



A PROSPECTIVE OBSERVATIONAL STUDY OF PRE AND POST OPERATIVE LIPID PROFILE IN PATIENT UNDERGOING LAPAROSCOPIC CHOLECYSTECTOMY

General Surgery

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ABSTRACT

Introduction : Gall Stone disease is one of the most prevalent gastrointestinal disease world wide. Its evidence that gall stones are associated with lipid disorder. Cholecystectomy increases the frequency of enterohepatic circulation and lose of bile acid pool in it which decreases serum cholesterol, Tryglycerie level and increase in HDL level. **Aims & Objective :** Evaluate and Analysis of lipid profile of patient with gall stone and establish the effect of laparoscopic cholecystectomy pre and post operative 7th and 30th day. **Material and Methods :** A prospective observation study included 100 patient of Gall Stone diseases admitted in JLN Hospital, Ajmer. Who underwent laparoscopic cholecystectomy. Their lipid profile was evaluated pre and 7th & 30th post operative day. **Result:** Serum cholesterol level was decreased 7th & 30th post operative day significantly from 162.98 ± 32.92 to 123.64 ± 35.33 mg/dl. There was a significant decrease in tryglyceride level on 7th and 30th post operative day from 196.67 ± 92.83 to 179.73 ± 52.28 mg/dl. Serum HDL increased non significantly on 7th post operative day but increased significantly on 30th post operative day from 42.28 ± 8.86 to 48.25 ± 44.96 . Serum LDL decreased from pre operative level of 107.94 ± 20.44 mg/dl to 102.33 ± 8.89 mg/dl 7th day and further 105.72 ± 33.34 mg/dl on 30th post operative day but the change was not significant. Serum VLDL does not show any significant change post cholecystectomy. **Conclusion:** Serum cholesterol, serum triglyceride decreased and serum HDL level increase significantly while serum LDL & VLDL dose not show any significant change Post cholecystectomy.

KEYWORDS

lipid profile change, laparoscopic cholecystectomy

INTRODUCTION

The presence of stones in gall bladder is referred as cholelithiasis. Gall stones is a chronic hepatobiliary disease which occurs due to impaired metabolism of cholesterol, bilirubin, bile acid. Which eventually lead to stone formation in gall bladder, hepatic duct and common bile duct⁽¹⁾.

Gall Stone disease one of the most prevalent gastrointestinal diseases with worldwide distribution and with a substantial burden to health care system. Many studies have been shown an association between gall stone and abnormal lipid profile. Almost 50% of patients with cholelithiasis have some sort of lipid disorder. It is estimated that 20 million people are in USA have gall stone and approximately one million new cases of gall stone develop each year⁽²⁾. Now cholelithiasis becomes one of the most common disorders of gastro intestinal tract and affect 10 present population in western country and half of that in Asian population⁽³⁾.

Gall stones are classified into three main types⁽⁴⁾:

1. Cholesterol stone- Cholesterol stones contains 51% to 99% of cholesterol but pure cholesterol stones are very rare to occur (10%).
2. Pigment stone - contains less than 30% of cholesterol and classified as black or brown stones.
3. Mixed stones - mixed stones have cholesterol plus calcium salts, bile acids, phospholipids and bile pigments. About 70% to 80% gall stones are mixed stones.

Gallstones are major public health problem today as most of them are detected incidentally and only few patients present with acute complication of gallstones. The constitutional risk factors for cholesterol gallstones include, Increasing age, dietary habits, Interaction between genetic and environmental factors, Metabolic syndrome, obesity, female hormones, oral contraceptive pills, pregnancy also contribute in gall stone formation⁽⁵⁾. This may explain the higher incident of cholelithiasis in females⁽⁶⁾.

Cholesterol is insoluble in water. Usually, cholesterol combined with Lecithin (phospholipid) and form unilamellar vesicles. These vesicles are later combined with bile acids and form micelles. These micelles transport in bile and this bile excrete bilirubin and excess amount of cholesterol from the body. When cholesterol concentration increases

in bile above the maximum capacity of bile acids to accommodate the cholesterol or if there is decrease in total bile acid pool That is called super saturation of cholesterol. Super saturation along with nucleation and stasis results in formation of gall stones⁽⁷⁾.

