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STUDY OF ASSOCIATION OF LIPID PROFILE WITH CHOLELITHIASIS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Gallstone disease (GSD) is the most common disorder affecting the biliary system and is also the most common gastro-intestinal disorder requiring hospitalisation. Gallstones in patients without biliary symptoms are commonly diagnosed incidentally on ultrasonography, CT scans, and abdominal radiography. But, 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 been elucidated.
Methods: A Cross sectional study amongst 78patients was conducted at Government medical college ,Rajnandgaon. All patients with GSD coming to the general surgery OPD above 18years were included in the study with few exclusion criteria. The diagnoses of gallstones were confirmed by ultrasound (USG) and venous blood sample was used to estimate lipid profile. All data were entered on a personal computer in Microsoft Excel and analysed using SPSS version 20 software. Descriptive data is given in frequency and percentage. Chi-square was used to find the association between different variables.
Results: In our study of 78 patients, mean difference of the lipid profile had a statistically significantly association with the weight of the stone. All biochemical parameters like T.Cholestrol, TGL, HDL, LDL and VLDL were compared and showed a p-value of less than 0.005. Serum SGOT, SGPT & TGL had a statistical significant association with average weight of stone. (p=0.050).
Conclusion: Biochemical parameters like SGOT, SGPT, and ALP influenced the type and weight of stone significantly. Similarly, while comparing the weight of the stone with lipid profile, a significant association was observed.

Keywords: Cholelithiasis, Gallstones, Lipid profile

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INTRODUCTION

Gallstone disease (GSD) is a big problem for healthcare systems around the world and is one of the most common issues people face when they go to the hospital in an emergency because of stomach pain(1). The number of people who get gallbladder diseases (GBD) depends on where they live and their race. Some factors that increase the risk of GSD are being overweight, having had many pregnancies, and having long-term infections. It has been said that GSD can lead to gallbladder cancer (2). Gallstones, also called cholelithiasis, are solid things formed from parts of bile. These stones can be found in the gallbladder or in the bile ducts. There are two main types of gallstones: cholesterol stones and pigment stones. Each type has its own way of appearing and different risks. Pigment stones can be black or brown. Black pigment stones tend to stay in the gallbladder, while brown ones are

made up of calcium from a type of bile pigment, along with small amounts of cholesterol and proteins. Brown pigment stones are usually found in the bile ducts, which can block the flow and are often linked to infection. These types of stones are more common in Asian countries(3). Most people with gallstones don't have any symptoms, but those who do might face serious problems. These problems can be due to inflammation, infection, or blockage, leading to conditions like acute cholecystitis, choledocholithiasis, cholangitis, pancreatitis, emphysematous cholecystitis, cholecysto-enteric fistulae, Mirizzi's syndrome, and porcelain gallbladder. Biliary colic is the most common symptom, which is a repeated pain in the upper right part of the abdomen and sometimes in the middle of the stomach. The time between these pain attacks can vary from days to months or even years. The reason cholesterol gallstones form involves too much cholesterol in the bile, the formation of cholesterol crystals, difficulty in emptying the gallbladder, and slow movement in the intestines(4). There is not much information on how abnormal lipid levels are connected to gallstone disease in Western India, as previous studies were done in other regions(5). Because of this, this study was done to compare the levels of different lipids like total cholesterol (TC), triglycerides (TG), HDL-c, low-density lipoprotein cholesterol (LDL-c), and very low-density lipoproteins (VLDL) in people with GSD. About 1 to 2 percent of people who don't have symptoms may develop them and need surgery, making gallbladder removal one of the most common surgeries done by general surgeons. Gallstones in people who don't have symptoms are often found by accident during imaging tests like ultrasound, CT scans, abdominal X-rays, or during surgery. In this study the association of serum lipids to cholelithiasis has been tried to been elucidated

OBJECTIVES

1. To estimate the serum lipid profile in cholelithiasis patients attending Tertiary Care Hospital, Rajnandgaon , Chhattisgarh.
2. Determine the association between lipid profile with cholelithiasis and other risk factors.

MATERIALS AND METHODS

Study design: Cross sectional study

Study subjects: Patients with cholelithiasis attending OPD in General Surgery Department, Government Medical College Chhattisgarh.

Sample size: Total of 78 patients diagnosed with cholelithiasis will be included in this study

Inclusion criteria:

1. All patients newly diagnosed with cholelithiasis
2. Patients willing to participate in the study

Exclusion criteria:

1. Patients with cholelithiasis unfit for surgery.
2. Patients on steroid therapy and using any lipid lowering drug.
3. patients with cholelithiasis along with other co-morbidities like hypertension, DM, Cardiac abnormalities.
4. Mentally ill Patients or those subjects who is unable to comprehend the questionnaire.
5. Tobacco user, alcohol, vitamin supplement
6. Pregnant and <18 years age patient without any Systemic disease and recent infectious disease.

