

# Assessment of Fasting Blood Sugar Levels in Gallstone Patients: A Prospective Study

Mohd. Mubashir

Associate Professor, Department of General Surgery,  
Era's Lucknow Medical College, Lucknow, Uttar Pradesh, India.

## ABSTRACT

**Background:** Gallstones are hardened deposits of the digestive fluid bile that can form within the gallbladder. Although, in comparison to the western countries, the Asian population has a particular different metabolic profile, there is currently only minimal data regarding the relationship among gall stones patients and their glucose profile. Hence, under the light of above mentioned data, we planned the present study to evaluate the role of fasting blood sugar in gallstone disease patients.

**Materials & Methods:** The present study included assessment of fasting blood glucose in gallstone patients undergoing cholecystectomy. On presentation, detailed history with demographic profile of patient was recorded in the proforma with simultaneous recording of hematological parameters. Serum fasting glucose levels was estimated in all the patients preoperatively and postoperatively. All the results were analysed by SPSS software 17.0. Chi-square test and student t test were used for assessment of level of significance.

**Results:** Out of 50, majority of the patients (24 patients) belonged to the age group of 41 to 60 years. We didn't observe

any significant change in the mean fasting blood sugar (FBS) levels in the patients undergoing cholecystectomy.

**Conclusion:** Gallstones should now be considered as a marker of an underlying metabolic disorder and should be assessed and treated accordingly.

**Key Words:** Fasting, Gallstones, Glucose.

## \*Correspondence to:

**Dr Mohd. Mubashir**

MBBS, MS (Surgery), Associate Professor,  
Department of General Surgery,  
Era's Lucknow Medical College,  
Lucknow, Uttar Pradesh, India.

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## INTRODUCTION

Gallstones (cholelithiasis) are hardened deposits of the digestive fluid bile that can form within the gallbladder. In one study, the relationships between insulin and the incidence of gall stones in a sample of the general population was studied by the authors and from results, they concluded that hyperinsulinaemia may play an important role in the aetiology of gall stones even in individuals without diabetes and with normal serum glucose levels.<sup>1-4</sup> The correlation of cholesterol gall stones and lipid and glucose profile of the patients has been the topic of research in the many of the recent reports. Although, in comparison to the western countries, the Asian population has a particular different metabolic profile, there is currently only minimal data regarding the relationship among gall stones patients and their glucose profile in Asian population.<sup>5-7</sup> Hence, under the light of above mentioned data, we planned the present study to evaluate the role of fasting glucose in gallstone disease patients.

## MATERIALS & METHODS

The present study was conducted in the Department of General Surgery, Era's Lucknow Medical College, Lucknow, Uttar Pradesh

(India) and included assessment of fasting blood glucose in gallstone patients undergoing cholecystectomy. Ethical approval was taken from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. A total of 50 patients were included in the present study.

## Exclusion criteria

- Patients less than 18 years of age
- Patient on lipid lowering agents and patients with renal failure, nephrotic syndrome, pancreatitis, cardiac failure, morbid obesity, hypothyroidism, hemoglobinopathies, hypertensive, diabetic, pregnancy and immune-compromised.

## Methodology

- On presentation, detailed history with demographic profile of patient was recorded in the proforma with simultaneous recording of hematological parameters i.e., complete blood count, Renal function tests, Blood glucose, Serum electrolytes, Lipid profile, Liver function tests and Triple viral markers.

- Radiological investigation i.e., USG abdomen & pelvis, x-ray chest (PA view) were also recorded.
- The operative findings were noted and recorded in the proforma which included number of stones (single or multiple), type and colour of stones (mixed, cholesterol or pigment stone).
- Serum fasting glucose levels was estimated in all the patients both preoperatively and postoperatively. All the values obtained were recorded on excel sheet.

All the results were analysed by SPSS software 17.0. Chi-square test and student t test were used for assessment of level of significance. P-value of less than 0.05 was taken as significant.

**Table 1: Distribution of subjects of patients of the study group according to age**

Age group (years)	Number
<20	1
21- 30	5
31- 40	9
41- 50	15
51- 60	10
> 60	10
<b>Total</b>	<b>50</b>

**Table 2: Comparison of lipid profile in the study group at different time intervals**

Parameter	Pre-operative time		Post-operative Third day time		P- value
	Mean	SD	Mean	SD	
<b>FBS</b>	96.5	11.5	97.1	12.2	0.55

**RESULTS**

A total of 50 patients were included in the present study. Out of 50, majority of the patients (24 patients) belonged to the age group of 41 to 60 years. Out of 50, 30 were females and 20 were males. We didn't observe any significant change in the mean fasting blood sugar (FBS) levels in the patients undergoing cholecystectomy.

