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Original Research Paper

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EFFECT OF CHOLECYSTECTOMY ON SERUM LIPID PROFILE

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ABSTRACT

Introduction: Gallstones have become a major health problem because of their silent manifestation and unclear pathogenesis. Cholelithiasis (gallstone disease) is one of the most common gastrointestinal disorders being prevalent in about 10-15% of adults in the developing countries . In a review of worldwide incidence, the female-to-male ratio was reported between 2 and 3. Although the association between the disturbed lipid metabolism and formation of gallstones has been elucidated in many studies, the effect of cholecystectomy on lipid profile has not been studied in detail. Based on evidence more than 50% of patients with gallstones have some sort of lipid disorder[1]. It is now widely accepted that the primary event in the pathogenesis of cholesterol gallstones is an altered lipid metabolism, because of which there is a relative increase in the cholesterol levels compared to other lipids secreted by the liver into the bile . Cholecystectomy causes redistribution of bile acid pool in the entero-hepatic circulation and increases the frequency of cycling cause reduction in pool size thus exerting effect on lipid profile decreasing total cholesterol and LDL cholesterol levels[2]. Women are twice as likely as men to form gallstones. Most common gallstone type found is mixed type and least is cholesterol type. Age group most commonly affected is between 31-50 years. There is a statistically significant association between high BMI and occurrence of gallstone. There is a statistically significant association between diabetes and occurrence of gallstone. No association has been found with parity, use of OCP, occupation, smoking, alcoholism in patients with cholelithiasis[3].

Aim: Evaluating lipid profile of patients with gall stone pre- and post operatively on 7th day and 12 month and to establish the effect of cholecystectomy on lipid profile.

Objective : To determine the changes in lipid profile parameters after cholecystectomy

Materials and Methods: This prospective observational study included 50 patients of gall stones admitted to Surgery Department of multispecialty govt Hospital at Meerut from for duration of 1 years from Jan 2017 to Dec 2017 and who underwent cholecystectomy. The lipid profile was evaluated pre-operatively on the day of operation and post operatively on 7th day and 12 mth month after.

Results: This is a quasi-experimental study, carried out on 50 patients who were admitted to our hospital for elective laparoscopic cholecystectomy surgery during a period of 12 months from Jan 2017 to Dec 2017. Blood samples were collected from all of the study subjects prior to surgery, and again six month after the procedure. Serum was separated by centrifugation and total cholesterol, triglycerides (TG), high-density lipoprotein (HDL), and low-density lipoprotein (LDL) were measured. The data were analyzed using ANOVA with repeated measures in SPSS (17) software. The total serum cholesterol and LDL levels were significantly decreased one year after the surgery ($P = 0.007$) expect HDL, were significant differences compared to the pre-surgery values after one year ($P = < 0.033$). However, a significant decrease in TG levels was observed during the study ($P \leq 0.001$).

Conclusion: Total serum lipids, serum cholesterol, serum LDL cholesterol and serum triglycerides levels decrease and serum HDL cholesterol increase after cholecystectomy.

KEYWORDS : Cholelithiasis; Cholecystectomy; Lipid profile; Triglyceride; Cholesterol; LDL-C; HDL-C

Introduction

Gallstones have become a major health problem because of their silent manifestation and unclear pathogenesis. Cholelithiasis (gallstone disease) is one of the most common gastrointestinal disorders being prevalent in about 10-15% of adults in the developing countries . In a review of worldwide incidence, the female-to-male ratio was reported between 2 and 3. Although the association between the disturbed lipid metabolism and formation of gallstones has been elucidated in many studies, the effect of cholecystectomy on lipid profile has not been studied in detail. Based on evidence more than 50% of patients with gallstones have some sort of lipid disorder. It is now widely accepted that the primary event in the pathogenesis of cholesterol gallstones is an altered lipid metabolism, because of which there is a relative increase in the cholesterol levels compared to other lipids secreted by the liver into the bile . Cholecystectomy causes redistribution of bile acid pool in the entero-hepatic circulation and increases the frequency of cycling cause reduction in pool size thus exerting effect on lipid profile decreasing total cholesterol and LDL cholesterol levels. Women are twice as likely as men to form gallstones. Most common gallstone type found is mixed type and least is cholesterol type. Age group most commonly affected is between 31-50 years. There is a statistically significant association between high BMI and occurrence of gallstone. There is a statistically significant association between diabetes and occurrence of gallstone. No association has been found with parity, use of OCP, occupation, smoking, alcoholism in patients with cholelithiasis..

Objectives

The objectives of the study was: to determine the changes in lipid profile parameters after cholecystectomy

Material & Methods

This is a quasi-experimental study, carried out on 50 patients who were admitted to our hospital for elective laparoscopic cholecystectomy surgery during a period of 12 months from Jan 2017 to Dec 2017. Blood samples were collected from all of the study subjects prior to surgery, and again six month after the procedure. A total of 50 adult patients (Gender: 8 males, 42 females; Age range: 25-65 years, Mean age+SD: 45.5 ± 12.2 years) with cholelithiasis (gall stone disease) were included in this case-control prospective interventional phase-I study of our objectives. The patients with gallstone disease (cholelithiasis) were diagnosed as having

cholelithiasis according to standard clinical and laboratory criteria as practiced in hospital. Patients on lipid lowering drugs, morbid obesity, hypothyroidism, haemoglobinopathies, pregnancy and patients with choledocholilithiasis , patients with renal failure, nephritic syndrome, pancreatitis, cardiac failure,and obstructive jaundice in addition to cholelithiasis were excluded [4,5]. After obtaining consent, patient's details and clinical findings were recorded. The fasting blood samples were taken at diagnosis before cholecystectomy. After Cholecsystomy, treatments/medications were given as required for the patients. After 12 months at follow-up, fasting blood samples were taken again from the same patient. All quantitative estimations in serum were made by standard medical laboratory methods such as TC by enzymatic end point CHOD-PAP, TG by enzymatic colorimetric GPO-PAP and HDL-C by enzymatic colorimetric phosphotungstate/magnesium method using standard diagnostics kits from internationally reputed companies and LDL-C calculated by Friedwald formula[6]. The results in patients pre and post cholecystectomy and controls (NC) were compared statistically by ANOVA and Student's t-test with SPSS programme in computer[7,8].

