INTRODUCTION
Hyperlipidaemia is one of the major risk factors of CVD, which can be modified either by proper lifestyle changes, medical management or by the combination of both. It has emerged as the most important preventable and modifiable risk factors for Cardiovascular disease (CVD). Clinical signs of this condition are an increase in the fasting serum cholesterol level (hypercholesterolemia) or the fasting serum triglyceride level (hypertriglyceridemia) or both. This makes study of lipid profile in the general population very important. In many countries, there is a concomitant rise in the level of serum total cholesterol (TC), and with it a rise in cardiovascular diseases. Hyperlipidemia is called primary if it is inherited and secondary if it is caused by illness or other health problem. Observations have shown that hyperlipidemia, if not managed on time, results in cardiovascular diseases such as atherosclerosis, stroke, hypertension etc. Modification of the low density lipoproteins (LDL), mostly by oxidation, is believed to play an important role in health. Hyperlipidemia has been identified as one of the most important risk factor associated with cardiovascular disease. Some of risk factors like diabetes, smoking, sex, age, hypertension has been found to be associated. Despite the presence or no of these risk factor the possibility of cardiovascular diseases is not ruled out. It has been suggested that the combination of lipid profile parameters can be used to identify high risk individuals. Atherogenic indexes are ratios that can be studied in predicting the risk of CVD. Castelli’s risk indexes calculated as TC/HDL and LDL/HDL in predicting the risk for CVD. A case control study was conducted with 80 patients and 80 healthy volunteers. Lipid profile was measured on automated analyzer. LDL, HDL and Castelli’s risk indexes were calculated for both case and control group. These ratios were significantly different (p<0.05) between groups. These are the calculated fraction that can be used in the clinical setting for assessing the risk factors for CVD beyond the doing of lipid profile. The objective of the present study is to assess the significance of hyperlipidemia and the lipid ratios like Castelli’s Index in identification of at risk individuals for cardiovascular diseases beyond the routinely done lipid profile.

MATERIALS
The study was conducted by the department of Biochemistry laboratory and the department of Cardiology of the Elbasan hospital center. First we explained to everyone the aim of the study and took their confirmation. It is used a standard questionnaire to take information about the sample. We divided the study subject into two groups. Case groups was angiographically confirmed patients in the age range 35-65 years hospitalized in cardiology department of Elbasan hospital. Control group consisted of 80 individuals matched age and sex, healthy volunteers. All subjects were non smokers, there was no family history for coronary heart disease, non alcoholic. Body Mass Index was calculated for everyone, after anthropometric assessment which included height (m), weight (kg). BMI is kg (Wt/Ht) m². Obesity was defined as BMI > 25kg/m². Hypertension was defined as BP 140/90 mmHg. The patients were recommended at least 12 hours fasting before blood analyses. It was taken 3 ml blood at the cubital vein with disposable syringe under sterile conditions with alcohol. After centrifugation for 5 minutes with 4000 rpm serum was used to test the lipid profile parameters.

serum total cholesterol (TC)
serum triglycerides levels
serum HDL cholesterol levels
serum LDL cholesterol levels calculated using the Friedwald formula.

The test were carried out in automated apparatus Sat 400 using standard reagents. These tests were done by enzymatic endpoint methods. The HDL was done by centrifugation method with phosfotungistic acid. For measuring of LDL cholesterol we use the supernatant from centrifugation with the reagent of total cholesterol. LDL was calculated with Friedwald formula.
LDL ch= TC- (TG/5+ HDL ch). The atherogenic ratios\(^{19}\) were calculated:
- Castelli’s risk Index CRI-I were calculated: TC/HDL
- Castelli’s risk Index CRI-II were calculated: LDL/HDL

Statistically analyses were performed with SPSS 20. To see the association of the variables we used the Chi square test and \(p<0.05\) as the significance level.

**RESULTS**

The study was designed to assess the role of Castelli’s risk ratio and the lipid profile in the identification of risk for CAD and CVD. The sample characteristics are presented in Table 1. The study sample was divided in two groups case and control group. They were matched by age and sex. BMI was found to be significantly higher in cases compared with control group.

Hypertension and obesity were the most significant risk factors in coronary artery disease patients. The result of lipid profile and risk ratios are given in Table 2. Cardiovascular patients had statistically significant increase in triglycerides (\(p=0.001\)), and statistically significant decrease of HDL cholesterol (\(p=0.002\)). There was a significant increase even in total cholesterol (\(p=0.024\)) and in LDL cholesterol (\(p=0.03\)). The ratios calculated were found to be significantly elevated in cases compared with controls.