The metabolic factors are related with solubility of cholesterol in bile acids. The bile acids are produced in liver from cholesterol itself. The normal ratio of bile acid to cholesterol is 25:1 and the critical level of precipitation is 13:1. The concentration of bile salts in bile is reduced by factors which interrupt their normal enterohepatic circulation e.g., ileal disease, resection or gastric bypass surgery or biliary fistulas. These diseases are associated with increased incidence of gall stones.

Aims

Aim of this study to evaluate the lipid profile of patients with gall stone pre and post-operatively and to establish the effect of cholecystectomy on lipid profile on 7th day and 1 month post cholecystectomy.

MATERIALS AND METHODS

This prospective study included 100 patients of cholelithiasis those who admitted to the Department of Surgery at J.L.N Medical College, Ajmer, Rajasthan, India from January 2023 to July 2024 undergoing Laparoscopic Cholecystectomy. Patients were evaluated and their complete biodata was recorded after taking detailed history. The diagnosis was based on the basis of clinical picture, supported by ultrasonography and confirmed pre-operatively.

Informed consent was taken prior to the study. The patients suffering from the condition which are known to disturb the lipid Levels itself were excluded from the study like. Diabetes Mellitus, Renal Failure, Hypothyroidism, Nephritic syndrome etc.

For lipid profile 10 ml blood fasting blood sample was obtained before surgical intervention and after surgery 1 week and 1 month in patients by venipuncture under all aseptic conditions. Samples were allowed to clot at room temperature. The separated serum samples were immediately processed for biochemical estimations and Complete lipid profile (which includes total serum lipids serum cholesterol, serum triglycerides, high density lipoprotein, low density lipoprotein) was evaluated pre-operatively on the day of operation and postoperatively on 7th day and after one month.

RESULT

Age and gender distribution-Age of the patients with cholelithiasis ranges from 18 to 70 years with majority of patients were of fourth decade (32%) followed by sixth (24%) and fifth decade (22%) and second and seventh decade had 11% each. One hundred patients belong to the study, undergo laparoscopic cholecystectomy. Among them, male participants were 22 and the rest 78 were female patients and male to female ratio was 1:3.5.

Sign and symptoms-72% of the patients presented with history of pain in the right hypochondrium. Next common symptom was nausea and vomiting which is present in 58% followed by dyspepsia in 24% patients, Murphy's sign was positive in 16 patients and absent in 84 patients.

Lipid profil - Complete biochemical analysis of serum lipid profile of 100 patients of cholelithiasis, Undergoing cholecystectomy had done pre-operatively, one week and 30 day post-operatively. There is decrease in the levels of serum cholesterol, serum triglyceride, serum LDL, serum VLDL, and increase in serum HDL pre and post-operatively

Parameters	Preoperative	1 week, postoperative	P	1 month, postoperative	P*
TC (mg%)	162.98±32.89	150.98±28.32	<0.01	123.64±35.33	<0.001
TGs (mg%)	196.67±92.83	213.82±69.99	<0.01	179.73±52.28	<0.001
HDLC(mg%)	43.28±8.86	40.88±23.63	0.063	48.25±44.94	<0.01
LDLC(mg%)	107.94±20.44	102.33±8.89	0.060	105.72±33.34	0.023
VLDL (mg%)	39.41±17.88	40.8±25.29	0.231	34.52±28.29	0.33

Serum cholesterol - Pre-operatively the serum cholesterol level ranges from 130.09 - 195.87 mg% with mean value of 162.98 ± 32.89 mg%. Post-operatively on the 7th day, the serum cholesterol level ranges from 122.60 to 179.30 mg% with mean value of 150.98 ± 28.32 mg%. One month after cholecystectomy, the serum cholesterol level was range from 88.31-158.97mg% with mean value of 123.64 ± 35.33 mg%. There was significant decrease in the levels of serum cholesterol levels post-operatively. This decrease is more after one month post-operatively as compared to the 7th post-operative day.

