STUDY THE EFFECT OF LIPIDS PROFILE AFTER CHOLECYSTECTOMY OF PEOPLE IN AL_RAMADI CITY

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ABSTRACT:

Background: The gallbladder is removed during a cholecystectomy. The gallbladder is a tiny organ that sits under the liver. It's located on the upper right side of your abdomen. Bile, a digestive liquid produced by the liver, is stored in the gallbladder. There may be health problems for the persons after gallbladder removal (cholecystectomy), such as increase of fat, increase of weight, and other diseases because differences in the values concentrations of liver functions and lipid profile. This study has been conducted at AL-Ramadi Teaching Hospital in Anbar, Biochemistry Laboratory in College of Science, at the period between 2/11/2020 to 5/5/2021.

The purpose of this research is to examine and compare changes in patients’ age, sex, BMI, period before, after, and after cholecystectomy lipid profile (Total Cholesterol (TC), Triglyceride (TG), (HDL), (LDL) and (VLDL). All healthy blood samples were tested first, followed by tests on patients’ blood samples following cholecystectomy at various times.

Keywords: cholecystectomy, Gallbladder, lipid profile

I. INTRODUCTION:

Bile, sometimes known as gall, a dark-green to yellowish-brown fluid secreted by the gallbladder. Liver of most vertebrates aids in fat digestion in the small intestine, liver (liver bile) constantly produces bile and it is processed and collected Gallbladder disease is a condition that occurs when the gallbladder is blocked.

After eating, the bile that has built up in the stomach is released into the duodenum.

The composition of hepatic bile is made up of water (97-98%), bile salts (0.7%), bilirubin (0.2%), and fat (cholesterol, fatty acids, and lecithin). (Barrett, et al.2012).

Steatorrhea can cause a deficiency in essential fatty acids and fat-soluble vitamins. (Azer, et al.2019). Gallstones are formed when cholesterol in the bile accretes into lumps in the gallbladder, requiring surgical removal. Increase the concentration of naturally occurring bile acids like chenodeoxycholic acid and ursodeoxycholic acid to dissolve them. (Guarino, et al.2013). Vomit on an empty stomach might be green or dark yellow, It's possible that the bitter and greenish component is bile or normal digestive fluids that come from the stomach (Choices, et al.2016).

The gallbladder:

The gallbladder is a small, Thin-walled green bag (Marieb, 2018) situated in the main liver scissura on the underside of the liver at the junction of the liver's right and left lobes. The relationship between the gallbladder and the liver ranges from being lodged in a mesentery to being suspended inside the liver material. It is a 7.5-12 cm long, pear-shaped structure with a normal capacity of about 25-30ml (Conlon, et al.2018). After trans abdominal ultrasonography, gallbladder problems are discovered, and the diagnosis is further refined by computed tomography, magnetic resonance imaging, or endoscopic ultrasonography. Gallbladder polyposis was shown to be present in 4.3-6.9% of asymptomatic people. While resection of polyploid lesions larger than 10 mm has been
suggested, size alone does not reliably predict histology. To prevent unnecessary surgery, accurate diagnosis is needed. And for the specific diagnosis of polyploid gallbladder lesions and gallbladder wall thickening, endoscopic ultrasonography is necessary. To distinguish polyploid lesions more precisely than ultrasonography, endoscopic ultrasonography has been published (Imazu, et al. 2014). Cholecystitis, usually caused by obstruction of the duct with gallstones, also appears as cholelithiasis as a consequence, bile gathers, allowing inflammatory substances such as phospholipase to be released. In the upper corner of the blood vessels, the function of an inflamed gallbladder normally leads to a Murphy sign (Britton, et al. 2010).

Lipid Profile

The lipid profile or lipid panel is a blood lipid pattern that is often a group of blood tests used to determine the risk of developing or monitoring the therapeutic impact of cardiovascular disease (Zhao, et al. 2010).

Aim of this study:

1. Efficiency Assessment of liver efficiency and lipid levels after cholecystectomy
2. Identify the changes in these variables in relation to age, gender and BMI
3. Calculate the correlation coefficient between lipid profiles and liver function.

