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Research Article

Assessment of mean serum calcium and lipid profile in patients with gallstone disease

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ABSTRACT

Objective: To assess the serum calcium and lipid profile in patients with gallstone disease in southern Punjab.
Material and methods: This cross sectional was conducted at Department of Surgery, Multan medical and Dental College Multan from January 2017 to June 2017 over the period of 6 months. Total 250 patients of gallstone disease having age range form 20-70 years either male or female were selected and mean calcium and lipid profile was assessed in selected patients.
Results: Mean age of the patients was 42.76 ± 14.362 years, mean serum calcium was 11.62 ± 1.21 mg/dl, mean serum HDL was 40.28 ± 2.97 mg/dl, mean serum LDL was 138.04 ± 9.69 mg/dl, mean serum TC was 203.06 ± 24.08 mg/dl, mean serum TG was 196.66 ± 70.089 mg/dl. Out of 250 patients of gall stone disease, 48 (19%) were male and 202(81%) patients were female. Total 99 (40%) patients were diabetics and 151 (60%) patients were non-diabetics. Total 126 (50%) patients were belonged to age group 20-45 years and 124 (50%) patients belonged to age group 46-70 years.
Conclusion: Findings of present study showed that female are more victim of gallstone disease as compare to male. It is also concluded that increased serum calcium and serum lipid have a role in the pathogenesis of different types of human gallstones in this area.

Key Words: Serum calcium, lipid profile, Gallstone patients, Cholelithiasis

INTRODUCTION:

Gallbladder stones are common in the Western world with an incidence of 1.4 per 100 person-years.[1] Gallstones are classified by their cholesterol content as either cholesterol or pigment stones, and most stones are made of mixed contents, while pure stones are rare.[2] The stones with cholesterol concentrations higher than 50% are considered to be cholesterol stones, and 70% to 80% of gallstones are cholesterol stones.[3-5] Cholesterol is a lipid. Its major synthesis site is the liver, and its only excretion site is the biliary system.[2]The pathogenesis of cholesterol gallstones

is multifactorial and complex. The known factors associated with cholesterol gallstones include cholesterol hypersecretion and supersaturation, bile salt and phospholipid concentrations, crystal nucleation, gallbladder dysmotility and gallbladder absorption and secretion functions.[6-7] Low-density lipoproteins (LDLs) and high-density lipoproteins (HDLs) are plasma lipids, and their main function is to transport cholesterol. LDL transports cholesterol from the liver to the peripheral tissues, and HDL transports cholesterol from the peripheral tissues to the liver.[2]

The results of this studymay help us to set a primary data in our targeted population to explore the possible role of impaired serum calcium and lipid profile in gall stone formation so that we can establish the preventive strategies in patients of altered serum parameters(serum Calcium and lipid profile)

MATERIAL AND METHODS:

This cross sectional was conducted at Department of Surgery, Multan medical and Dental College Multan from January 2017 to June 2017 over the period of 6 months.

Inclusion Criteria:

- All the patients with gallstone (as per operational definition).
- Patients who give informed consent.
- Both male and female patients.
- Age range from 20-70 years.
- Patients with or without diabetes mellitus.(on fasting plasma glucose level ≥126mg/dl,history)
- Obese and non-obesepatients.
- Incidentally gall stone detected on imaging perform for other symptoms

Exclusion Criteria:

- Non consenting patients.
- Patients with acalculus gallbladder disease on ultrasound.
- Terminal ileal resection and disease e.g.Crohn's disease. (On history and medical record.)
- Foreign body CBD such as stents (history and medical record).
- Haemolysis (hereditary spherocytosis, sickle cell anemia on history and CBC film)
- Liver cirrhosis (on Abdominal Ultrasound)
- Renal failure (RFT).
- Patient on antihyperlipidemic drugs. (history)

DATA COLLECTION PROCEDURE

Total 250 patients were included in this study after scrutinized by inclusion criteria and after taking written consent from ethical committee of hospital. Written informed consent was taken from every patient.

After an overnight fasting, 5 ml venous blood sample was taken from patients. Sample was sent to laboratory for serum calcium and lipid profile analysis. All the data with Demographic profile was record in pre- designed profroma.