Serum triglyceride - Pre-operatively the total serum triglycerides level ranges from 103.84- 289.50mg% with mean value of 196.67±92.83 mg%. Post-operatively on the 7th day, the total serum triglycerides level ranges from 143.83-283.81mg% with mean value of 213.82±69.99 mg%. One month after cholecystectomy, the total serum triglycerides level ranges from 127.45-232.01mg% with mean value of 179.73±52.28 mg%. There was increase in the levels of serum TG on 7th post-operative day as compared with pre-operative level. But after one month there is significant decrease in serum TGs level was reported with p- value <0.001.

Serum HDL - Pre-operatively the serum HDL level ranges from 34.42-52.14mg% with mean value of 43.35±8.4 mg%. Post-operatively on the 7th day, the serum HDL level ranges from 17.25-64.51mg% with mean value of 40.27±23.3 mg%. One month after cholecystectomy, the serum HDL level ranges from 32.46-68.23 with mean value of 54.10±8.5 mg%. The p-value is 0.001 showing significant increase in level of HDL on 30th day after cholecystectomy.

Serum LDL - Pre-operatively the total serum LDL level was ranges from 87.50-128.38 mg% with mean value of 107.94±20.44 mg%. Post-operatively on the 7th day, the total serum LDL level ranges from 93.44 - 111.22 mg% with mean value of 102.33±08.89 mg%. One month after cholecystectomy, the total serum LDL level ranges from 72.38 - 139.06 mg% with mean value of 105.72 ± 33.34 mg%. There is decrease in the levels of LDL on the 7th post-operative day and one month post-operatively. This decrease is not significant post-operatively with the p- value <0.023.

Serum VLDL - Pre-operatively the total serum VLDL level was ranges from 22.23 to 56.59 mg% with mean value of 39.41±17.88 mg%. Post-operatively on the 7th day, the total serum VLDL level ranges from

12.51 to 69.09 mg% with mean value of 40.8±25.29 mg%. One month after cholecystectomy, the total serum VLDL level ranges 16.23 to 52.81 mg% with mean value of 34.52±28.29 mg%. There was increase in the levels of VLDL on the 7th post-operative day. One month post-operatively there was decrease in the level of VLDL but this decrease is not significant (p- value <0.33)

DISCUSSION

This study was done to observe the effect of cholecystectomy on the serum lipid Profile of cholelithiasis patients, pre and postoperatively. Around half of the patients of cholelithiasis have abnormal lipid profile. This increases the incidence of coronary artery disease (CAD) and stroke. Recent studies have shown that hyper triglyceridemia, hypercholesterolemia, and low level of HDL are commonly associated with cholelithiasis. It is a well known fact that this association can further lead to CAD and stroke.

In the present study age of the patients with cholelithiasis ranges from 18 to 70 year with majority of patients were of fourth decade (32%) followed by sixth (24%) and fifth (22%) decade. Kuldip Singh and Rajendra Pal Singh et al⁽⁶⁾ (2017) observe in their study that majorities of patients of gall stone disease were noted in 31-40 yr of age (35%), followed by 3rd and 5th decade 21% each and 18.3% in 6th decade.

Lipid profile-In the present study pre-operative level of serum cholesterol, serum TGs, and serum LDL was high in cholelithiasis patients. Similar study was done by Virupaksha HS et al⁽⁹⁾ found a significant increase in total cholesterol (p<0.01), LDL cholesterol (p<0.01) and an significant decrease in HDL cholesterol (p<0.01) in cholelithiasis patients.

Serum Cholesterol - Several studies have reported the impact of cholecystectomy on lipid levels. In the present study there was significant decrease in the levels of serum cholesterol levels, Pre and post-operatively. This decrease is more after one month post-operatively as compared to the 7th post-operative day.