Data collection:

The data will be collected from all the male patients visiting surgical OPD and ward for gall stones with proper consent. Analysis of Lipid profile including total cholesterol, HDL, triglycerides, LDL and VLDL(calculated) will be done in fasting state.

The samples will be analysed in fully automated AU-680 in Clinical Biochemistry Laboratory by enzymatic method.

Variable data:
Age, address, food habits (veg or non-veg), educational qualification, BMI, past medical/surgical history, family history and drug history. Data will be collected with Proper consent will be taken from the study participants. Serum lipid sample will be taken for the analysis. A performa and patient information sheet will be given to each study subject.

Statistical analysis:
Statistical analysis will be done using Microsoft excel and data will be summarised in terms of mean and standard deviation. Association of lipid profile and other risk factors will be done by regresioand p value (<0.05) will be considered significant.

RESULTS

The common surgical procedure they encountered was LSCS which was seen in 36.22% of the study participants. Abdominal pain was the commonest presentation in about 39% of the cases followed by dyspepsia in about 28% cases. None of the patients reported features of cholangitis. 14% of the cases had incidence of thickened gall bladder wall however majority of the participants had normal thickness of gall bladder. Presence of multiple stones happened in 73% of the cases whereas 27% had single gall stones. Pure cholesterol stone was the commonest type of stone in both male and female than other types of stone and the association of type of stones seen among gender distribution was statistically significant.56.8% of the patients with gall stone disease had pure cholesterol stone, 24.9% had mixed stone, Dolomite and Calcium bilirubinate were 8.1% and 10.2% respectively.
There was a statistical significant mean difference between the biochemical parameters like SGOT, SGPT, ALP, T.Protein and Serum albumin among the study population with cholelithiasis. (P-value 0.050). Mean difference of the lipid profile had a statistically significantly association with the weight of the stone All biochemical parameters such as T.Cholesterol, TGL, HDL, LDL and VLDL were compared and showed a p-value of less than 0.005. Serum SGOT, SGPT & TGL had a statistical significant association with average weight of stone.(p=0.050) The most frequent post-operative complication observed was upper abdominal pain (68.26%) followed Nausea and Vomiting (25.64%). Maximum number of days stayed post operatively was 4 days. Majority of the cases had a maximum stay of 2 days after surgery (74%). The most common histopathological finding was chronic cholecystitis (66.1%) and the least common finding was acute cholecystitis (2.3%) Mean difference of the lipid profile was statistically significant based on the weight of the stone. All parameters such as T.Cholestrol, TGL, HDL, LDL, VLDL were compared and showed a p-value of less than 0.005. [Table 1] Serum TGL had a statistical significant association with the type of the stone as shown above (p=0.009). There was a statistically significant mean difference between the biochemical parameters like SGOT, SGPT, ALP, Total protein and Serum albumin among the group .

DISCUSSION

Gallstones (GS) are formed due to impaired metabolic regulation in the human body. Abnormal lipid metabolism contributes to the pathogenesis of gallstones, which are mainly composed of cholesterol. A literature review of previous Indian studies indicated that the incidence of gallstones is higher in northern India compared to southern India. This study describes the pattern of serum lipid concentrations in patients with gallstones from Northeast India. The prevalence of gallstones may vary according to gender, with females showing a higher incidence compared to males, as observed in this study and also in studies conducted by Shaffer et al. [7,8] Multiple factors have been evaluated to understand the gender difference as a cause for gallstone disease. The role of estrogens in the formation of gallstones has been experimentally proven. Progesterone also appears to promote the production of saturated bile by causing smooth muscle relaxation and impaired gallbladder emptying. Singletary et al. have demonstrated the presence of estrogen and progesterone receptors in the human gallbladder. [9] Studies by Pradhan et al., Jindal et al., and Gaharwar et al. also echo similar results as in our study with respect to sex distribution. [10-12] However, a possible effect of serum lipids causing a higher incidence of gallstones among females was identified in this study. Many studies

support these findings. [13] This is in line with the study by Ahi et al. in April 2017, who found the maximum prevalence of this disease between the ages of 31-40. [14] The mean height of the participants was 58 cm, and the BMI was 24. However, BMI does not play any role in this study. Only a few participants had hypertension, hypothyroidism, diabetes, and tuberculosis, but none of these conditions were significantly associated with gallstones. We found that the proportion of gallstone disease (GSD) increases with age, a finding corroborated by several other authors. [15,16] Spontaneous changes in BMI over a decade were not associated with the incidence of gallstone disease in this study. We also analyzed the association of various biochemical parameters with the development of GSD. We found that levels of plasma triglycerides, total cholesterol, and LDL cholesterol were not significantly associated with the development of GSD.