II. MATERIALS AND METHODS:

This study has been conducted at AL-Ramadi Teaching Hospital in Anbar, Biochemistry Laboratory in College of Science, at the period between 2/11/2020 to 5/5/2021. The study included (105) subjects, (50) controls and (55) patients. Their ages were between 20-60 years who were divided as the two groups. Those patients, who had uncomplicated, symptomatic gallstones (cholelithiasis), had a laparoscopic cholecystectomy as an elective procedure, were diagnosed by specialists as having uncomplicated, symptomatic gallstones (cholelithiasis). Patients with respiratory, hepatic, cardiovascular (ischemic heart disease and hypertension), diabetes were excluded from this study. The patient’s information was collected using a questionnaire designed specifically for this purpose.

This study was confirmed by the ethics council of Anbar University and our inquiry was directed consistent to the standards of the statement of Helsinki (1964). Samples of blood were taken after fasting for 8-12 hours.

Anthropometric measurements (AMs) were taken for all study participants, which comprised weight and height measurements. BMI was computed by dividing weight (kg) by height squared (m²).

Statistical Analysis:

To detect effect of different components in research parameters, Statistical Analysis System- SAS (2012) application was utilized. To make a significant comparison between means, the T-test and the Least Significant Difference –LSD test (ANOVA) were utilized. To make a significant comparison between percentages, the Chi-square test was performed (0.01 probability). In this study, the correlation coefficient between variables was estimated. (SAS. 2012).

III. RESULTS:

The study included (105) subjects, (50) controls and (55) patients. Their ages were between 20-60 years who were divided as the two groups. Symptomatic gallstones (choledocholithiasis) were diagnosed by specialists, and they underwent elective laparoscopic cholecystectomy. Patients with respiratory, hepatic, cardiovascular (ischemic heart disease and hypertension), diabetes were excluded from this study. The patient’s information was collected using a questionnaire designed specifically for this purpose.

The results of our research have been cleared that there, were some health problems for the persons after gallbladder removal (cholecystectomy), such as increase of fat, increase of weight, and other diseases because of the differences in the values concentrations of liver functions and lipid profile. This study has been conducted at AL-Ramadi Teaching Hospital in Anbar, Biochemistry Laboratory in College of Science, at the period between 02/11/2020 to 05/05/2021. The purpose of this study was to assess and compare changes in lipid profiles in patients before and after cholecystectomy based on age, gender, BMI, and time. Cholesterol (TC), Triglyceride (TG), High Density
Lipoprotein (HDL), Low Density Lipoprotein (LDL), and Very Low Density Lipoprotein (VLDL) are all components of total cholesterol (VLDL).

<table>
<thead>
<tr>
<th>Factors</th>
<th>Control (No=50)</th>
<th>Patients (No=55)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>35 (70.00%)</td>
<td>27 (49.09%)</td>
</tr>
<tr>
<td>No (%)</td>
<td>Female</td>
<td>15 (30.00%)</td>
<td>28 (50.91%)</td>
</tr>
<tr>
<td>Age</td>
<td>Mean ± SE (year)</td>
<td>36.74 ±1.07</td>
<td>42.14 ±1.33</td>
</tr>
<tr>
<td>BMI</td>
<td>Mean ± SE (kg/m²)</td>
<td>22.08 ±0.31</td>
<td>25.87 ±0.34</td>
</tr>
<tr>
<td>Period</td>
<td>Mean ± SE</td>
<td>21.19 ±2.46</td>
<td>---</td>
</tr>
</tbody>
</table>

** (P<0.01).

Table1: Distribution result of difference in Sex, Age and BMI for patients and control group

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean ± SE</th>
<th>Triglyceride</th>
<th>HDL</th>
<th>LDL</th>
<th>VLDL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cholesterol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>141.80 ±3.22</td>
<td>115.04 ±3.44</td>
<td>36.26 ±0.53</td>
<td>82.41 ±2.63</td>
<td>23.01 ±0.68</td>
</tr>
<tr>
<td>Patients</td>
<td>207.31 ±5.49</td>
<td>221.73 ±8.42</td>
<td>39.95 ±0.63</td>
<td>123.07 ±4.06</td>
<td>44.45 ±1.68</td>
</tr>
<tr>
<td>T-test value</td>
<td>12.967 **</td>
<td>18.706 **</td>
<td>1.651 **</td>
<td>9.816 **</td>
<td>3.749 **</td>
</tr>
<tr>
<td>P-value</td>
<td>0.0001</td>
<td>0.0001</td>
<td>0.0001</td>
<td>0.0001</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