Results:

The most interesting finding of this study was that the females were far more prone to gallstone disease than the males in a ratio of female: male as 3.47:1.0. The disease had the highest incidence in the age group of 41-50 years of age. The common complaint was flatulence (32 cases), dyspepsia (30 cases), epigastric pain in 22, and pain in the right hypochondrium in 30 patients. Murphy's sign was positive in 19 cases; 16 patients had a complaint of nausea (Fig 1) . Mixed stones were the most common, present in over 80% cases followed by cholesterol and pigment stones in the form of 12% and 8%, respectively (Fig 2).

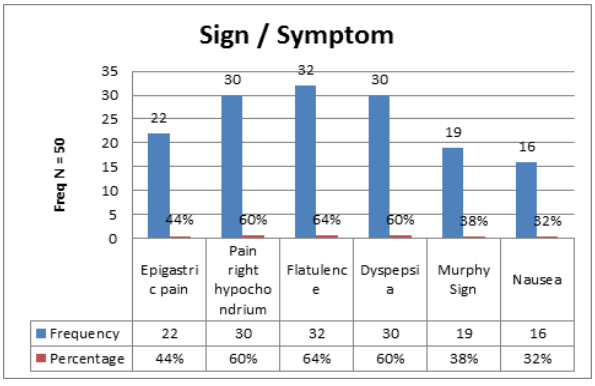
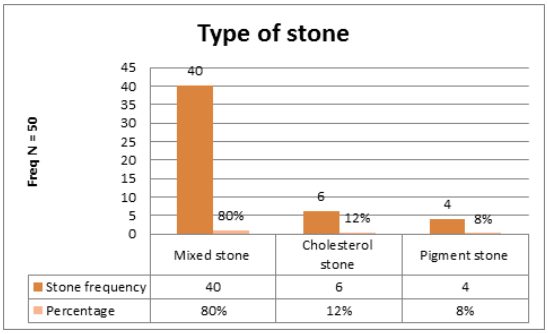


Fig 1: Sign & Symptoms shown by patients



The lab result are shown in table 1.

Table 1 : Serum levels of TG, TC, LDL-C, HDL-C and Lp(a) in controls and patients.

Controls & Patients	Lipid Profile*`			
	TG (mg/dl)	TC (mg/dl)	LDL-C (mg/dl)	HDL-C (mg/dl)
Patients (Pre cholecystectomy) N=50 (M:8, F:42)				
Mean±SD (SE)	188.18±48.92 (7.37)	140.35±33.83(5.11)	77.20±30.86 (4.65)	41.78±14.02 (2.11)
Observed Range	95.01-303.01	71.51-220.01	26.21-136.41	14.01-67.01
95% CIM	173.31-203.05	130.06-150.63	60.81-79.58	37.52-46.04
Patients (Post Cholecystectomy) N=50 (M:8, F:42)				
Mean±SD (SE)	139.61±46.01(7.89)	188.24±40.12(6.88)	56.12±29.97 (5.14)	49.15±8.10(1.39)
Observed Range	55.01-236.21	112.01-243.11	52.01-132.01	37.01-64.01
95% CIM	123.56-155.67	174.24-202.24	85.66-106.58	46.32-51.98

*TG (mg/dl): Triglyceride, TC (mg/dl): Total Cholesterol, HDL-C (mg/dl): High density lipoprotein-cholesterol, LDL-C: Low density lipoprotein-cholesterol; N: Number of subjects, M: Male, F: Female; SD: Standard deviation, SE: Standard error, 95% CIM: 95% Confidence Interval of mean.

Discussion

Cholecystitis is an inflammatory condition of the gall bladder characterized by the inflammation of the gallbladder wall, which may be due to retention of bile in gallbladder or secondary to infection by microorganisms, predominantly Escherichia coli, Klebsiella, Enterobacter, and Bacteroides species . Simultaneous bacteriologic assessment of bile from gallbladder and common bile duct in control subjects and patients with gallstones and common bile duct stones[9,10].

The present study showed that serum TG level was elevated in all gall stone patients and was much reduced in after **cholecystectomy** . It was evident from the results that changes in lipid profile in cholelithiasis were significant and interesting, but a very complex one and cholecystectomy did have significant impact on them.

The results of the present study indicated a higher incidence of cholesterol gallstones in this population with females comprising about 84.0% of the study population. The incidence of cholesterol gallstones, although less in the male population, was probably related to sedentary lifestyle and consumption of diet particularly rich in animal fats, refined sugars and poor in vegetable fats and fibers, all of which are significant risk factors for gallstone formation. The lab result indicate that removing the gallbladder does not increase the production of bile salts and so does not affect cholesterol levels.

Conclusion:

It was evident from our results that changes in lipid profile in cholelithiasis were significant and interesting, but a complex one and cholecystectomy did have significant impact on them. Total serum lipids, serum cholesterol, serum LDL cholesterol and serum triglycerides levels decrease and serum HDL cholesterol increase after cholecystectomy. The perturbation in the delicate balance among components of lipid profile is of crucial importance and the gallbladder may have a definitive role in it leading to development of gall stone disease i.e. cholelithiasis.

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