Low levels of plasma HDL cholesterol were identified as a potential risk factor for gallstone disease (GSD), although the association was not statistically significant(17,18,19). Similar results were observed in other studies, where hyperlipidaemia and plasma triglycerides were not significantly linked to GSD(16). Liver enzymes (AST and ALT) and total bilirubin were also not significantly associated with gallstone formation, consistent with findings from many studies. However, in this study, liver enzymes were found to have a significant association with the weight of the gallstones. Notably, female patients in the study group had higher serum HDL-C levels compared to male patients. The beneficial effects of female reproductive hormones on lipid profiles may explain this observation. Gallbladder wall thickness was found to be increased in some studies, but most participants in this study had normal gallbladder wall thickness. In this study, 73% of the study population had multiple stones. Various types of stones were identified, with pure cholesterol stones being the most common. Other types of stones were also prevalent among female patients. The mean serum cholesterol levels in the study group were 178.85 mg, with mean triglycerides at 119 mg/dl, mean HDL at 46 mg/dl, mean LDL at 109 mg/dl, and mean VLDL at 26 mg/dl. These findings suggest that lipid profile does not play a significant role in the development of cholelithiasis. Although cholesterol levels are typically expected to be elevated in individuals with gallstones, our study did not show a highly significant increase, indicating that other pathways may be involved in gallstone formation, necessitating further research. Roda E et al. reported that lowering cholesterol levels after cholecystectomy may improve bile solubility due to a more rapid circulation of the bile acid pool in fasting cholecystectomized patients.(20) The idea that gallstones and blood fats are connected is something people have thought about for a long time. This is because most gallstones have cholesterol in them. In this study, none of the people had very high levels of total blood fats, specifically not above 900 mg%. So, having high levels of fat in the blood isn't very common in people with gallstones. The color of some stones, called pigment stones, comes from bilirubin, which mixes with calcium to form a compound called calcium bilirubinate.

Brown pigment stones form in the bile ducts and are thought to be caused by problems like slow bile flow or infections in the bile ducts, which can be caused by bacteria, parasites, or worms.(21-25) These kinds of stones contain more cholesterol and fatty acids than black pigment stones.(22,23)The study looked at blood tests such as SGOT, SGPT, Total Protein, and ALP, and compared them with the size of the stones.It found that there was a strong link between these blood test results and the size of the stones, with a p-value less than 0.01, which means the connection is likely real. When the gallbladder is removed, the body changes how it handles bile acids.This causes more cycling of bile acids, which in turn reduces the amount of bile acid the body makes. This process also lowers levels of total cholesterol and LDL cholesterol in the blood. However, even though this happens, previous studies have not clearly shown that high cholesterol levels lead to gallstones.

CONCLUSION

One impotant finding from this study is that most of the stones were pure cholesterol stones.Most of the people in the study had a normal weight. Many had multiple stones, regardless of how thick their gallbladder walls were. More people had pure cholesterol stones than other types. Blood test results like SGOT, SGPT, and ALP had a strong influence on the type and size of the stones. Also, there was a clear link between the size of the stones and blood fat levels. This is probably because many people

had risk factors like high blood fat levels. However, more research, especially randomized studies, is needed to confirm these findings.Cholesterol stones were the most common type in this group, and cholesterol seems to be a major part of all kinds of stones.So, controlling cholesterol might be an important way to help prevent gallstones.The existence of relationship between gall stones and serum lipids is an old assumption based on fact that the majority of the gallstones contain cholesterol as one of the constituents. None of the patients in the study group had serum total lipid above the upper limit of 900 mg%. Therefore, biochemical hyperlipidaemia is an uncommon finding in the patients of cholelithiasis. The colour of the pigment stones could be attributed to colour of bilirubin which forms salt with calcium to form calcium bilirubinate. Brown pigment stones are found in the bile ducts and believed to be caused by biliary stasis and cholangitis due to anaerobic and aerobic bacterial infection, parasitic infestations, or bile seeking worms.[21-25] They contain more cholesterol and fatty acids than black pigment stones.[22,23] Biochemical parameters such as SGOT, SGPT, Total Protein and ALP were compared with stone size. It was observed that there was a statistically significant association as p-value less than 0.01. Cholecystectomy causes redistribution of bile acid pool in the entero-hepatic circulation and increases the frequency of cycling. This exert negative feedback on bile acid synthesis and cause reduction in pool size and hence exerts effect on lipid profile decreasing total cholesterol and LDL cholesterol levels. But, in previous researches also there is no conclusive evidence linking serum cholesterol, elevated serum cholesterol and gall stones.

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