ORIGINAL RESEARCH

Serum Lipid Profile in Patients with Gall Stone Disease – Analysis in a Tertiary Care Hospital in Himachal Pradesh

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Abstract
Introduction: Gall Stone Disease shows aprevalence of 10-15% with 1.4% incidence every year in developed nations. Gall bladder illness results in a expenditure of 6.2 billion US dollars, which has risen by 20% in last 30 years and has built up a considerable health burden. Various risk factors for formation of gall stones have been postulated such as dietary habits, gender, obesity, age, multiparity and decreased physical activity.
Methods: The present study was conducted on 50 patients with gall stones disease admitted in the Department of Surgery during period of 2020-2022 at MMMC & H Kumarhatti, Solan, H.P. Gall stones assessed by clinical and ultrasonographic examination of abdomen and confirmed on gross operative findings. Fasting 10 ml peripheral venous blood was collected from each patient and was processed for Serum Lipid Profile.
Results: In our study,Total 50 patients with Gall stones were recruited. The Mean age was 49.48±12.78 years. 70% were females and 30 % were males.The mean BMI was 25.25±2.79 kg/m2. 50% of the study population had BMI in the healthier range while 44% had BMI in overweight category and only 6% patients with gall bladder stones were obese.
The mean Total cholesterol was 207.98±54.11mg/dl, TG was 156.02±40.09mg/dl, HDL was 35.70±9.96 mg/dl, LDL was 141.08±49.05mg/dl while VLDL was 31.20±8.0209mg/dl
Conclusion: Present study showed that Mean Age is 49.48 ± 12.78 years.
Females are more affected with Gall Stones than Males. Patients with raised Total Cholesterol, Triglycerides, LDL, VLDL had higher BMI(Overweight and Obese category), HDL was below normal with higher BMI.
Keywords: Lipid Profile, Gall Stone Disease, BMI

Introduction
The oldest incidence of human gall bladder stones come across in the Egyptian mummies that date back to 1000 BC .[1]Cholelithiasis shows a prevalence of 10-15% with 1.4% incidence every year in developed nations.[2] Gall stone disease is responsible for roughly 18 Lakh visits to hospital facilities in a year. Gall bladder illness results in a expenditure of 6.2 billion US dollars, which has risen by 20% in last 30 years and has built up a considerable health

burden.[3] In India, specifically northern states occurrence found is nearly 7.4% affecting adult population.[4]

On basis of composition, Gall stones are divided into cholesterol or mixed or pigment stones. Pure cholesterol stones are found less and mostly stones are of mixed type. Gall Stones having more than 50% constituent as cholesterol are termed as cholesterol stones.[5] Various risk factors for formation of gall stones have been postulated such as dietary habits, gender, obesity, age, multiparity and decreased physical activity.[6] It has been observed that gall stone patients belonging to both genders had raised mean serum TGs and serum cholesterol and LDL were on lower side.[7]

The term Hyperlipidemia means elevation of total

cholesterol, TG's, LDL, and reduced HDL. Increased TG and decreased HDL are mostly associated with prevalence of gallstones. However, relationship between total cholesterol and LDL with gallstones are not found much.[8,9]

Altered ratios of bile acids, cholesterol, phospholipids leads to production of lithogenic bile along with decrease in motility of gall bladder and lag in large gut transit time leads to reabsorption of deoxycholic acid which further boost gallstone production .Localised factors withinin the gallbladder also have a role.[10]There is lack of evidence regarding relation of cholelithiasis and lipid profile. In this study the association of serum lipids to cholelithiasis has been tried to elucidate.

Materials and Methods

The present study was conducted on 50 patients with gall stones disease admitted in the Department of Surgery at MMMC&H Kumarhatti, Solan, H.P. Gall stones assessed by clinical and ultrasonographic examination of abdomen and confirmed on gross operative findings.

 Fasting 10 ml peripheral venous blood was collected from each patient and was processed for Serum Lipid Profile . The study was approved by Institutional ethics committee. Informed consent was taken from all the patients.

Inclusion criteria was patients with Gall stones.

Exclusion Criteria :All patients having conditions which cause derangement of lipid profile for e.g.Diabetes mellitus, Renal failure,Hypothyroidism/Hyperthyroidism etc.

Statistical Analysis

All the analysis were done using SPSS software for Windows (Version 26.0 IBM Corp. ARMONK, NY, USA) . Data was recorded on Microsoft Excel 2013.