DATA ANALYSIS PROCEDURE:

The data was approached through SPSS V16 for statistical analysis. Quantitative variable like age, serum calcium, serum Total Cholesterol, serum LDL, serum HDL, serum Triglycerides, weight, height and BMI was presented as mean ± SD, while qualitative variable like gender Diabetes and obesity was presented in frequency and percentages. Stratification was done for age, gender, diabetes and obesity. Post stratification t-test was applied to see the level of significance. P-values $\leq$ 0.05 was considered statistically significant. The other effect modifiers were controlled through exclusion criteria

RESULTS:

Total 250 patients with gallstone were selected in this study and mean serum calcium and lipid profile was assessed. Mean age of the patients was 42.76 ± 14.362 years, mean serum calcium was 11.62 ± 1.21 mg/dl, mean serum HDL was 40.28 ± 2.97 mg/dl, mean serum LDL was 138.04 ± 9.69 mg/dl, mean serum TC was 203.06 ± 24.08 mg/dl, mean serum TG was 196.66 ± 70.089 mg/dl. (Table 1). Out of 250 patients of gall stone disease, 48 (19%) were male and 202(81%)

patients were female. (Fig. 1) Total 99 (40%) patients were diabetics and 151 (60%) patients were non-diabetics. (Fig. 2) Total 126 (50%) patients were belonged to age group 20-45 years and 124 (50%) patients belonged to age group 46-70 years. (Fig. 3)

Stratification for was done and two age groups were made, age group 20-45 years and age group 46-70 years. Age group 20-45 years consisted on 182 patients and age group 46-70 years were consisted on 198 patients. Mean serum calcium, HDL, LDL, TC and TG of patients of age group 20-45 years was 11.48 ± 1.12 mg/dl, 40.35 ± 2.69 mg/dl, 137.97 ± 9.16 mg/dl, 198.90 ± 23.05 mg/dl, 185.73 ± 53.63 mg/dl and mean serum calcium, HDL, LDL, TC and TG of patients of age group 46-70 years was 11.49 ± 1.11 mg/dl, 40.20 ± 3.23 mg/dl, 138.26 ± 9.97 mg/dl, 198.90 ± 23.05 mg/dl, 207.77 ± 82.30 mg/dl. T test was applied to compare the mean serum calcium levels between the two age groups. Statistically significant (P=0.030, 0.026) difference for mean TC and mean TG between the both age groups were detected and insignificant (P=0.319, 0.373, 0.558) difference for mean serum calcium, HDL, LDL between the both groups were detected. (Table 2)

Gender distribution of gall stone patients was done and mean serum calcium, HDL, LDL, TC and TG was compared between male and female patients. Mean serum calcium, HDL, LDL, TC and TG of male patients was 11.57 ± 1.27 mg/dl, 40.52 ± 3.10 mg/dl, 138.83 ± 9.11 mg/dl, 200.02 ± 20.86 mg/dl, 178.19 ± 35.53 mg/dl and mean serum calcium, HDL, LDL, TC and TG of female was 11.62 ± 1.19 mg/dl, 40.22 ± 2.94 mg/dl, 137.85 ± 9.84 mg/dl, 203.78 ± 24.77 mg/dl, 201.05 ± 75.42 mg/dl. Insignificant (P=0.873, 0.301, 0.778, 0.426, 0.071) difference for mean serum calcium, HDL, LDL, TC and TG between the male and female patients were detected. (Table 3)

In our study mean serum calcium, HDL, LDL, TC and TG of diabetics was 11.49 ± 1.14 mg/dl, 40.15 ± 3.12 mg/dl, 138.74 ± 10.40 mg/dl, 207.60 ± 24.75 mg/dl, 209.42 ± 86.46 mg/dl and mean serum calcium, HDL, LDL, TC and TG of non-diabetics was 11.70 ± 1.24 mg/dl, 40.36 ± 2.86 mg/dl, 137.58 ± 9.20 mg/dl, 200.09 ± 23.23 mg/dl, 188.30 ± 55.60 mg/dl. Insignificant (P=0.407, 0.852, 0.260, 0.310, 0.200) difference for mean serum calcium, HDL, LDL, TC and TG between the diabetic and non-diabetic patients were detected. (Table 4)

