# A Comparison Between Sodium, Renin and Aldosterone Relations in Normotensive Pregnancy and in Pregnancy Induced Hypertension

Thesis Submitted for Partial Fulfillment for the Master Degree in Obstetrics and Gynaecology


By:

**Dr. Ayman Hussein Abdel-Mohsen**
M.B.B.ch.
Under Supervision
of:

**Professor Dr.El-Sayed El-Mahgoub**
Professor of Obstetrics and Gynaecology
Faculty of Medicine
Ain Shams University

**Professor Dr. M. Abdel-Hamid Mansour**
Professor of Radiation Biology
National Centre for Radiation Research and Technology

**Dr. Gamal Abdel-Salam Wafa**
Assist.Prof. of Obstetrics and Gynaecology
Faculty of Medicine
Ain Shams University





**Faculty of Medicine**
**Ain Shams University**
**1991**

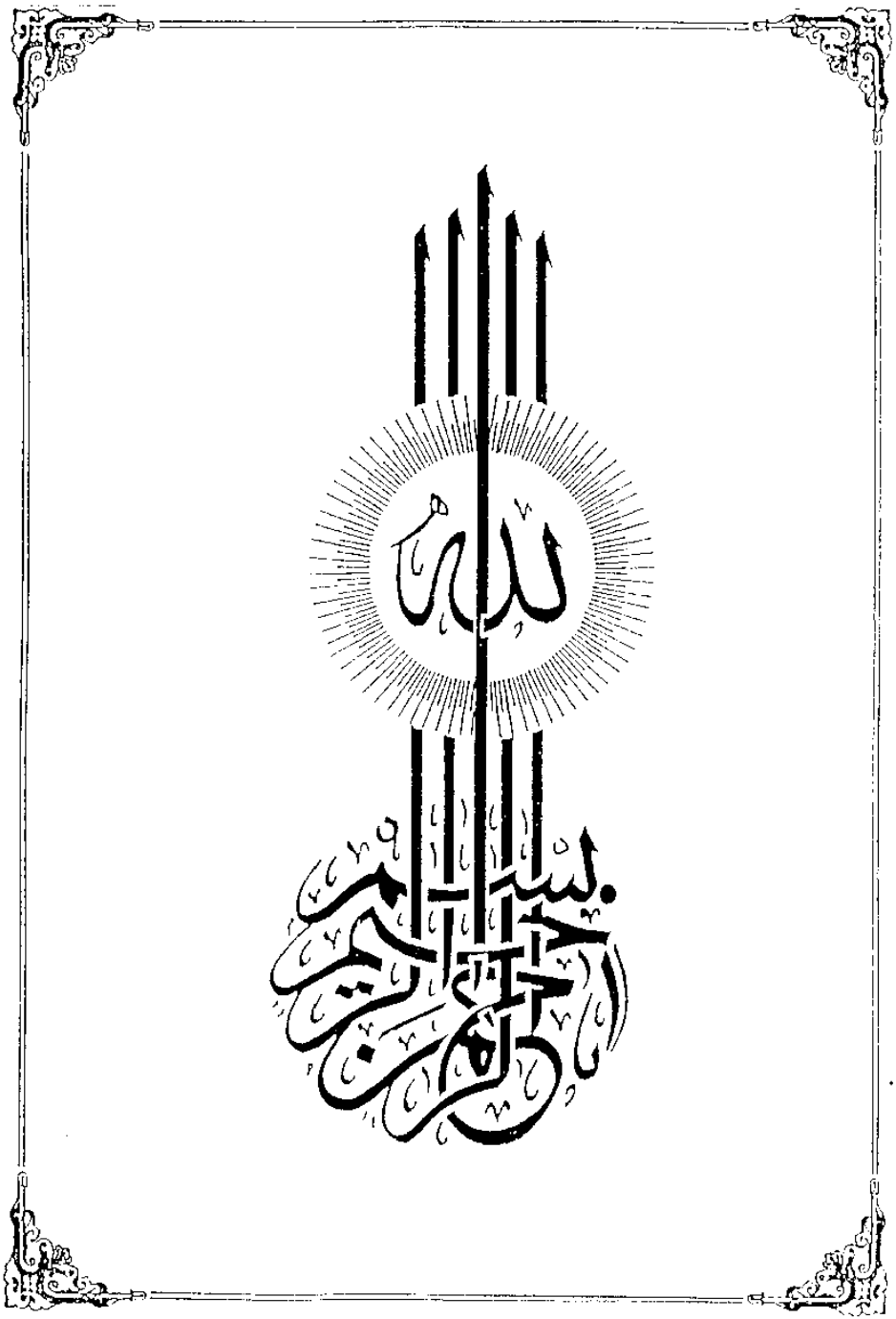
**Acknowledgement**

Best regards and sincerest wishes to my father in science Professor Dr. Sayed El-Mahgoub for his kindest advice and support in the work for M.Sc.

Great thanks and much gratitude to my professor Dr. M. Abdel-Hamid Mansour, who teached me the technique of radioimmunoassay and stood with me step by step and hand by hand during the experimental work of this thesis with his valuable advice which added a great deal to my capabilities for completing the practical part of this thesis through the most accurate and scientific methods.

Kindest regards and many thanks to my constant guide Dr. Gamal Abdel-Salam Wafa, who helped me choosing the subject of this thesis and stood with my step by step not saving any effort or advice throughout the work of the M.Sc.

Many thanks and much gratitude to my professor Dr. Mahmoud Sayed Mahmoud assistant professor of clinical chemistry, National Centre for Radiation Research and Technology, who guided me learning the basics of statistical science and helped me in the accurate statistical evaluation of the results of my work.



Finally and not last my gratitude to the National Centre of Radiation Research and Technology to whom I am proud to belong to, who gave me all the scientific experimental and financial support for my work.

