# REPEAT GLUCOSE TOLERANCE TEST

# IN

# DIAGNOSIS GESTATIONAL DIABETES

**THESIS**

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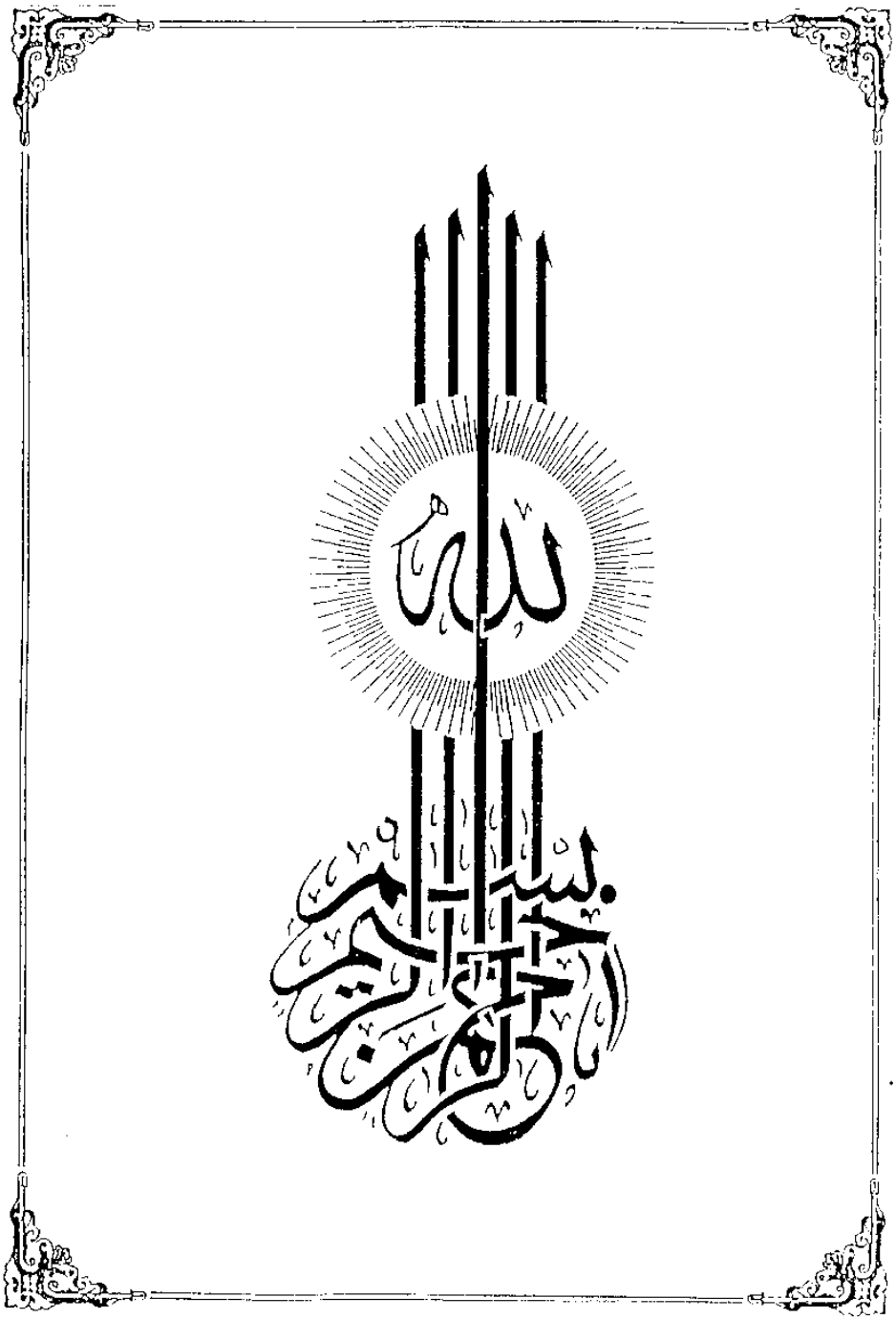

# INTRODUCTION

# INTRODUCTION and AIM OF WORK

During the preinsulin era, the maternal mortality rate was 30 per cent and an over all fetal loss rate was of 65 per cent. Since 1921 the availability of insulin has markedly improved the outlook for both mother and fetus. Nevertheless, perinatal mortality continues at rates 3 to 5 per cent. Considerably above 1 to 2 per cent noted in the general population (Coustan and Felig, 988). Major congenital anomalies occur in 6 to 12 per cent of offspring of diabetic mother, three to fourfold rate in the general population. But, till very recently the incidence of congenital anomalies has failed to decline despite on over all decline in perinatal mortality (Coustan and Felig, 1988). The normalization of maternal fuel metabolism, which previously had been emphasized in late pregnancy to prevent perinatal mortality and morbidity, must be attempted at conception and during early pregnancy (i.e. during the earliest stages of embryogenesis) in order to lower congenital malformation rates (Fuhrmann et al, 1984). Beside insulin, the advances in the fetal monitoring and obstetric management play an important role to improve the outlook of fetus

(Coustan and Felig, 1988). Diagnosis and treatment of gestationaldiabetes may reduce perinatal mortality and morbidity (Gabbe, 1986). About half of patients whose oral glucose tolerance test (G T T) results are abnormal lack the risk factors traditionally considered to be markers for gestational diabetes (Coustan et al. (1989). Therefore all pregnant women are now screened for gestational diabetes in many centers. Those whose screening tests (1-hour, 50 gm glucose load) are abnormal are evaluated with a 3-hour,100 gm oral GTT. The diagnosis of gestational diabetes requires at least two abnormal values on the oral GTT. In an attempt to identify those patients whose initial oral GTT results are not diagnostic of gestational diabetes but in whom this disease may develop in a later stage of pregnancy, we will investigate the results of repeat oral GTTs in patients with one abnormal value on the initial oral GTT. The hypothesis is that during the period between the two tests the glucose tolerance of some these patients will worsen such that they will meet the criteria for gestational diabetes.