Kuldip Singh Ahi, Rajinderpal Singh et al⁽⁶⁾ (2017), they did a study on Serum Lipid Profile in Pre and Post Cholecystectomy Patients show the Result that There was significant decrease in total serum cholesterol and total serum low density lipoprotein cholesterol 7th day post-operatively which decreased further after one month.

Serum triglyceride - In the present study there was significant decrease in the levels of serum triglyceride levels, Pre and post-operatively. This decrease is more after one month post-operatively as compared to the 7th post-operative day. Jindal N et al⁽¹⁰⁾ (2013) done a study to check the existence of relationships between Cholelithiasis and serum lipids and observe that there was a continuous decrease in the levels of serum triglyceride on the 7th Postoperative day and one month after surgery .

Serum HDL - There was also increase in level of serum HDL post cholecystectomy. This increase in serum HDL level was more significant after one month of cholecystectomy (p<0.01). Gurpreet Singh Gill, Kapil Gupta et al⁽¹¹⁾ (2017). They study on lipid profile after cholecystectomy which shows there was a significant increase in high-density lipoprotein levels after 1 month of surgery which is significant.

Serum LDL - There is decrease in the levels of LDL on the 7th post-operative day and one month post-operatively. This decrease is not significant post-operatively (p value <0.023). Van der Linden et al (12) demonstrated that decreased serum LDL and serum cholesterol levels may be associated with this higher flux of bile per unit time after cholecystectomy.

Serum VLDL - There was increase in the levels of VLDL on the 7th post-operative day but one month post-operatively there was decrease in the level of VLDL but this decrease is not significant (p- value <0.33). Post cholecystectomy significant decrease in levels of LDL has also been inferred in literature in the studies conducted by V.Francisco Menezes et al (13) (2019)

CONCLUSION

The Hospital based comparative observational study was carried at Department of General surgery, J L N Medical College and associated group of Hospital, Ajmer, Rajasthan. Present study included 100 patients of cholelithiasis to observe the effect of laparoscopic cholecystectomy on total serum lipid profile pre operatively and on 7th and 30th post operative day. Age of the patients ranging from 18-70

years and the male-female ratio was 1:3.5. Most of the patients had their lipid profile deranged preoperatively. Serum cholesterol level showed significant decrease on 7th and 30th post cholecystectomy day as compared to serum triglyceride level, which shows rise in level on 7th post cholecystectomy day but later on 30th post cholecystectomy day, the level of total triglyceride level significantly decrease less than pre operative level. Serum HDL level increase on 7th post operative day but the increase was not significant but HDL level further increase on 30th post operative day which was significant. Serum LDL and VLDL show no significant change after 7th and 30th day post cholecystectomy and almost remain the same.

From this study, it can be concluded, that serum total lipids, serum cholesterol and serum triglycerides levels decrease and serum HDL cholesterol increase after cholecystectomy. These results can be explained by the fact that when significant increase in bile acids and phospholipids secretion rate after cholecystectomy occurs, that can lead to a definitive improvement in bile composition and a significant reduction in bile acid pool after operation that may occur due to rapid cycling around the entero hepatic circulation, leading to a significant reduction in total serum cholesterol. This can be accounted to the fact that total cholesterol is the precursor to bile acids so this reduction in the bile acids pool leads to a significant reduction in total cholesterol after cholecystectomy. Cholecystectomy does not negatively affect normal health status or total metabolic regulation. This study also included a positive effect of cholecystectomy. It is a well known fact that association of cholelithiasis with deranged lipid profile can further lead to CAD and stroke. From the study, it can be concluded that cholecystectomy leads to normalization of lipid levels and thus can be helpful in blocking the subsequent development of CAD and stroke.

LIMITATIONS

1. The main limitation in the study was that the serum lipid profile obtained in the study may differ from other populations, which can be attributed to the local food habits. A larger multi-institutional study would surely be more conclusive. The present study widens our knowledge regarding serum lipid being a factor contributing to the formation of gall stone disease. Further research in the molecular level for the same can be done for the etiopathogenesis of the disease.
2. Short term of follow up, as CAD and stroke may take longer duration to develop

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