Table 1: Mean and standard deviation for calcium and lipid profile

Variable								
Mean & SD	**Age Years**	**Calcium mg/dl**	**HDL mg/dl**	**LDL mg/dl**	**TC mg/dl**	**TG mg/dl**	**Weight kg**	**Height Inches**
Mean	42.76	11.62	40.28	138.04	203.06	196.66	54.01	63.54
SD	14.362	1.21	2.97	9.69	24.08	70.089	12.69	4.25

Fig. 1: Gender distribution

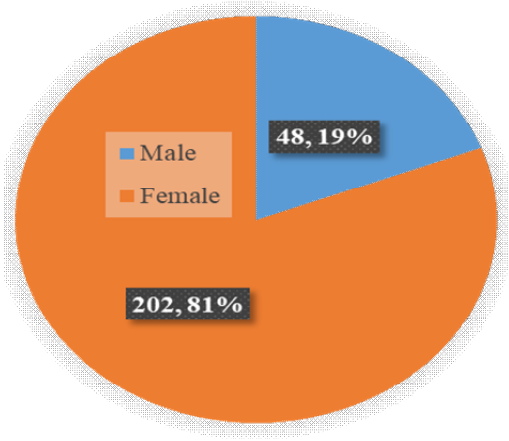

Fig. 2: Frequencies for diabetes mellitus

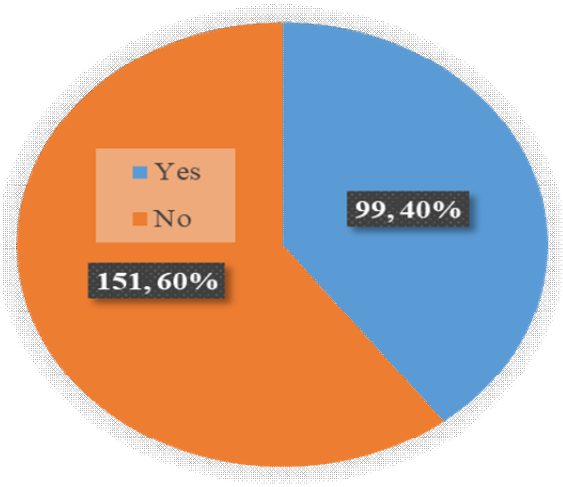

Fig. 3: Age distribution

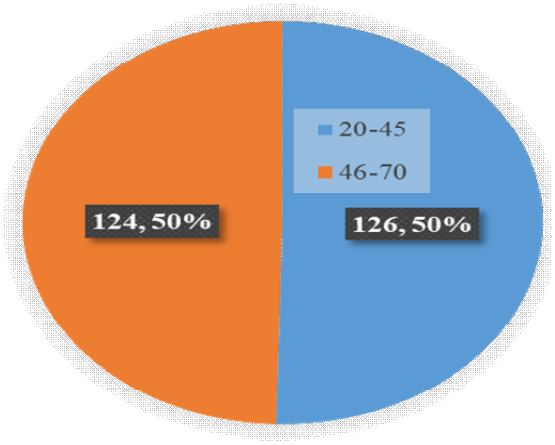

Table 2: Comparison of mean serum calcium levels and mean lipids in different age groups

Age Group	**Calcium mg/dl** P=0.319	**HDL mg/dl** P=0.373	**LDL mg/dl** P=0.558	**TC mg/dl** P=0.030	**TG mg/dl** P=0.026
	Mean ± SD	**Mean** ± SD	**Mean** ± SD	**Mean**± SD	**Mean** ± SD
20-45	11.48 ± 1.12	40.35 ± 2.69	137.97 ± 9.16	198.90 ± 23.05	185.73 ± 53.63
46-70	11.49 ± 1.11	40.20 ± 3.23	138.26± 9.97	207.29 ± 24.45	207.77 ± 82.30