# REVIEW

# CHAPTER -I-

## DEFINITION & CLASSIFICATION

The term diabetes mellitus currently refers to a syndrome characterized by chronic hyperglycemia and other disorders of carbohydrate and lipid metabolism, which often lead to the development of a specific micro-vascular disease, particularly affecting the eye and the kidney, and to an increased incidence of macroangiopathic changes, particularly affecting the heart and the peripheral vessels (Schoffling, 1985).

The syndrome diabetes as is also the case for example with anaemia or arthritis, is found in association with a heterologous group of diseases, differing from one another in their etiology and pathogenesis as well as in their genetics, onset, and course. The common factor in all these diseases is the insufficient cellular action of insulin. This can result either from impaired insulin synthesis or secretion. Thus defect of hormone secretion and impaired hormonal action on target organs may be related to an insufficiency of hormonopoiesis. Less frequently the cause is the secretion of an insulin defective in its primary structure or

disorders of the insulin receptors. Common to these various diseases are hyperglycemia, impaired glucose tolerance, and insulin deficiency, the latter being either absolute or relative (Schoffling, 1985).

***Classification of diabetes mellitus:***

Members of an international workshop, now called the National Diabetes Data Group convened in 1979 to formulate, among other things, the following scheme for classifying diabetes mellitus, including diabetes apparent only during pregnancy (gestational diabetes).

**I- Idiopathic diabetes Mellitus.**

1- *Insulin dependent.*

2- *Non-insulin dependent.*

a) Non obese. b) Obese.

**II- Gestational diabetes.**

**III- Impaired glucose tolerance.**

**IV- Previous abnormality of glucose tolerance**

**V- Potential abnormality of glucose tolerance.**

**VI- Secondary diabetes mellitus**.

***White classification : (1974)***

Maternal diabetes has been classified on the basis of insulin requirements, age of onset, duration of overt diabetes and severity of complications. The most commonly used classification was proposed by white (1974) and combines several of those factors:

**Class A:**

Chemical diabetes: Positive glucose tolerance test prior to or during pregnancy. Prediabetes: history of large babies more than 4 kg or unexplained stillbirths after 28 weeks.

**Class B:**

Medication-dependent. Onset after 20 years of age duration less than 10 years.

**Class C**:

$C_1$ : Onset at 10 to 19 years of age.

$C_2$ : Duration 10 to 19 years.

**Class D:**

$D_1$ : Onset before 10 years of age.

$D_2$ : Over 20 years duration

$D_3$ : Benign retinopathy

$D_4$ : Calcified vessels of legs.

$D_5$ : hypertension

**Class E:**

No longer sought

**Class F**:

Nephropathy

**Class G:**

many failures

**Class H**

diabetic cardiopathy

**Class R:**

proliferative retinopathy

**Class T:**

Renal transplantation

***But this classification is complex enough to be used widely.***

Research over the past several years into the etiology and pathogenesis of the various types of diabetic disease has provided now insights, and hence lead to new attempts at classification as follow (Schoffling, 1985).

***A- Diabetes mellitus:*** ***Type I*** : insulin dependent

***Type II*** : Non insulin dependent

***Type IIa*** : Non obese ***Type IIb*** : Obese

***B-Gestational diabetes mellitus:***

***C- Impaired glucose tolerance:***

a) Without obesity

b) With obesity

***D- Diabetes mellitus or impaired glucose tolerance caused by or associated with other illness or syndromes.***

a- Pancreatic diseases.

b- endocrine disease.

c- drug or chemical induced disorders.

d- disorders of insulin receptors.

e- genetic or chromosomic syndromes.

The attempt to clearly differentiate type **I** from type **II** diabetes on the basis of insulin dependence with only minimal consideration of age at diagnosis is fundamental, since although insulin dependent type **I** diabetes predominantly occurs in youth, it is occasionally first observed at a later age Similarly, type **II** diabetes, which is not insulin dependent may not only appear in middle or old age, but on occasion also in young patients, as for example is the case in maturity- onset diabetes of the young. For this reason the expert committee of the W.H.O. suggested in 1980 that the old term primary and secondary should be avoided, since both may be either insulin dependent or non- insulin- dependent (Schoffling, 1985). The world wide view of the diabetic syndrome has expanded remarkably during the past few years, and both the National Diabetes Data Group (NDDG) and the World Health Organization (W.H.O.) have made major contributions towards a better definition and delineation of the many heterogeneous forms of glucose intolerance that comprise the diabetic

syndrome. It now seems reasonable that his approach, which takes into account the rapidly expanding advanced in molecular biology, immunogenetics, and epidemiology, be adapted to our differentiation of different categories of pregnant women with impaired glucose tolerance. Table .1. is a proposed classification for pregnant diabetic women (Hollingsworth et al., 1984). It is recognized that heterogeneity also exists within these broad groupings of patients, but it is useful to recognize the quite different metabolic problems of various types of pregnant diabetic women who unfortunately share the name diabetes in common.