Mean and standard deviations were calculated for quantifiable variables and were compared using T-test & ANOVA. Chi square and Fisher's exact test was also be applied for qualitative variables.

Results

The mean age of patients observed in the present study was 49.48 ± 12.78 years.

3(6%) patients were present in ≤ 30 years, 13 (26%) patients in 31-40 years, 11(22%) in 41-50 age group, 11(22%) in 51-60 years and 12(24%) patients were present in > 60 years age group.

35(70%) patients were females while 15(30%) were males.

31(62%) patients were Vegetarian and 19 (38%) were Non-vegetarians.

The mean BMI was 25.25 ± 2.79 kg/m2.

25(50%) of the study population had BMI in the healthier range while 22(44%) had BMI in overweight category and only 3 (6%) patients were obese.

The Mean Total Cholesterol was 207.98 ±54.11 mg/dl, TG was 156.02 ±40.09mg/dl, HDL was 35.70 ±9.96 mg/dl, LDL was 141.08 ±49.05mg/dl and VLDL was 31.20 ±8.0209mg/dl. 22(44%) patients had Total Cholesterol above normal range. HDL was below normal in 19(38%) while LDL was above normal in 14(28%) patients.

TG was above normal in 22(44%) and VLDL was above normal in 18(36%) patients.

On Comparing BMI with Lipid Profile ,

BMI was associated with Lipid profile. Patients with raised Total Cholesterol, Triglycerides, LDL, VLDL had higher BMI, HDL was below normal with higher BMI.

Table 1

BMI (kg/m^2)	No. of Patients	Percentage (%)
Healthy (18.5-24.9)	25	50
Overweight(25-29.9)	22	44
Obese (>30)	3	6
Total	50	100

Distribution of study population according to BMI

25(50%) of the study population had BMI in the healthier range and 25(50%) had higher BMI i.e 22(44%) in overweight category and 3 (6%) patients were obese.

The mean BMI was 25.25±2.79 kg/m2.

Table 2

Lipid Profile (in mg/dl)		No. of Patients (n=50)	Percentage (%)
Total Cholesterol	Below normal(<120)	1	2
	Normal(120-200)	27	54
	Above normal(>200)	22	44
HDL	Below Normal (<30)	19	38
	normal(30-70)	31	62
LDL	Below normal(<95)	7	14
	Normal(95-190)	29	58
	Above normal(>190)	14	28
TG	Normal(40-165)	28	56
	Above normal(>165)	22	44
VLDL	Normal(5-35)	32	64
	Above normal(>35)	18	36

Distribution of Patients according to Lipid Profile

22(44%) patients had Total Cholesterol above normal range. HDL was below normal in 19(38%) while LDL was above normal in 14(28%) patients. TG was above normal in 22(44%) and VLDL was above normal in 18(36%) patients.

The Mean Total Cholesterol was 207.98 ±54.11 mg/dl, TG was 156.02 ±40.09mg/dl, HDL was 35.70 ±9.96 mg/dl, LDL was 141.08 ±49.05mg/dl and VLDL was 31.20 ±8.0209mg/dl.

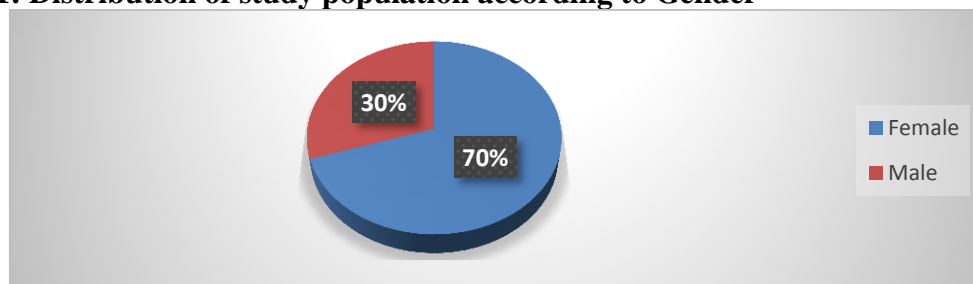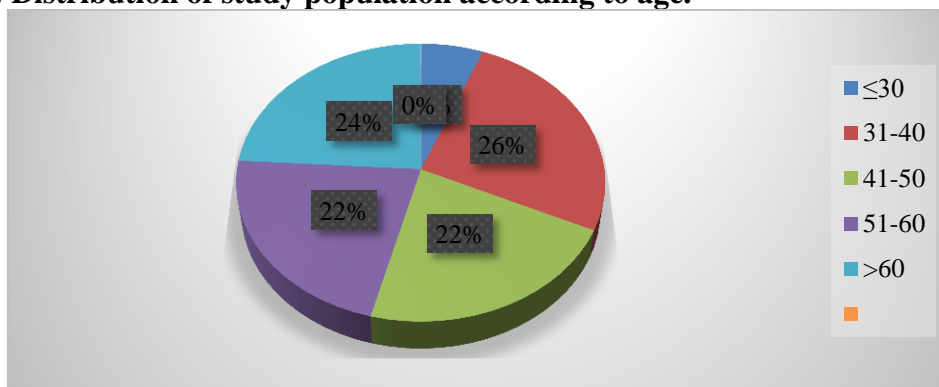**Figure 1: Distribution of study population according to Gender**