** (P<0.01).

Table2: Mean and S.D of Lipid Profile in patients and healthy group

IV. DISCUSSION:

The gallbladder, a pear-shaped organ located on the upper right side of belly immediately behind the liver, is removed during a cholecystectomy. The gallbladder stores bile, a digestive fluid produced by the liver. A cholecystectomy is a frequent procedure that has a low risk of side effects. The patient is usually able to return home the same day as the cholecystectomy. A cholecystectomy is most commonly performed by inserting a small video camera and specialized surgical instruments into the belly through four small incisions to see inside and remove the gallbladder. This is considered laparoscopic cholecystectomy by physicians. To extract the gallbladder, one broad incision can be used in some cases. An open cholecystectomy is called this (Kim SS, et al 2018).

To ensure proper resection and to remove the risk of seeding tumor cells at the port site, gallbladder carcinoma should be treated with open cholecystectomy. Liver cirrhosis, breastfeeding, morbid obesity and laparoscopic cholecystectomy are not contraindicated (Ponsky, et al 2018).

Post Cholecystectomy Symptoms:

1. Diarrhea: There is controversy over this topic. There is a prevalent community perception that diarrhea is prevalent after cholecystectomy, particularly after fatty foods.
2. Heartburn and reflux symptoms: A survey conducted over 20 years ago found that patients were more prone than the general population to experience heartburn and dysphagia. (Rourke N. A. 2018).
4. Gallbladder perforation and gallstone leakage after laparoscopic cholecystectomy are relatively common complications (Memon, et al 1999). Small intestinal blockage and jaundice as a result of spilling stones have also been discovered as unusual consequences. (Rourke, et al 2018).
Impact of Cholecystectomy:

Where the gallbladder is a controller functioning in accordance with main metabolic homeostasis pathways (Garruti1G. 2018). As a result of the loss of the gallbladder's reservoir-concentrating function after cholecystectomy, various pathophysiological and clinical alterations are expected. (Portincasa and Calamita G.2012). The intestine will be the primary source of bile acid, with a twofold increase in bile acid synthesis (Barrera, et al. 2015). Cholecystectomy has been proven to enhance bile acid entry hepatic recirculation rates in mice and humans in a variety of investigations, particularly during fasting. Rapid intestine recycling after cholecystectomy is linked to higher bile acid and bile cholesterol production rates. As a result, even though the bile acid pool is not increased, fat is frequently processed and eaten in cholecystectomy patients. (Housset, et al. 2016).

Despite contradictory findings, consensus is reached on the increased occurrence of colon cancer following cholecystectomy Secondary bile acids, known to play a role in the promotion of colon cancer, have been deemed responsible because cholecystectomized patients have large proportions of secondary bile acids in their pool of bile acids(Zuccato,1993). The lipid profile or lipid panel is a blood lipid pattern that is often a group of blood tests used to determine the risk of developing or monitoring the therapeutic impact of cardiovascular disease (Zhao J. 2016). For several years, a standard lipid profile (total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides) has been determined in the clinical laboratory using fasting blood test. The rationale for such a requirement stems from the fact that postprandial changes in lipoprotein composition are known to occur, particularly increases in triglycerides (TG) concentration, which are directly related to the meal fat and carbohydrate content, as well as the fact that postprandial changes in lipoprotein composition are known to occur. The Friedewald equation was used to estimate the clinically relevant effects of elevated(TG) (>400 mg/dL; 4.5 mmol/L) on LDL cholesterol (LDL-C), as well as the use of fasting lipid assessment samples in a variety of clinical trials and epidemiological research with treatment goals. However, because most of a person's life is spent in the postprandial state, the use of taking a fasting sample to predict future cardiovascular disease risk has been questioned.(Nader, et al. 2016). Gallbladder disease is one of the most frequent gastrointestinal illnesses. Gallstones have been related to lipid changes in the blood, according to several reports(Shanmugam, et al. 2020). Gallstone serum cholesterol has an inverse association with HDL serum, and serum triglyceride has a positive relationship with cholelithiasis serum LDL. (Singh, et al. 2018).

Table (2) show a significant increase in the concentrations of serum Total Cholesterol (TC), in the patient group in comparison with control (healthy) group (p≤0.01).These results agree with previous studies(Fathi, et al. 2019 ), (Dock,2021).The result showed agreement with the research referred to, where increased of (TC) was clear in the two studies, While These results are disagree with previous studies(Osman, et al. 2020). because there is a difference between the study and the mentioned source.

