

# A Study on Correlation of Gall Stones and Lipid Profile among Patients with Gall Stones in Tertiary Care Hospital

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## Abstract

**Background:** Cholelithiasis is the presence of one or more calculi (gallstones) in the gallbladder. In developed countries, about 10% of adults have gall stones. The precipitation of calcium carbonate and phosphate is influenced by local gallbladder factors.

**Objective:** To establish a relationship between serum lipid levels and type of gallstones.

**Methodology:** The present prospective study was carried out at Department of Surgery of tertiary care centre during November 2021 to October 2022. A total of 100 patients diagnosed as having cholelithiasis and undergoing open or laparoscopic cholecystectomy surgery were included after obtaining informed written consent of patients. Data was summarized in percentages and proportions.

**Results:** The patients ranged from 18 to 82 years and mean age among the distribution of cases was  $44.16 \pm 18.12$  years. Out of 100 cases, females (76%) were the most affected when compared to males (24%). Serum triglyceride levels were more among cholesterol stones with statistically significant.

**Conclusion:** There was a positive correlation between Serum triglyceride levels and type of gallstones.

**Keywords:** Correlation, Gall Stones, Lipid Profile.

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## Introduction

Cholelithiasis is the presence of one or more calculi (gallstones) in the gallbladder. In developed countries, about 10% of adults have gall stones [1]. Gall stones disease (GD) is a very common gastro-intestinal disorder which is present commonly in the western world. Studies from northern India have looked into the dietary factors which predispose to cholesterol gall stones [2]. The major elements which are involved in the formation of gall stones are cholesterol, bile pigments, calcium, hepatic bile composition, biliary glycoprotein, infection, age, sex, genetics, oestrogen,

dietary factors, geographical prevalence [3].

The precipitation of calcium carbonate and phosphate is influenced by local gallbladder factors. Brown pigment stones are formed in bile infected with enteric bacteria that elaborate hydrolytic enzymes: beta-glucuronidase, phospholipase A, and conjugated bile acid hydrolase. The resulting anions of bilirubin and fatty acids form insoluble calcium salts. The presence of 40% bilirubin monoconjugates in mouse gallstones indicated the importance of this

moiety in the pathogenesis of black stones. [4]

Therefore, the present study was conducted to establish a relationship between serum lipid levels and serum calcium levels based on the type of gallstones.

### Objectives:

- To establish a relationship between serum lipid levels and type of gallstones.

### Methodology

The present prospective study was carried out at Department of Surgery of tertiary care centre during November 2021 to

October 2022. A total of 100 patients diagnosed as having cholelithiasis and undergoing open or laparoscopic cholecystectomy surgery were included after obtaining informed written consent of patients. Their pre-operative values of serum lipid levels, bilirubin and serum calcium levels was recorded. Post operatively the stones was divided based on the colour of stones. And the values were compared accordingly. The study was conducted after obtaining clearance from the Ethical Committee of the institute. Data was summarized in percentages and proportions.

### Results

**Table 1: Demographic variables among patients:**

Variables		No. of Patients (n=100)	Percentage
Age group (years)	<20	01	01.00
	21-30	19	19.00
	31-40	36	36.00
	41-50	21	21.00
	51-60	14	14.00
	>60	09	09.00
Gender	Male	24	24.00
	Female	76	76.00

Among 100 patients, majority were in age group 31-40 years (36%) with mean age of 44.16 ±18.12 years with female dominance. (76%) (Table 1)

**Table 2: Distribution of patients according to clinical presentation:**

Clinical Presentation	Frequency (n=100)	Percentage
Pain	62	62.00
Dyspepsia	46	46.00
Nausea/ Vomiting	32	32.00
Fever	18	18.00

(\* Multiple response present)

The maximum numbers of cases presented with pain (62%), followed by dyspepsia (46%), nausea and vomiting (32%) and fever. (18%) (Table 2)

**Table 3: Distribution of patients according to type of gall stones:**

Type of gall stones	Frequency (n=100)	Percentage
Cholesterol stones	24	24.00
Pigment stones	30	30.00
Mixed	46	46.00
Total	100	100

