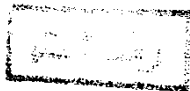


SONOGRAPHIC ASSESSMENT OF THE LIVER SIZE COMPARED
TO LIVER FUNCTION TESTS IN DIABETIC PATIENTS

THESIS

Submitted In Partial Fulfilment for the
Master Degree of General Medicine



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*Introduction
&
Aim of the work*

INTRODUCTION

Diabetes mellitus is a clinical syndrome characterized by hyperglycaemia due to deficiency and/or diminished effectiveness of insulin. The disease is usually chronic and affects the metabolism of carbohydrates, proteins, fat, water and electrolytes. Consequently, it is expected to affect all systems of the body. As the liver is the site of metabolism of all food stuffs, it can be affected in cases of longstanding uncontrolled diabetes.

It may be enlarged due to fatty infiltration or glycogen deposition, especially in young diabetics.

The aim of the present study:

Sonographic assessment of liver size compared with liver function tests in diabetic patients.

*Review
of
literature*

Diabetes mellitus

Definition:

Diabetes is the most common of the serious metabolic diseases of humans.

The disease is characterized by a series of manifestations, however none of these is specific for diabetes.

Diabetes should be viewed as a syndrome of clinical entity which can involve any or all of long symptoms and clinical laboratory findings which show a variable response to therapy (Porte and Halter, 1981).

In spite of its complexity, diabetes mellitus may be defined as a disorder of metabolism of which the most obvious component is a diminished ability to utilize carbohydrate, manifesting itself as hyperglycaemia, glucosuria, tendency to ketosis and typical complications. (Ghalioungui and Ghareeb, 1978).

According to Porte and Halter (1974), diabetes has five main components consisting of:

- 1) Biochemical changes, especially with regard to the carbohydrate, lipid, protein and nucleotid metabolism.
- 2) Deficient insulin action.

- 3) Increased glucagon action.
- 4) Microscopic and macroscopic alteration in various organs of the body consisting especially of a characteristic microangiopathy, precocious atherosclerosis and pancreatic islet disorder.
- 5) Clinical manifestations due to altered hydration & Osmolarity, micro-angiopathies & atherosclerosis.

Diabetes mellitus is not a disease entity, but multiple diseases affecting different organs with one common basic pathology, viz: laying down of PAS positive material in the basement membranes leading to their thickening or which is commonly called microangiopathies.

It is characterized by hyper glycaemia and glucosuria, based on a disturbance in carbohydrate, fat, protein and mineral metabolism and mainly due to lack of effective available insulin.

Typical vascular and neuropathic manifestations of diabetes may occur in patients with genetic predisposition to diabetes with mild carbohydrate intolerance and normal fasting blood glucose levels.

Furthermore, there are tremendous differences among diabetic patients with respect to the extent of development of the various disorders, the time and the presentation of their manifestations.

- Recent Classification of
Diabetes mellitus.

When diabetes is inherited, it is called essential or idiopathic, while secondary diabetes is related to some other diseases or precipitated by drugs. Some patients with secondary diabetes have a hereditary predisposition to develop diabetes, i.e. are prediabetics. Hereditary idiopathic diabetes is classified into insulin dependent diabetes mellitus (IDDM) and non insulin dependent diabetes mellitus (NIDDM), (Porte and Halter, 1981).

A summary of the differences in the most common two types is given in tables I, II, III and IV.

Table (I) Showing classification of Diabetes mellitus
According to Williams 1981.

1. Juvenile-Onset type diabetes (IDD)	Insulin dependent diabetes mellitus
a. Ketosis-Prone diabetes	
b. Juvenile onset diabetes	
c. Severe diabetes	Type I (I.D.D.M.)
d. Brittle diabetes.	
2. Maturity-Onset type diabetes (M.D.D.)	Non-Insulin dependent diabetes mellitus
a. Adult-onset diabetes.	Type II (NIDDM)
b. Ketosis resistant diabetes.	a. Non obese (NIDDM).
c. Mild diabetes.	b. Obese.
d. Obesity hyperglycaemia.	
e. Stable diabetes.	
3. Maturity-Onset type in youth.	
a. Familial-maturity diabetes.	
b. Maturity-onset diabetes of youth.	
4. Gestational diabetes.	
5. Secondary diabetes	Diabetes mellitus and impaired glucose tolerance associated with other conditions.
6. Congenital insulin resistance with Acanthosis Nigricans.	Diabetes mellitus secondary to congenital insulin receptor deficiency.
7. Acquired insulin resistance with Acanthosis Nigricans.	Diabetes mellitus secondary to insulin receptor antibody.
8. Familial auto-immune Diabetes.	Diabetes mellitus secondary to familial auto-immunity.

