Role of Fructosamine in Management of Gestational Diabetes

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By

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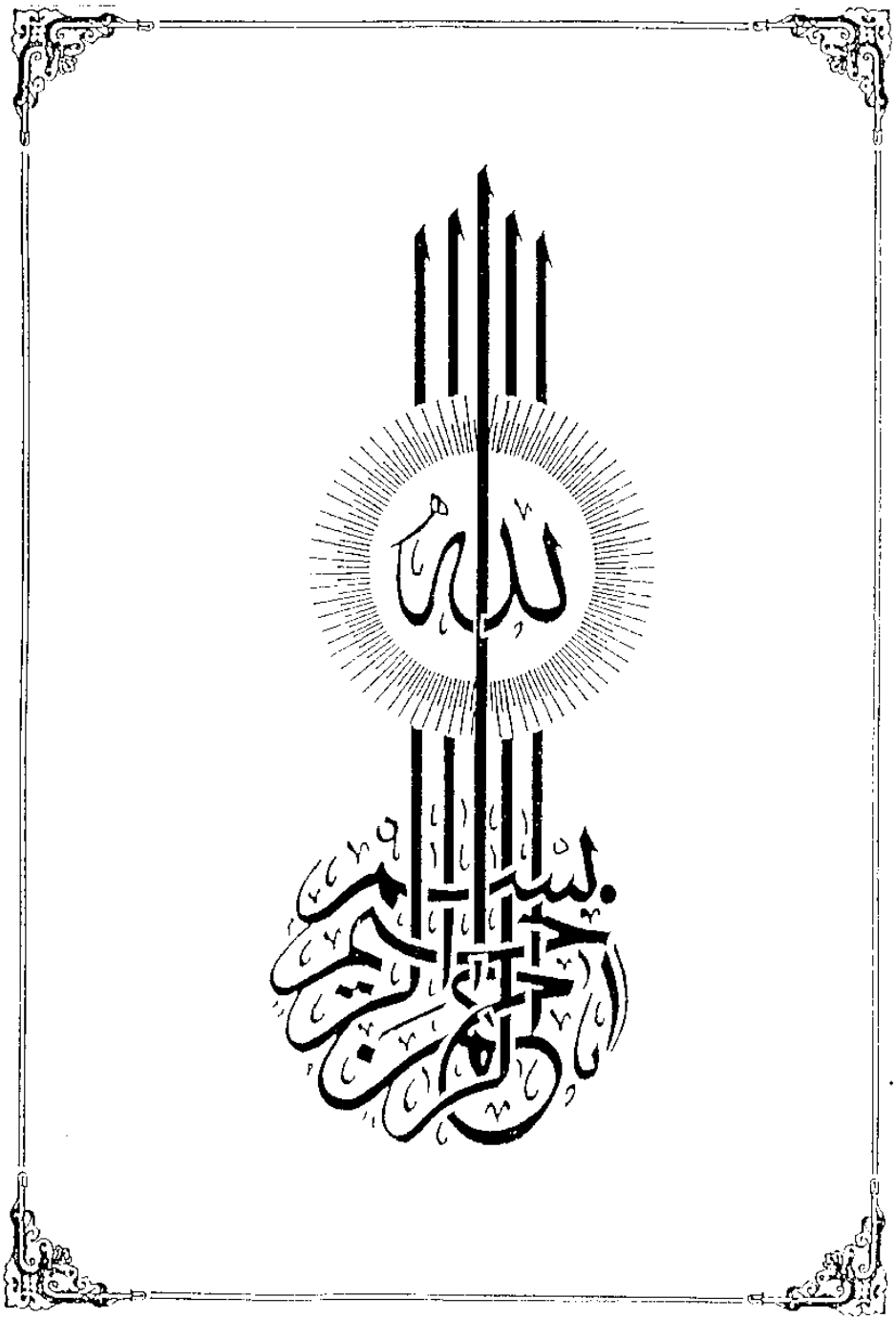
بسم الله الرحمن الرحيم

"قالوا سبحانك لا علم لنا إلا ما علمتنا
إنك أنت العليم الحكيم"

صدق الله العظيم

سورة البقرة - آية ٣٢



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CONTENT

INTRODUCTION

Diabetes mellitus is a clinical syndrome characterized by hyperglycemia due to a deficiency or diminished effectiveness of insulin. The metabolic disturbances affect the metabolism of carbohydrate, fat, protein and electrolytes. The deranged metabolism leads eventually, in many cases, to cellular damage specially to vascular endothelial cells in the eye, kidney and nervous system.

The occurrence of pregnancy in the diabetic woman has always had a fascination for the obestetrician because of the obvious effect which the maternal disease has on both the course of pregnancy and the fetal outcome (Brudenell., 1982).