The maximum numbers of cases had mixed gall stones (46%), followed by Pigment stones (30%) and Cholesterol stones. (24%) (Table 3)

**Table 4: Relation of type of stones and lipid profile:**

Lipid profile	Type of gall stones (Mean $\pm$ SD)			P value
	Cholesterol stones	Mixed	Pigment stones	
Total Cholesterol (mg%)	211.28 $\pm$ 30.11	184.13 $\pm$ 25.24	182.21 $\pm$ 21.18	0.03 (S)
HDL (mg%)	35.95 $\pm$ 9.10	42.28 $\pm$ 9.29	43.41 $\pm$ 10.12	0.02 (S)
LDL (mg%)	143.1 $\pm$ 21.48	123.12 $\pm$ 23.45	121.09 $\pm$ 21.58	0.004 (S)
VLDL (mg%)	34.26 $\pm$ 5.72	30.18 $\pm$ 5.99	32.11 $\pm$ 6.78	0.19 (NS)
Triglycerides	153.26 $\pm$ 21.98	106.95 $\pm$ 26.95	104.25 $\pm$ 21.98	0.02 (S)

The mean total cholesterol levels were highest in Cholesterol stones (211.28  $\pm$  30.11 mg%) compared to Mixed stones (184.13  $\pm$  25.24 mg%) and pigment stones (182.21  $\pm$  21.18 mg%) with statistically significant difference. (P<0.05)

Similarly, mean triglycerides and LDL levels were highest in Cholesterol stones compared to Mixed stones and pigment stones with statistically significant difference. (P<0.05) HDL levels were lower in Cholesterol stones compared to Mixed stones and pigment stones with statistically significant difference.

### Discussion

The present observational cross-sectional study carried out to study serum lipid profile level in patients with cholelithiasis at tertiary teaching hospital. In the present study, the maximum numbers of cases were in the age group of 31-40 years (36%), followed by in 41-50 years (21%). The patients ranged from 18 to 82 years and mean age among the distribution of cases was 44.16  $\pm$ 18.12 years. Sidduraj C Sajjan et al [5] observed the mean age of patients was 41.89 years. Similarly Sumbal Amjad et al [6] found mean age of patient was 45.5 $\pm$ 6.48 years.

The sex distribution among patients shows, out of 100 cases females (76%) were the most affected when compared to males (24%). Sidduraj C Sajjan et al [5] observed among 200 cases, 60 were males and 140 were females. Battacharya [7] series showed 71.4% were female, 28.6% were male. The reason for the high incidence among females could be that pregnancy and

child birth have a definitive influence on biliary tract disease, acting by cholestasis as well as weight gain and consequent hypercholesterolemia. Multiple reasons have been evaluated in the identification of gender difference as a cause for gall stone disease. Role of estrogens in formation of gall stones has been experimentally proved. Progesterone too appears to promote production of saturated bile by causing smooth muscle relaxation and impaired gall bladder emptying. [7]

In the present study, clinical presentation distribution among patients showed that maximum numbers of cases presented with pain (62%), followed by dyspepsia (46%), nausea and vomiting (32%) H N Joshi et al [8] in a study observed among a total of 202 individuals with gallstone, pain abdomen was one of the commonest symptoms (97.84%) followed by Nausea (28.11%), Dyspepsia (28.11%), Vomiting (18.38%), Fever (1.62) and Jaundice (1.08%). Sumbal Amjad et al <sup>6</sup> in a study on clinical profile of patients with cholelithiasis out of 200 patients, 106 patients (53.00%) had a chief complaint of pain 16 patients presented with nausea along with pain abdomen and 78 patients presented with vomiting, whereas 94 patients presented with both. Jaundice was seen in 33 patients.

In the study, mean total cholesterol levels, mean triglycerides and LDL levels were highest in Cholesterol stones compared to Mixed stones and pigment stones with statistically significant difference. (P<0.05) HDL levels were lower in Cholesterol stones compared to Mixed stones and

pigment stones with statistically significant difference.