TABLE OF CONTENTS

# INTRODUCTION AND AIM OF THE WORK

## Introduction and Aim of the Work

Nearly two hundred years ago Alexander Hamilton described preeclampsia as a disease which is always accompanied with the outmost hazard and frequently kills a woman like a fit of epoplesy (1781).

Despite of intensive research, the cause or causes of preeclampsia and eclampsia remain for the most part unknown. These disorders remain among the most important unsolved problems in obstetrics **(Lucas, Soble, Laurent, Ganguly and Favol, 1978).**

Although there were many theories for the aetiology and pathogenesis of hypertension in pregnancy, there was a limited number of pathways by which blood pressure can be elevated, and these factors relate primarily to cardiac output and peripheral vascular resistance **(Symonds, 1979).**

The renin-angiotensin aldostrone system is a major factor in the control of blood pressure acting on the peripheral vascular resistance by producing vasoconstriction by angiotensin II and acting on the cardiac output by sodium and water retention produced by aldosterone hormone. Taking this into consideration this study was taken to answer these questions :

1- Does plasma-renin activity varies significantly between hypertensive and normotensive pregnant women?

2- Does aldosterone level varies significantly between hypertensive and normotensive pregnant women?

3- Does the renin-aldostrone relation differs significantly between hypertensive and normotensive pregnant women?

4- Does the aldostrone-sodium relation varies significantly in hypertensive pregnant women as compared with normotensive pregnant women?

# REVIEW OF LITERATURE

Terminology and Nomenclature :

The unsatisfactory term "Toxaemias of Pregnancy" was applied variably to any or all disorders in which hypertension, proteinurea and/or oedema were present during pregnancy, or during peurperium and other disorders as well.

The Committee on Terminalogy of the American College of Obstetricians and Gynaecologists suggested the following definitions of hypertension that developed during pregnancy or peurperium (Hughes, 1972). These definitions were modified later by Chesely (1978) and Gant and Worley (1980).

- **Hypertension** :- was defined as a diastolic blood pressure of at least 90 mm Hg, or systolic blood pressure of at least 140 mm Hg, or a rise in the former of at least 15 mm Hg or in the later of at least 30 mm Hg. The blood pressure cited must be manifested on at least two occasions 6 hours or more apart.

- **Preeclampsia** :- is the development of hypertension with proteinurea, oedema or both induced by pregnancy after the 20th week of gestation and sometimes earlier when there are extensive hydatiform changes in the chorionic villi.

- **Eclampsia** :- is the occurrence of convulsions not caused by any coincidental neurologic disease such as epilepsy, in a woman who's criteria fullfills the criteria for preeclampsia.

- **Superimposed Preeclampsia or Eclampsia** :- was defined as the development of preeclampsia or eclampsia in a woman with chronic hypertensive vascular disease, or renal disease.

- **Chronic Hypertension** :- was defined as the presence of persistant hypertension of whatever the cause, before the 20th week of gestation in the absence of hydatiform mole or extensive molar changes, or persistant hypertension beyond 6 weeks post partum.

- **Gestational Hypertension** :- was defined as hypertension that develops during the later half of pregnancy or during thg first 24 hours after delivery. It is not accompanied with other evidence of preeclampsia or hypertensive vascular disease and disappears within 10 days following parturition.

- **Gestational Oedema** :- generalized accumulation of fluid of greater than 1+ pitting oedema after 12 hours bed rest or a weight gain of 5 pounds or more in a week.

- **Gestational Proteinurea** :- proteinurea during pregnancy in the absence of hypertension, oedema, renal infection or known renovascular disease.

## Classification of Hypertensive Disorders of Pregnancy

The Commitee on Terminology of the American College of Obstetricians and Gynaecologists also modified the classification of hypertension complicating pregnancy in order to separate vasospasm and in turn hypertension generated by pregnancy from hypertension that merely coexists with it (**Hughes, 1972**) :-

**A- Pregnancy Induced Hypertension**

1- Without proteinurea or generalized gross oedema.

2- With proteinurea or generalized gross oedema (Preeclampsia).

a- Mild b- Severe

3- Eclampsia

**B- Coincidental Hypertension**

**C- Pregnancy Aggrevated Hypertension**

1- Superimposed preeclampsia

2- Superimposed eclampsia

**Baird (1977)** suggested that future studies into the epidemeology of preeclampsia require systemic accumulation of data on blood pressure before pregnancy and during the first 20 weeks of gestation. He suggested the following classification :-

**A. In Normal Women :-**

1- Mild preeclampsia :- as shown by rise in blood pressure to 140/90 or more, without proteinurea or with not more than 0.25 gm/litre urine.

2- Severe preeclampsia :- as shown by rise in blood pressure to 140/90 or more, with proteinurea or with not more than 0.25 gm/litre urine.

**B. In Hypertensive Women :-**

1- Blood pressure of 140/90 before pregnancy and in the first 20 weeks of gestation, usually rising to a higher level during the second half of gestation, but with proteinurea of no more than 0.25 gm/litre urine.

2- Further rise in blood pressure during the second half of pregnancy with proteinurea of more than 0.25 gm/litre urine.

## Diagnosis of Pregnancy Induced Hypertension

The diagnosis of pregnancy induced hypertension is usually straight forward : the blood pressure is 140/90 or greater or increase of 30 mm Hg systolic or 15 mm Hg diastolic over baseline values on at least two occasions 6 hours apart.

It was found that one third of women developed generalized oedema by the 38th week of gestation, and so no statiscal correlation between oedema and hypertension was able to be showed (Robertson, 1971). On the other hand the combination of hypertension and proteinurea showed a marked increase in the perinatal mortality rate (MacCartney and co-workers, 1971).