LIPID PEROXIDATION IN PRE-ECLAMPSIA

THESIS

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BY

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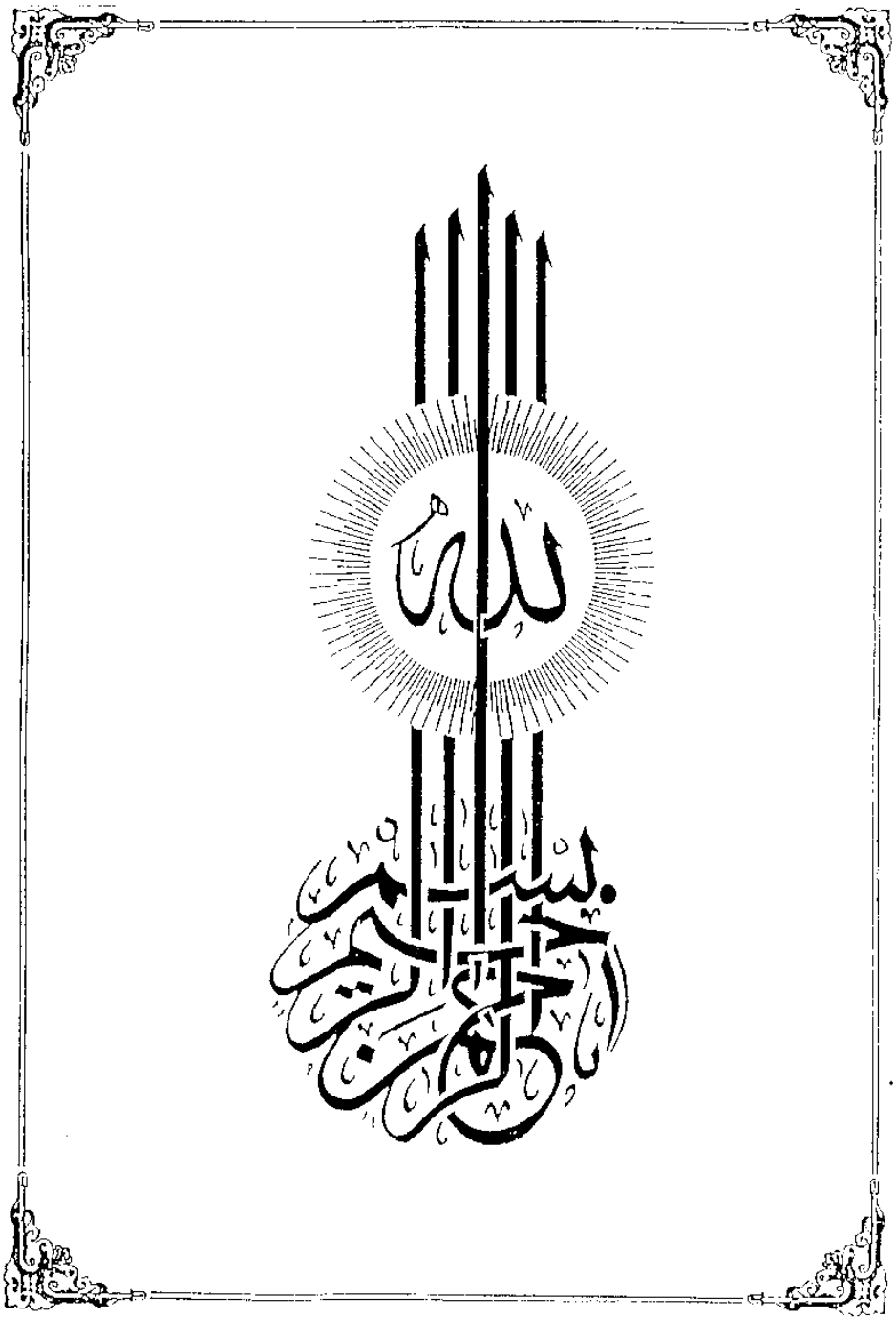

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Nearly two hundred years ago ***Alexander Hamilton [1781]*** discribed pre-eclampsia as a disease which is always accompanied with the utmost hazards and frequently kills a woman like a fit of apoplexy.

Despite the intensive research, the cause or causes of pre-eclampsia and eclampsia remain for the most part unknown. These disorders remain among the most important unsolved problems in obstetrics ***[Lucas et al., 1978]***.

Although there were many theories for the etiology 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 resistance ***[Symonds, 1979]***.

Basic research during the past two decades has led to increased awarness to the role of lipid peroxidation in various physiologic and pathophysiologic processes. A number of reports indicate that pre-eclampsia is associated with elevated blood levels of lipid peroxidation products. In view of its potentially destructive character,

uncontrolled lipid peroxidation has been suggested as an etiologic factor in pre-eclampsia *[Hubel et al., 1989a]*. However, there is conflicting evidence regarding the dependency of lipid peroxide levels on the level of total serum lipids and various lipid fractions in pre-eclampsia *[Ishehara, 1978]*.

