Original research

Association of dyslipidaemia with choliolithiasis and effect of cholecystectomy on the same

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A B S T R A C T

Background: The association between gallstones and abnormal lipids and later increase in risk of coronary artery disease and stroke has been shown in many studies. The aim of study is to elucidate the association of dyslipidaemia with Choliolithiasis and effect of Cholecystectomy on the same.

Methods: 73 patients with symptomatic gallstones were studied prospectively. Plasma concentration of cholesterol, triglycerides, LDL, HDL was analysed preoperatively and postoperatively on day 3 and after 6 months of Cholecystectomy. None of the patients received any lipid lowering drug or dietary restriction. Results were analysed and compared.

Results: 36 (80%) of the female patients and 20 (71.42%) of male patients had one or other abnormality in their lipid profile preoperatively. Plasma concentration of total cholesterol, triglycerides, and LDL cholesterol were significantly reduced in patients on day 3 of surgery and 6 months thereafter. There was no significant increase/decrease in HDL cholesterol in 6 months after Cholecystectomy.

Conclusion: There was a significant decrease in plasma concentration of lipids in Cholecystectomy patients postoperatively. These changes in plasma lipids are likely to have significant effect in the development of coronary artery diseases in patients with Cholecystectomy.

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1. Introduction

Gallstones are the most common biliary pathology. In 1992, it was estimated that 10–15% of adult population in USA had gallstones (20 million people) and 600,000 underwent cholecystectomy annually. Patients of renal stones are most often evaluated for any underlying metabolic disorder but the same is not an established practice in gall stone patients. The movement of cholesterol from the liver into the bile must be accompanied by the simultaneous secretion of phospholipid and bile salts. If this dual process is disrupted and more cholesterol enters the bile than can be solubilised by bile salts and lecitin present, the cholesterol may precipitate in the gall bladder, initiating the occurrence of cholesterol gallstone disease. This disorder is typically caused by decrease of bile acids in the bile, which may result from:

- Gross malabsorption of bile acids from intestine.
- Obstruction of biliary tract.
- Severe hepatic dysfunction leading to decreased synthesis of bile salts
- Excessive feedback suppression of bile acid synthesis.

Evidence from 30 years ago show that about half of patients with gallstones will have an abnormal lipid profile. This would increase their risk of coronary artery disease and stroke.2 There is no Indian or UK data on which to base our current practice. This study prospectively investigates the frequency of lipid disorder in patients of choliolithiasis and effect of Cholecystectomy on the same.

2. Methods

73 patients of symptomatic choliolithiasis (Ultrasonography documented) were studied prospectively. These patients were evaluated in our outpatient department. All patients underwent detailed history and clinical examination. Base line investigations included haemogram, Kidney function, Liver function, Electrocardiography and X-ray chest. A detailed lipid profile (serum cholesterol, triglycerides, LDL cholesterol and HDL cholesterol) of all these patients was obtained preoperatively. All the patients underwent pre-anaesthetic check up by an anaesthetist. All these patients underwent Laparoscopic Cholecystectomy subsequently for symptomatic choliolithiasis. Another detailed lipid profile was obtained on day 3rd of surgery. Patients were followed for 6 months and a lipid profile at 6 months postoperatively was also obtained. None of the patients was put on any lipid lowering drug or any dietary restriction.

3. Results

Of the 73 Cholecystectomies performed 45 (61.64%) were females and 28(38.35%) were males. Median age of females was 38 years (range 18–67 years) and 42 years for males (20–72 years). All patients underwent lipid profile in the main laboratory of our
Hypercholesterolemia was the most common abnormality followed by hypertriglyceridemia.

Hospital (SKIMS). 36 (80%) of the female patients and 20 (71.42%) of male patients had one or other abnormality in their lipid profile preoperatively. Cholesterol was raised in 80% of the females and 70% of men in our study had abnormal lipid profile preoperatively. Hypercholesterolemia was the most common abnormality in both the sexes followed by hypertriglyceridemia. This incidence decreased on the day 3rd of surgery. Micheal J., Walmsley J., and Philip F Schofield had similar result in early postoperative period, similar results were also achieved by Juvenon et al. This observation was probably because of altered enterohepatic circulation. All our patients were followed for six months and there was a decrease in incidence of abnormal lipid profile at 6 months postoperatively again. This observation was in contrast to other series. Our series is the first series to observe such result.

Ethical approval

Ethical committee approved.

Sources of funding

None.

Conflict of interest

None.

References


Table 1

Preoperative lipid profile of patients.