**DISCUSSION**

Gallstones represent the most common and costly of all digestive diseases. Studies have shown that the vast majority of patients with gallstones will remain asymptomatic throughout life. The reason a subgroup of individuals will ultimately develop symptoms remains unknown; however, once symptoms arise, the recurrence rate is high and risk of progression to gallstone-related complications is significantly increased.<sup>8-10</sup>

In the present study, we didn't observe any significant change in the mean fasting blood sugar levels in the patients undergoing cholecystectomy (P-value > 0.05). Cortés V et al (2017) assessed the effects of cholecystectomy (XGB) on hepatic fat content (HFC) and insulin resistance (IR) in non-obese, middle aged Hispanic subjects. Twenty-six gallstone patients undergoing elective XGB and 16 control subjects with normal livers and gallbladders at ultrasonography were prospectively followed 24 months for changes in HFC and IR. Serum insulin level increased from 8.1 ± 0.7 to 10.0 ± 1.9 (µU/ml) 24 months after surgery in XGB patients (p < 0.05); no significant changes were detected in control individuals. Serum apoB concentration increased from 61.5 ± 3.4 to 79.0 ± 7.8 (µg/ml) in XGB patients (p < 0.03). Serum apoB levels remained within normal ranges in both periods of the study in control subjects. HFC significantly increased in 2 of the 4 segments 24 months after XGB: right posterior hepatic lobe (from 5.3 ± 0.2% to 6.0 ± 0.2%, p > 0.04) and right anterior hepatic lobe (from 5.8 ± 0.2% to 6.6 ± 0.3%, p < 0.02). The average HFC of the four hepatic segments studied slightly increased from 5.4 ± 0.2 to 5.8 ± 0.3 2 years after XGB (p < 0.03). No significant

changes were found in HFC in the control subjects at the end of the study. Elective XGB increases HFC and serum apoB concentration. These results supported the notion that XGB is a risk factor non-alcoholic fatty liver disease and other IR-associated disease conditions.<sup>11</sup> Batajoo H et al (2013) compared the serum lipid abnormalities in females who have cholelithiasis with controls. A retrospective study of females who underwent cholecystectomy for gallstone disease was carried out. A total of 133 patients were divided into two age groups ≤ 40 and >40 years. In age group ≤ 40 years, there were 72 cases with no controls, whereas, in >40 years, 61 cases were compared with 67 controls. The serum lipid profile were collected and compared according to the age groups. The groups were compared by using Student's t-test, p<0.05 was considered statistically significant. In age group >40 years serum LDL of gallstone patients were statistically significantly raised (P<0.05) (95% CI -22.077; -850) compared with controls and serum total cholesterol and triglycerides were not statistically significantly high (P >0.05). Serum HDL and VLDL were lower in gallstone patients but not statistically significant (P >0.05) compared to control group. The study showed that serum LDL level was statistically significant in females >40 years of age, whereas other parameters were not statistically significantly different.<sup>12</sup>

Alkataan M et al (2010) determined the changes in some lipid profile parameters and glucose level in serum in gall stone patients before, after one week and after one month of cholecystectomy, in order to evaluate the effect of cholecystectomy on the parameters measured. Patients and Methods: Sixty patients (19 males and 41 Females) age range from (22-79) years, with a mean of (43) years were included in this study. All of them underwent cholecystectomy in either of two Hospitals (AL-Zahrawae General Hospital and Ninevah Private Hospital) during a period of six months from 1st October 2004 to 31st March 2005. Blood samples were collected from all subjects in this study. Serum was separated by centrifugation for the measurement of fasting glucose, total cholesterol, triglycerides,

HDL-cholesterol, LDL-cholesterol and atherogenic index. Results: The results of the data analyzed are presented according to the intervals at which the samples were obtained from the patients as follows: 1. Day of cholecystectomy. 2. After 1 week of cholecystectomy. 3. After 1 month of cholecystectomy. Total cholesterol (TC): It is found that there is a significant reduction in TC ( $P < 0.01$ ) in both intervals after cholecystectomy when compared to that before operation.<sup>13</sup> Kono S et al (1988) examined the relationships of gallstones and the postcholecystectomy state with serum total cholesterol, serum triglycerides, glucose tolerance, and obesity in male officials of the Self-Defense Forces. The study population had rather low rates of gallstones (2%) and prior cholecystectomy (3%). A strong relationship between obesity and gallstones was confirmed. Glucose intolerance was associated with the risk of gallstones independent of obesity. No relation between gallstones and either serum total cholesterol or triglycerides after adjustment for obesity and glucose tolerance was evident. However, the serum concentration of total cholesterol among men having had a cholecystectomy was less than that of those without gallstones.<sup>14</sup>

## CONCLUSION

The authors conclude that gallstones should now be considered as a marker of an underlying metabolic disorder and should be assessed and treated accordingly.

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