This table show significant differences in the concentrations of serum Triglycerides (TG), between two groups (p<0.01). These results are agree with previous studies(Osman, et al. 2020).These results show agreement with the research referred to, where increased of (TG) was clear in the two studies, These results disagree with previous studies(Sergeev, et al. 2020) because there is a difference between the study of (TG) and the mentioned source. This table show group significant differences in the concentrations of serum (HDL) cholesterol, between two groups (p≤0.01).

These results agree with previous studies(Osman, et al. 2020),( Raj, , et al. 2020).which was significant elevation in (HDL) cholesterol after post-cholecystectomy as compared to pre-operative values In the study, such as the mentioned sources. These results disagree with previous studies (Saldanha, et al. 2020).Because there is a difference between the study of HDL and the mentioned source. This table show group significant differences in the concentrations of serum (LDL) low-density lipoprotein levels , between two groups (p<0.01).These results agree with previous studies (Cherkashchenko, 2020). Where there was a clear increased in patients after cholecystectomy, as in the case in the results of the mentioned source. These results disagree with previous studies(Osman, et al. 2020),( Ahi and Singh,2017). In which of these sources did the total serum (LDL) cholesterol level decrease significantly from the pre-operative mean value. This table show group significant differences in the concentrations of serum (VLDL) very low-density lipoprotein, between two groups (p≤0.01).These results agree with previous studies(Saldanha, et al. 2020).which was significant elevation in (VLDL) cholesterol after post-cholecystectomy as compared to pre-operative values In the study, such as the mentioned sources. These results disagree with previous studies(Mouzeni-Bistgani,2014). In which of these sources did the total serum (VLDL) cholesterol level drop considerably from the pre-operative mean value.
Figure 6: comparison between control and patient group in TC

Figure 7: comparison between control and patient group in TG

Figure 8: comparison between control and patient group in HDL
Figure 9: comparison between control and patient group in LDL

Figure 10: comparison between control and patient group in VLDL

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean ± SE</th>
<th>T-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>197.37 ±7.01</td>
<td>216.89 ±8.13</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>201.89 ±6.86</td>
<td>240.85 ±14.41</td>
</tr>
<tr>
<td>HDL</td>
<td>39.41 ±0.73</td>
<td>40.46 ±1.02</td>
</tr>
<tr>
<td>LDL</td>
<td>117.37 ±6.18</td>
<td>128.56 ±5.20</td>
</tr>
<tr>
<td>VLDL</td>
<td>40.60 ±1.41</td>
<td>48.17 ±2.88</td>
</tr>
</tbody>
</table>

* (P≤0.05). NS: Non-Significant.
Table 3: Effect of Sex in parameters study of patients group

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean ± SE</th>
<th>T-test</th>
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<tbody>
<tr>
<td></td>
<td>&lt;1 yr.</td>
<td>≥1 yr.</td>
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<tr>
<td>Cholesterol</td>
<td>214.64 ±5.98</td>
<td>197.83 ±9.76</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>226.09 ±6.63</td>
<td>216.08 ±17.47</td>
</tr>
<tr>
<td>HDL</td>
<td>40.16 ±0.69</td>
<td>39.67 ±1.14</td>
</tr>
<tr>
<td>LDL</td>
<td>129.55 ±5.07</td>
<td>114.70 ±6.33</td>
</tr>
<tr>
<td>VLDL</td>
<td>45.22 ±1.32</td>
<td>43.46 ±3.51</td>
</tr>
</tbody>
</table>

NS: Non-Significant.

Table 4: Effect of Period in parameters study of patients group

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean ± SE</th>
<th>T-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;1 yr.</td>
<td>≥1 yr.</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>207.20 ±7.39</td>
<td>203.60 ±11.29</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>216.36 ±6.84</td>
<td>225.06 ±18.09</td>
</tr>
<tr>
<td>HDL</td>
<td>39.76 ±0.76</td>
<td>39.64 ±1.62</td>
</tr>
<tr>
<td>LDL</td>
<td>124.13 ±6.42</td>
<td>118.94 ±7.63</td>
</tr>
<tr>
<td>VLDL</td>
<td>4E.27 ±1.36</td>
<td>45.01 ±3.62</td>
</tr>
</tbody>
</table>

NS: Non-Significant.

Table 5: Effect of Period in parameters study of patients group

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