Table 3: Comparison of mean serum calcium levels between male and female

Gender	**Calcium mg/dl**	**HDL mg/dl**	**LDL mg/dl**	**TC mg/dl**	**TG mg/dl**
	Mean± SD P=0.873	**Mean** ± SD P=0.301	**Mean** ± SD P=0.778	**Mean** ± SD P=0.426	**Mean** ± SD P=0.071
Male	11.57 ± 1.27	40.52 ± 3.10	138.83 ± 9.11	200.02 ± 20.86	178.19 ± 35.53
Female	11.62 ± 1.19	40.22 ± 2.94	137.85 ± 9.84	203.78 ± 24.77	201.05 ± 75.42

Table 4: Comparison of mean serum calcium levels between diabetics and non-diabetics

Diabetes	**Calcium mg/dl**	**HDL mg/dl**	**LDL mg/dl**	**TC mg/dl**	**TG mg/dl**
	Mean ± SD P=0.407	**Mean** ± SD P=0.852	**Mean** ± SD P=0.260	**Mean** ± SD P=0.310	**Mean** ± SD P=0.200
Diabetic	11.49 ± 1.14	40.15 ± 3.12	138.74 ± 10.40	207.60 ± 24.75	209.42 ± 86.46
Non-diabetic	11.70 ± 1.24	40.36 ± 2.86	137.58 ± 9.20	200.09 ± 23.23	188.30 ± 55.60

DISCUSSION:

Gall stone disease is one of the most common and most expensive conditions to treat of all digestive disorders requiring admission to hospital.[13]Of all gallstones found during cholecystectomy, cholesterol gallstones account for 80-90%.[9] Cholesterol gallstones are primarily made up of cholesterol crystals (70%) which are held together in an organic matrix of glycoproteins, calcium salts, and bile pigments. They could be present either singly or multiply, in various sizes, shapes and surfaces.[10]

Mean age of the patients was 42.76 ± 14.362 years, mean serum calcium was 11.62 ± 1.21 mg/dl, mean serum HDL was 40.28 ± 2.97 mg/dl, mean serum LDL was 138.04 ± 9.69 mg/dl, mean serum TC was 203.06 ± 24.08 mg/dl, mean serum TG was 196.66 ± 70.089 mg/dl. Out of 250 patients of gall stone disease, 48 (19%) were male and 202(81%) patients were female. Total 99 (40%) patients were diabetics and 151 (60%) patients were non-diabetics. Total 126 (50%) patients were belonged to age group 20-45 years and 124 (50%) patients belonged to age group 46-70 years.

Nayal et al.,[11] reported mean age of patients with gallstone as 48.6 ± 11.5 years which is comparable with our study.

In one study by Nagaraj et al,[12] mean serum Triglycerides (mg/dl), Total cholesterol (mg/dl), HDL cholesterol (mg/dl), LDL cholesterol (mg/dl) was 144.19±12.70, 175.83±12.68, 30.95±4.42, 115.76±12.01 respectively in patients of gallstone. These findings are in agreement with the findings of present study.

Devaki et al,[13] assessed lipid profile in cases of gallstone and found mean serum Total cholesterol (mg/dl) and HDL cholesterol (mg/dl), LDL as 224.3 ± 42.4, 139.3 ± 23.8 respectively. Findings of this study are in agreement with our findings.

In a study by AL-Kataan MA-G [14] on patients with gallstone, mean and standard deviation for total cholesterol, HDL, LDL and TG was 6.388 ± 0.98 (mmol/L),0.91 ± 0.15 (mmol/L), 4.66 ± 1.07 (mmol/L) and 1.94 ± 0.58 respectively. In a study by Méndez-Sánchez[15]total cholesterol, HDL, LDL and TG was 5.3 ± 1.2 (mmol/L), 1.0 ± 0.3 (mmol/L), 3.3 ± 0.9 (mmol/L) and 1.9 ± 0.9respectively.

In present study mean serum calcium was 11.55 ± 1.18 mg/dl. In one study by Channa et al[16] serum calcium level was measured and mean serum calcium level was found in patients of gallstone as 13.1 ± 4.63 (mg/dl).In another study by Kumari et al[17] mean serum calcium levels was 2.10 ± 0.38 (mmol/L). Findings of these studies also in agreement with my study.

CONCLUSION:

Findings of present study showed that female are more victim of gallstone disease as compare to male. It is also concluded that increased serum calcium and serum lipid have a role in the pathogenesis of different types of human gallstones in this area.

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