A high serum LDL level was described as a marker for increased risk of cholesterol gallstone disease by Fu et al. [9] Similarly, Han et al. [10] and Fu et al. [11] revealed a positive correlation between a high serum LDL level and cholesterol gallstone development, and Halldestam et al. [12] demonstrated a relationship between a high serum LDL level and gallstone disease. The results of our study support these results; we observed positive correlations between a high serum LDL level and a high cholesterol stone rate and a high stone cholesterol concentration. In contrast, Andreotti et al. [13] and Tang [14] reported an inverse correlation between the serum LDL level and gallstones risk. [15]

### Conclusion

The present study concludes that females are more victim of gallstone disease as compare to male. It is also concluded that serum triglyceride levels and serum HDL levels were statistically significant in gallstones patients and there was a positive correlation between these parameters and type of gallstones.

### References

1. Sandler RS, Everhart JE, Donowitz M, Adams E, Cronin K, Goodman C et al. The burden of selected digestive diseases in the United States. *Gastroenterology* 2002; 122: 1500-11.
2. Aerts R, Penninckx F. The burden of gall stone disease in Europe. *Aliment Pharmacol Ther* 2003; 18 Suppl 3: 49-53.
3. Gokulakrishnan S, Murugesan R, Mathew S, Prasanthi R, Ashok AC, Ramesh H, et al. Predicting the composition of gall stones by infrared spectroscopy. *Trop Gastroenterol* 2001; 22: 87-9.
4. Thijs C, Knipschild P, Brombacher P. Serum lipids and gall stones: a case-controlled study. *Gastroenterology* 2001; 99:843-49.
5. Sajjan SC, Javali S, Madhusudhan BV, Ramya B. Clinical profile of patients with cholelithiasis at a tertiary care hospital. *International Journal of Surgery*. 2021;5(2):244-6.
6. Sumbal Amjad, Yusra Bukhari and Mamoona Kausar. Clinical profile of patients with cholelithiasis at a tertiary care unit in Multan. *World Journal of Pharmaceutical and Medical Research*. 2019;5(4): 156-158.
7. Battacharya R. Cholecystectomy in west port, New zealand". *Indian journal of surgery*, August. 1983; 450-455.
8. Joshi HN, Singh AK, Shrestha D, Shrestha I, Karmacharya RM. Clinical Profile of Patients Presenting with Gallstone Disease in University Hospital of Nepal. *Kathmandu Univ Med J (KUMJ)*. 2020 Jul-Sept.;18 (71):256-259.
9. Fu X, Gong K, Shao X. The relationship between serum lipids, apolipoproteins level and bile lipids level, chemical type of stone. *Zhonghua Yi Xue Za Zhi*. 1995;75(11):656-659.
10. Han TQ, Jiang ZY, Suo GJ, Zhang SD. Apolipoprotein B-100 gene Xba I polymorphism and cholesterol gallstone disease. *Clin Genet*. 2000; 57 (4):304-308.
11. Fu X, Gong K, Shen T, Shao X, Li G, Wang L, et al. Gallstones and their chemical types in relation to serum lipids and apolipoprotein levels. *China Med J*. 1997;110(5):384-387.
12. Halldestam I, Kullman E, Borch K. Incidence of and potential risk factors for gallstone disease in a general population sample. *Br J Surg*. 2009;96 (11):1315-1322.
13. Andreotti G, Chen J, Gao YT, Rashid A, Chang SC, Shen MC, et al. Serum lipid levels and the risk of biliary stones: A population-based study in China. *Int J Cancer*. 2008;122(10):23 22-2329.
14. Stuart GS, Tang JH, Heartwell SF, Westhoff CL. A high cholecystectomy rate in a cohort of Mexican American

- women who are postpartum at the time of oral contraceptive pill initiation. *Contraception* 2007; 76: 357-359.
15. Fedidat, Raphael, Ariel A. Benson, Harold Jacob, & Eran Israeli. Gastrointestinal bleeding on anticoagulant therapy: Comparison of patients receiving vitamin K antagonists and non-vitamin K oral antagonists. *Journal of Medical Research and Health Sciences*, 2022; 6(2): 2398–2413.