<table>
<thead>
<tr>
<th>Lipids</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol &gt; 5 mmol/L</td>
<td>36(45%)</td>
<td>20(28%)</td>
</tr>
<tr>
<td>Triglycerides &gt; 1.92 mmol/L</td>
<td>20(44%)</td>
<td>11(28%)</td>
</tr>
<tr>
<td>HDL Cholesterol &lt; 1 mmol/L</td>
<td>5(11%)</td>
<td>5(10%)</td>
</tr>
<tr>
<td>LDL Cholesterol &gt; 3 mmol/L</td>
<td>10(22%)</td>
<td>3(8%)</td>
</tr>
</tbody>
</table>

Table 2

Lipid profile on day 3rd of surgery (Cholecystectomy).

<table>
<thead>
<tr>
<th>Lipids</th>
<th>Female</th>
<th>P-value</th>
<th>Male</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol &gt; 5 mmol/L</td>
<td>18(45%)</td>
<td>0.007</td>
<td>13(28%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Triglycerides &gt; 1.92 mmol/L</td>
<td>6(13%)</td>
<td>0.005</td>
<td>8(28%)</td>
<td>0.050</td>
</tr>
<tr>
<td>LDL HDL Cholesterol &lt; 1 mmol/L</td>
<td>5(11%)</td>
<td>0.000</td>
<td>5(10%)</td>
<td>0.000</td>
</tr>
<tr>
<td>LDL Cholesterol &gt; 3 mmol/L</td>
<td>8(17%)</td>
<td>0.000</td>
<td>2(8%)</td>
<td>0.008</td>
</tr>
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Table 3

Lipid profile at 6 months after surgery (Cholecystectomy).

<table>
<thead>
<tr>
<th>Lipids</th>
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<th>P-value</th>
<th>Male</th>
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<tr>
<td>Cholesterol &gt; 5 mmol/L</td>
<td>8(17%)</td>
<td>0.179</td>
<td>6(21%)</td>
<td>0.142</td>
</tr>
<tr>
<td>Triglycerides &gt; 1.92 mmol/L</td>
<td>3(6%)</td>
<td>1.000</td>
<td>2(7%)</td>
<td>0.146</td>
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<td>HDL Cholesterol &lt; 1 mmol/L</td>
<td>5(11%)</td>
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There was a significant decrease in lipid profile abnormalities on 3rd postoperative Day.

4. Discussion

Most of the patients with gallstones are not evaluated for any metabolic disorder. All most about half of patients with gallstones will have an abnormal lipid profile. In United Kingdom about 5.5 million people have gallstones and around 50,000 Cholecystectomy are performed each year. Bile is the only significant pathway for elimination of excess cholesterol from the body, either as free cholesterol or as bile salts. Cholesterol is water insoluble and is rendered water soluble by aggregation with bile salts and lecithin cosedected into bile. When cholesterol concentration exceeds the solubilising capacity of bile, cholesterol can no longer remain dispersed and nucleates into the solid cholesterol monohydrate crystals. Three conditions must therefore be met to permit the formation of cholesterol gallstones: (1) Bile must be supersaturated with cholesterol, (2) Nucleation must be kinetically favourable, (3) Cholesterol crystals must remain in the gall bladder long enough to aggregate into stones. Nucleation is promoted by micro precipitated of inorganic or organic calcium salts, serving as nucleation sites for cholesterol stones. Gall bladder stasis plays a key role in permitting stone formation and growth. As bile becomes more concentrated during storage in gall bladder, cholesterol saturation of bile also may further increase. Since around half of the patients of cholelithiasis have abnormal lipid profile this would increase the incidence of coronary artery disease and stroke. Recent European studies have shown that hypertriglyceridemia, hypercholesterolemia and low level of high density lipoprotein cholesterol(HDL) a common finding in patients with cholelithiasis. It is well known that this in turn will be a risk factor for coronary artery disease and stroke. Around 80% of women and 70% of men in our study had abnormal lipid profile preoperatively. Hypercholesterolemia was the most common abnormality in both the sexes followed by hypertriglyceridemia. This incidence decreased on the day 3rd of surgery. Micheal J., Walmsley J., and Philip F Schofield had similar result in early postoperative period, similar results were also achieved by Juvenon et al. This observation was probably because of altered enterohepatic circulation. All our patients were followed for six months and there was a decrease in incidence of abnormal lipid profile at 6 months postoperatively again. This observation was in contrast to other series. Our series is the first series to observe such result.

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