Consequently, this work is intended to evaluate the process of lipid peroxidation and its relation to the total lipid changes in pre-eclamptic patients in comparison with normal pregnant and non-pregnant women.

REVIEW OF LITERATURE

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 large number of maternal deaths and remains a leading cause of maternal and neonatal mortality and morbidity *[Roberts, 1984]*.

Terminology and Nomenclature:

The unsatisfactory term "Toxemia of pregnancy" was applied variably to any or all disorders in which hypertension, protinuria and/or oedema was present during pregnancy or the peurperium, and to other disorders, as well *[Cunningham et al., 1989]*.

The American College of Obstetricians and Gynaecologists [1986] proposed the following defenitions of hypertension that develop during pregnancy or peurperium:

Hypertension:

Is defined as a diastolic blood pressure of at least 90 mmHg, or systolic blood pressure of at least 140 mmHg, or a rise in the former of at least 15 mmHg or in the later of at least 30 mmHg. The blood pressure readings cited must be obtained on at least two occasions 6 hours or more apart.

Pre-eclampsia:

Is the development of hypertension with proteinuria, 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 diagnosed when convulsions, not caused by any coincidental neurological disease such as epilepsy, develop in a woman who also has clinical criteria for pre-eclampsia.

Superimposed pre-eclampsia or eclampsia:

Is defined as pre-eclampsia or eclampsia that develops in a woman with chronic hypertensive vascular or renal disease.

Chronic hypertensive disease:

Is defined as persistant hypertension, of whatever cause, antedating pregnancy or detected before the 20th week of gestation in the absence of hydatiform mole or extensive molar change, or hyertension that persists beyond 6 week postpartum.

Earlier, the Committee on Terminology of the American College of Obstetricians and Gynaecologists *[Hughes, 1972]* sought to improve the diagnosis of pre-eclampsia and suggested the following definitions:

Gestational hypertension:

Is defined as elevated blood pressure that develops during the later half of pregnancy or during the first 24 hours following delivery. It is not accompanied by other evidence of pre-eclampsia or chronic underlying hypertension, and it disappears within 10 days of delivery.

Gestational oedema:

Abnormal fluid retention that regresses after delivery, hypertension never developing.

Gestational proteinuria:

Proteinuria that exceeds 300 mg per day in the absence of hypertension, oedema, renal infection, or other known renovascular disease. The last three terms are not used by many teaching centers in the United States.

CLASSIFICATION OF HYPERTENSIVE DISORDERS OF PREGNANCY

The Committee on Terminology of the American College of Obstetricians and Gynecologists suggested the following classification of hypertension complicating pregnancy in order to separate hypertension that is in some way induced by pregnancy from hypertension that merely coexists with it *[Cunningham et al., 1989] :*

A. Pregnancy-Induced Hypertension:

Hypertension that develops as a consequence of pregnancy, and regresses postpartum:

1. Hypertension without proteinuria or pathological oedema
2. pre-eclampsia: hypertension with proteinuria and/or pathological oedema.
   a. Mild b. Sever
3. Eclampsia: Hypertension with proteinuria and /or pathological oedema along with convulsions

B. Pregnancy aggrevated Hypertension:

Underlying hypertension worsened by pregnancy

1. Superimposed pre-eclampsia
2. Superimposed eclampsia

C. Coincidental Hypertension:

Chronic underlying hypertension that antecedes pregnancy or persists postpartum.

Pritchard et al., [1985] classified pre-eclampsia as mild or severe. It is regarded as severe when one or more of the following is found (Table 1):

Table 1: Criteria for the discrimination between mild and severe pre-eclampsia:

Abnormality	Mild	Severe
Diastolic B.P	<110 mm Hg	110mm Hg or higher
Proteinuria	Trace to 1+	Persistant 2+or more
Oliguria	Absent	Present
Headache	Absent	Present
Visual disturbance	Absent	Present
Epigastric pain	Absent	Present
Serum creatinine	Normal	Elevated
Thrombocytopenia	Absent	Present
Hyperbilirubinemia	Absent	Present
SGOT elevation	Minimal	Marked
Fetal growth retardation	Absent	Obvious

Diagnosis of pregnancy-induced hypertension

The diagnosis of pregnancy-induced hypertension is usually straightforward and made when the blood pressure is 140/90mm Hg or greater or a rise in the diastolic pressure of at least 15mm Hg, or in the systolic pressure of at least 30mm Hg over baseline values and at least two occasions 6 hours apart *[Villar et al., 1988]*.

Proteinuria is an important sign of pre-eclampsia and *Chesley [1985]* rightfully concluded that the diagnosis is questionable in its absence. Proteinuria is defined as 300mg or more of urinary protein during a 24 hours period or 100mg/dl or more in at least two random specimens collected 6 hours or more apart *[Chesley, 1985]*. The combination of proteinuria and hypertension during pregnancy markedly increases the risk of perinatal mortality *[Friedman and Neff, 1976]*.

On the other hand, *Robertson [1971]* reported that one third of women developed generalized oedema by the 38th week of pregnancy, and he was unable to show a significant statistical correlation between oedema and hypertension.