**Table 1. The characteristic of sample population.**

<table>
<thead>
<tr>
<th>Cases</th>
<th>Control</th>
<th>(p) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>49.2±1.46</td>
<td>0.39</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>64%</td>
</tr>
<tr>
<td>Female</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Risk factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hipertension</td>
<td>54%</td>
<td>61%</td>
</tr>
<tr>
<td>Diabetis Mellitus</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m(^2))</td>
<td>24.21±0.32</td>
<td>0.006(^b)</td>
</tr>
</tbody>
</table>

\(^a\)Values are expressed as Mean±St. Dev; \(^b\) \(p<0.05\) is statistically significant

Table 2. presents the information about profil lipid and atherogenic index accompanied with \(p\) value.

**Table 2. Lipid profile and ratios among study groups**

<table>
<thead>
<tr>
<th>Lipid profile (mg/dl)</th>
<th>Cases(^a)</th>
<th>(p) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol</td>
<td>224±91.3</td>
<td>0.024</td>
</tr>
<tr>
<td>178±64.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triglycerides</td>
<td>176±82.4</td>
<td>0.001</td>
</tr>
<tr>
<td>119±31.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DISCUSSION**

Lipid profile is used to evaluate the atherogenic status of coronary artery disease and cardiovascular diseases. It is a biochemical analyze and refers to analyzes like serum triglycerides\(^3\), total cholesterol\(^1\), HDL cholesterol and LDL cholesterol. It is emphasized the role of LDL cholesterol in assessment of coronary artery disease and the treatment of the disease\(^{14}\). Calculating these ratios using the lipid profile parameters may increase the identification of at risk individuals. In this study there 64% males and 36% females, and the mean age was 47 years old. We found that the mean levels of serum triglycerides was significantly higher in case group (176±82.4 mg/dl) compared with control group (119±31.2 mg/dl). The mean serum cholesterol level and LDL cholesterol were significantly higher in case group (224±91.3 mg/dl), (162±9.7 mg/dl) compared with control (178±64.5 mg/dl), (110±8.4 mg/dl). The mean serum HDL cholesterol were significantly lower (37±4.5 mg/dl) in case groups as compared to control group (44±3.8 mg/dl, \(p<0.05\)). In our study obesity\(^{15}\) was found to the dominant risk factor. Obesity is characterized by insulin resistance so enhanced fatty acid esterification is observed due to elevated insulin levels and serum triglycerides raises\(^8\). Cardiovascular disease has been associated with alteration in lipid profile levels as high levels of triglycerides\(^{14}\), cholesterol and low levels of HDL cholesterol\(^{15}\). The dislipidemia is concerning our society especially in my country because of lifestyle problem. In our study resulted that all lipid profile levels were higher in cases group compared with controls group, as TC over 200 mg/dl 70% of sample; TG over 150 mg/dl 78% , LDL over 160 mg/dl 63% and HDL. From different studies\(^{13,16}\) it has been observed that obesity leads to dislipidemia especially to raise of LDL cholesterol. It is recommended that when triglycerides level is more than 400 mg/dl LDL should be done by direct method not by formula of Friedwald\(^12\) that is used generally. In the current study we see that the evaluation of lipid values and Castelli’s index\(^{18}\), even though and the ratio of TG/HDL (\(p<0.001\)) was higher in cases group compared with control group. The control of these values is recommended as strong predictor for cardiovascular diseases and infarction. Castelli’s risk ratio is based on three important lipid profile parameters as: TC, HDL, LDL. Both of Castelli risk ratio: CRI-I calculated as (TC/HDL) and CRI-II calculated as (LDL/HDL) were found to be significantly elevated in cases compared to controls.
higher (p<0.01) in cases compared with controls. This significance we found and with other parameters. So the assessment of hyperlipidemia and the risk ratios is important to evaluate the cardiovascular events and diseases. Genest J,2003 has specified the TC/HDL ratio as an important goal of therapy considering it to be more specific in indexing cardiovascular risk that total cholesterol in patients with triglycerides level more than 300 mg/dl. In our study CRI was bigger than 4 in cases group that is in concordance with other studies. In our study CRI II in cases group resulted above 3 that is the limit for normal range as observed in other studies. This study suggest that in patients with dislipidemia CRI-I and CRI-II becomes the most predictor of the cardiovascular diseases contributing to identification of individuals at risk for these diseases.

From the results of this study it is recommended to evaluate always the Castelli’s risk index could be used for identifying the individuals in high risk for cardiovascular diseases in Albanian population. These indexes can be easily calculated besides lipid profile examinations. The use of these indexes should be encouraged, for identifying high risk individuals for CVD and for the drug management.

REFERENCES

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