

Gallbladder Disorder in Type 2 Diabetes Mellitus Cases

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ABSTRACT The present paper reports the prevalence of gallbladder disorder in type 2 diabetic patients and their correlation with sex, age, weight and duration of diabetes. 30 type2 diabetic patients and 20 healthy controls underwent real time ultrasonography to study the prevalence of gallbladder disorder. The fasting gallbladder volume and contraction 60 min. after a fatty meal of the diabetic subjects were compared with 30-35 age and sex match volunteers. The age, sex weight, duration of diabetes and control of diabetes were correlated to the prevalence of gallbladder disorder in diabetic patients. 29% percent of the diabetic patients had ultrasonographic evidence of gallstones as compared to 3.7% in healthy subjects. 67.5% of the diabetic patients with gallbladder disorder were females which is more than in males. Mean fasting gallbladder volume increased in diabetic patients (23.5 cm³) as compared to non diabetic healthy subjects (13.8 cm³). Mean fasting gallbladder volume of diabetic patients with gallbladder disorder was found to be larger than healthy persons. Mean percentage of contraction of gallbladder 60 min. after fatty meal was reduced in diabetic patients (48.5%) and also further reduced in the patients with gallbladder disorder (35%). Mean duration of diabetes was longer in diabetic patients with gallbladder disorder. But no significant effect of age, sex and weight was observed. It is concluded that type2 diabetic patients have increased prevalence of gallbladder disorder.

INTRODUCTION

Diabetes mellitus is a group of metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The chronic hyperglycemia of diabetes is associated with long term damage, dysfunction and failure of various organs especially the eyes, kidneys, nerves, heart, gallbladder and blood vessels. Digestive system dysfunction is also an important contributor to morbidity of this disease (Yang et al., 1984).

Diabetic subjects are reported to have a two to three fold increase in the prevalence of cholesterol gallstone. Inadequate emptying of gallbladder and increased fasting gallbladder volume has been reported in various studies (Gitelson et al., 1963). But contradictory results have been reported by some workers who observed no change in gallbladder emptying in diabetic patients as compared to non-diabetics (Keshavarzian et al., 1987). Hypomotility of gallbladder cause gallstone formation in diabetes mellitus and other chronic disorder like obesity, sclerosis and pregnancy (Hahm et al., 1997).

In the present study an effort is made to determine the prevalence of gallbladder disorder like gallstones, cholecystitis in type2 diabetic

patients with the help of ultrasonography. It was correlated with age, sex, weight and duration of diabetes and to compare the gallbladder volume and mobility of diabetics with age, sex and weight matched with healthy or control group.

MATERIALS AND METHODS

The type2 diabetics patients were enrolled on the out-patient clinic and in-patient services of Department of Pathology, Clara Swain Mission Hospital, Bareilly, Uttar Pradesh, India.

Control was healthy persons of age and sex matched cases without any symptoms and sign of gallbladder disorders. Age, sex, weight and duration of diabetes were recorded. Ultrasonography of abdomen was performed after 12 hr. of overnight fast in morning and various parameters like size of gallbladder, presence of stones etc. were made.

Gallbladder volume was calculated by Ellipsoid method (Emesson et al., 1980).

$$V = \frac{\pi}{6} (L * W * H)$$

Where,

L = length of gallbladder

W = Max. width of gallbladder

H = Max. height of gallbladder

Gallbladder motility was observed by measuring gallbladder volume and post meal gallbladder volume after giving fatty meal. The measurements were done 30 min. and 60 min. after fatty meal

Fasting and postprandial blood sugar was estimated by oxidase-peroxidase method and serum cholesterol was measured by autoanalyzer and urine protein was also estimated.

RESULTS

In the present study no significant difference has been observed in the results of mean age, sex and weight of diabetics and controls. Twenty nine percent of diabetic subjects had gallbladder stones whereas in non-diabetic subjects it was found in 3.7%. 67.5% of diabetic with gallbladder disorder were female (Table 1). Mean fasting gallbladder volume in diabetics was found to be 23.5 cm³ while in the control group it was 13.8 cm³. Mean percentage of contraction of gallbladder after fatty meal was reduced in diabetic patients i.e. 48.5% and also further reduced in the patients with gallbladder disorder i.e. 35%. The duration of diabetes was also a measuring factor.

Mean fasting blood sugar in diabetics with gallbladder disorder also increases 150-160 mg/dl as compared to diabetics without gallbladder disorder where it was 120-130 mg/dl but there was no significant relation between gallbladder disorder and cholesterol level (Table2).

Table 1: Mean fasting blood sugar in diabetics/ non-diabetic with and without gallbladder disorder

Cases	Total Subjects	Male	Female
Diabetic cases	30	12	18
Control	20	7	13
Diabetic without GBD	21	6	15
Diabetic with GBD	9	3	6
Non-Diabetic GBD	20	18	2

GBD= Gallbladder Disorder

Table 2: Gallbladder disorder and cholesterol level.

Parameters	Diabetic subjects	Non-Diabetic
Mean fasting gallbladder volume	23.5 cm ³	13.8 cm ³
Mean % contraction of gallbladder 60 min. after fatty meal	48.5%	54.8%

DISCUSSION

Increased prevalence of gallbladder disorder in type2 diabetics has been reported by Chapman *et al* (1998). In a study of 50 diabetic subjects (Raman *et al.*, 2002) was reported 32% prevalence of gallstone while 73.5% in diabetic female. Malik *et al.* (1999) reported 12.7% prevalence of gallstones in 329 type2 diabetic patients of which 71.4% were females.

Females are reported to have prevalence of gallstone till the age of 50 probably due to hormonal influence on bile composition and gallbladder motility. The increased fasting gallbladder volume and reduced contractility in diabetics observed in our study has also been reported by Gitelson *et al.* (1963), Shaw *et al.* (1993) and Gaur *et al.* (2000).

An increased in fasting gallbladder volume in diabetics with autonomic neuropathy was reported by Sharma *et al.* (1995). Longer mean duration of diabetes was observed in diabetics with gallbladder disorder as compared to those without gallbladder disorder. Longer the duration of diabetes more are the chances of developing complications like gallstone formation in gallbladder. Catnach *et al.* (1993) reported that erythromycin produced a dramatic reduction in gallbladder volume in patients with diabetes.

Stone *et al.* (1998) observed that the dose of cholecystokinin octapeptide which causes maximal gallbladder contraction in normal subjects produced submaximal gallbladder contraction in diabetes.

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