Table (II): Showing the clinical characteristics of the two major types of diabetes mellitus, according to Williams (1981).

N.J.H. Diabetes Data Group Terminology	Insulin Dependent Diabetes Mellitus (I.D.D.M)	Non Insulin Dependent Diabetes mellitus (NIDDM)
Alternate clinical terminology	Juvenile onset diabetes Brittle diabetes	- Maturity onset diabetes. - Adult onset diabetes - Stable diabetes.
Age of onset	Usually less than 45 years	Usually over 30 years
Genetics	Less than 10 % of first degree relatives affected	More than 20 % of first degree relatives affected.
Immunity	Increased incidence of autoimmune phenomena	No, increase in autoimmune phenomena.
HLA (on chromosome 6)	Associated with HLAB8, BW-15, Dw-3, and Dw-4	No, HLA association
Body weight	Usually lean	Usually obese
Metabolism	Ketone-prone	Ketone resistant
Treatment	Insulin	Weight loss, may need oral agent or insulin.

Williams, Text book of endocrinology 6th edition p. 758, 1981.

Table (III) Showing criteria and staging for maturity onset type diabetes mellitus.

Terminology employed				
By:				
Pajan (1971)	Prediabetic	Subclinical	Latent	Overt
American Diabetes Association.	Prediabetic	Suspected	Chemical or latent	Overt
British Diabetes association	Potential	Latent	Asymptomatic or subclinical or chemical	Clinical
NIH Diabetes Data group 1979	Potential abnormality of glucose tolerance.	Previous abnormality of glucose tolerance	Impaired glucose tolerance	Diabetes mellitus
Findings:				
Fasting plasma glucose	Normal	Normal	Normal	Abnormal
Glucose tolerance test	Normal	Normal Abnormal in pregnancy & stress	Abnormal	Abnormal (not necessary for diagnosis)
Cortisone glucose tolerance test	Normal	Abnormal	-	-

Williams Text Book of endocrinology 6th edition p. 761 (1981).

Table (IV) Showing Potential abnormality of glucose tolerance.

Individuals at increased risk to develop Insulin dependent diabetes mellitus (IDDM)	Individuals at increased risk to develop NIDDM
1. Individuals who are islet cell. antibody positive.	Monozygotic twin of NID diabetic
2. Monozygotic twin of an IDDM diabetic	Other first degree relatives of a NIDDM diabetic-sibling, parent or offspring.
3. Sibling of an IDDM diabetic a. HLA identical sibling (shares both haplotype) b. Haploidentical sibling (shares one haplotype) c. HLA non identical sibling (shares no, haplotype).	Obese individuals.
4. Offspring of an IDDM diabetic	Mother of a neonate weighting more than 4.5 kgm.
5. -	Members of racial or ethnic groups that have a high prevalence.
National Diabetes Data Group 1979.	

Insulin dependent diabetes (Type I).

The pathologic hallmark of type I (I.D.D.M.) diabetes is the selective destruction of pancreatic islet B-cells. In the early stage the, islets may be infiltrated by mononuclear cells.

This phenomenon "Insulitis" has been found in a substantial proportion of newly diagnosed cases and may be compatible with a recent viral infection or with a cell-mediated immune response causing B-cell destruction. "P. Pozzilli, O. Zuccarini, M. Iavicoli, D. Andreani, M. Sensi and A.G. Cudworth, Diabetes Vol. 32, January (1983) .

In a recent study, they provided evidence that abnormalities of T-cell regulation are detectable in patients with Type I diabetes and none of these abnormalities were detected in patients with type II diabetes, suggesting that hyperglycaemia itself is not responsible for abnormalities in lymphocyte subset in classical Type I diabetic patients. Thus it will be possible in the future to monitor early abnormalities of T-cell function during the initial pathogenesis of Type I diabetes especially in genetically susceptible siblings of Type I diabetics. (P. Pozzilli, O., Zuccarini and A.G. Cudworth, Diabetes, Vol. 32, 1983).