Pregnancy has a temporary diabetogenic effect and this is evident by the fact that some women who have no evidence of diabetes when they are not pregnant, develop distinct abnormalities of glucose tolerance during pregnancy (Cunningham et al., 1989). This diabetogenic effect of pregnancy render the control of diabetes more difficult as pregnancy advances.

Gestational diabetes is a carbohydrate intolerance of variable severity with its onset or first recognition during the present pregnancy irrespective of whether or not insulin

is used for treatment, or the condition persists after pregnancy (Freinkel and Josimovich., 1980).

The course of pregnancy in diabetics is characterized by an increased incidence of a variety of complications affecting both the mothers and fetus. Therefore early diagnosis of gestational diabetes and proper management can prevent these complications.

Screening for diabetes in pregnancy is difficult and the traditional methods of detecting diabetes in pregnancy comprises an assessment of clinical risk factors with 3h. 100 gm oral glucose tolerance test in suspected cases. Results are clearly unsatisfactory with detection of only 62 % of cases at best (O'Sullivan et al., 1973a). Subjection of all pregnant women to systematic glucose tolerance test (GTT) is expensive, inconvenient and time-consuming for the patient and provides a high (13 %) rate of false positive observations and detects only 79 % of diabetic pregnancy (O'Sullivan., 1980).

Glycosylated hemoglobin A1 determination in a random blood specimen would be a simpler diabetes screening test. Unfortunately its widespread clinical application has been

hampered by difficulties with the methods (Petersen et al., 1984).

A manual colorimetric assay that is based on reducing activity of glycated serum protein (Fructosamine) has been reported and a kit version of the method has been produced (Johnson et al., 1982).

Roberts & Baker (1986) reported that 85 % of women with diabetes in pregnancy have higher levels of serum fructosamine than nondiabetic pregnant women. Therefore the measurement of plasma fructosamine has been used as a screening test for diabetes and to reflect blood glucose control during the previous 1 to 3 weeks (Baker et al., 1984).

Roberts & Baker (1987) also found a significant correlation between maternal fructosamine concentration and neonatal birth weight, and reported that serum fructosamine concentration was significantly elevated in mothers of macrosomic infants.

AIM OF THE WORK

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The aim of our work is to find out the clinical usefulness of estimation of serum fructosamine concentration as a screening and diagnostic test for diabetes mellitus during pregnancy. Also to find out the relation between fructosamine concentration and blood glucose level, and to assess the role of fructosamine concentration in predicting macrosomic baby of the diabetic mother.

REVIEW OF LITERATURE

DIABETES MELLITUS

Diabetes mellitus is a universal health problem affecting human societies at all stages of development.

Definition of diabetes mellitus

Diabetes mellitus is a clinical syndrome characterized by chronic hyperglycemia, which may result from many environmental and genetic factors. The major regulator of glucose concentration in the blood is insulin, a hormone synthesized in and secreted by the β cells of the islets of Langerhans in the pancreas.

Hyperglycemia may be due to a lack of insulin or to an excess of factors that oppose its action (WHO., 1980). The metabolic disturbances affect the metabolism of carbohydrate, fat, protein and electrolytes.

It has been clearly established that diabetes mellitus is a genetically and clinically heterogenous group of disorders that share glucose intolerance in common (National Diabetes Data Group., 1979).

Clinically, diabetes mellitus may present with acute symptoms that include thirst, polyuria and unexplained weight loss and these can progress to life threatening ketoacidosis. Subacute symptoms include pruritis vulvae, skin infection, unusual fatigue or visual impairement (Welborn., 1984).

Classification of diabetes mellitus

There are many classifications of diabetes mellitus, but the major problem is that no classification is satisfactory.

A classification was recommended by the National Diabetes Data Group in 1979 and generally accepted by the WHO.,1980.

By this formulation, 3 major diagnostic classifications are recognized (Table 1):-

(A) Diabetes Mellitus

I - Type I (insulin - dependent diabetes mellitus).

II - Type II (non-insulin dependent diabetes mellitus).

III- Secondary diabetes.

(B) Impaired Glucose Tolerance

(C) Gestational Diabetes

(A) Diabetes Mellitus: It is subdivided into:-

(I) Type I, Insulin-dependent diabetes mellitus, (IDDM)

* This type is characterized by:-

- Abrupt onset of symptoms.
- Insulinopenia and dependence on injected insulin to sustain life.
- Occurs at any age, but common in young adults.
- Prone to develop ketosis.
-. Abnormal immune responses and autoimmunity are thought to play an etiologic role (islet cell antibody phenomena).

(II) Type II, Non insulin-dependent diabetes mellitus (NIDDM)

* This type is characterized by:-

- Slow progression of the disease.
-. Circulating levels of insulin may be normal, mild insulinopenia, or even above normal levels associated with insulin resistance.
- More frequent in adults but occurs at any age.
- Obesity is probably an important feature.
- Release of insulin in response to the ingestion of food is often delayed with a variable degree of insulin resistance at target tissues.