Figure 2: Distribution of study population according to age.

Discussion

The mean age of patients observed in the present study was 49.48 ± 12.78 years. The result of the present study were in accordance with Patel et al[11] who observed the mean age to be 47.11±19.1 years.

Based on Gender, 70% of the patients were females and 30% were males.

Females predominated than male with male: female ratio being 0.42:1.

According to the study conducted by Patel et al, Out of total 72 cases ,40 (55%) cases were female, with the remaining 32(44%) being male. [11]

Hangolkar et al[12] also reported females predominance with 85% of the study population.

Reason why females are more affected could be attributed to the fact that maternity and sex hormones are thought to put women at greater risk, Estrogen enhances biliary cholesterol release, leading bile to become cholesterol hyper-saturated and lithogenic.[13]

The mean BMI was 25.25 ± 2.79 kg/m2.

In our study, 50% of the study population had BMI in the healthier range (<25) while 50 % had higher BMI i.e 44% in overweight category and 6% patients in obese category.

Kharga et al [14] conducted a case control study in patients with and without cholelithiasis in which they found that patients in the cholelithiasis group had a higher BMI i.e 24.93 than the patients in the Non-cholelithiasis group i.e 22.[15]

This was in accordance to the present study.

Bansal D et al found the gall stone group had a mean BMI of 27.06 ± 2.79 kg/m2.[16]

The mean Total cholesterol was 207.98±54.11mg/dl, TG was 156.02±40.09mg/dl, HDL was 35.70±9.96 mg/dl, LDL was 141.08±49.05mg/dl while VLDL was 31.20±8.0209mg/dl.

In present study, it was observed that in 22 (44%) patients total cholesterol was above normal. HDL was below normal in 19(39%) while LDL was above normal in 14(28%), TG was above normal in 22(44%) and VLDL was above normal in 18(36%) patients.

Denbesten L[17] found that an increase in dietary cholesterol causes bile to become more saturated hence causing precipitation as cholesterol stones. Thornton et. Al[18] in a study showed that the bile cholesterol saturation index is negatively correlated with plasma HDL and positively correlated with both plasma triglycerides and LDL cholesterol. Indian researchers like Aulakh R et al, Mohan H et al[19] clearly ruled out any relationship between the lipid profile and gall stone disease while others like Saraya A, IrshadM et al[20] had established a positive relationship between the two. The results of the present study were in accordance with study conducted by Volzkeet al[21]where also the total cholesterol, HDL LDL and lipoprotein were significantly more in patients with cholelithiasis than without cholelithiasis. Numerous other investigations have demonstrated that hypertriglyceridemia, hypercholesterolemia, and a low HDL levels are prevalent in cholelithiasis patients.[21,22]

In present study we also found Obesity to be a risk factor for deranged lipid profile.
It was observed that patients with raised TC, TG, LDL and VLDL levels the BMI was on the higher side(p<0.05) while in case of HDL patients with higher BMI the HDL was below normal.
Shamai et al in their study showed that Higher BMI was inversely associated with HDL and directly associated with TG. BMI showed no significant association with LDL. Although the association between BMI and both HDL and TG may be explained by insulin resistance, the lack of a significant association between BMI and LDL remains an unexpected finding that requires further investigation.[23]

Conclusion

Present study showed that Mean Age is 49.48 ± 12.78 years.
Females are more affected with Gall Stones thanMales. Maternity and sex hormones put women at greater risk. Estrogen enhances biliary cholesterol release, leading bile to become cholesterol hyper-saturated and lithogenic.
HigherBMI was associated with deranged Lipid profile.
Patients with raised Total Cholesterol, Triglycerides, LDL, VLDL had higher BMI(Overweight and Obese category), HDL was below normal with higher BMI.

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