronic hypertension and chronic renal diseases:

Hypertension and/or proteinuria in pregnancy in a woman with chronic hypertension or chronic renal diseases diagnosed before, during or after pregnancy. This group is subdivided into:

1-Chronic hypertension (*without proteinuria*).

2-Chronic renal diseases (*Proteinuria with or without hypertension*).

3-Chronic hypertension with superimposed pre-eclampsia:

"*Proteinuria is developing for the first time during pregnancy in woman with known chronic hypertension*" .

(C) Unclassified hypertension and/or proteinuria:

Hypertension and/or proteinuria found either